
**University
of California,
Santa Cruz**

General Catalog
2008–10

About the Catalog

This catalog contains the basic information about UC Santa Cruz. A complete list of academic programs and concentrations, both graduate and undergraduate, appears on pages 8–9.

The next part of the catalog, pages 10–106, is divided into sections describing various aspects of the campus: undergraduate admission and financial information, the undergraduate academic program (including advising and support services), graduate education (including information on graduate student admission, expenses, and financial support), research programs and facilities, and the ten residential colleges and student life.

The academic programs and courses offered at UCSC are described in detail on pages 109–442. The listings are alphabetical, with appropriate cross-references.

The Santa Cruz teaching staff and their academic qualifications, the University of California administration, and the Santa Cruz campus administrative staff appear on pages 443–476.

The catalog constitutes the campus's document of record. While every effort is made to ensure the correctness and timeliness of information contained in this catalog, changes are likely to occur after publication. On an ongoing basis, the university is examining ways to bring the greatest possible efficiency to the delivery of its programs and curricula. This process may result in changes in services, teaching and administrative staff, and curricula and courses that could not be reflected

in this catalog, which was prepared well in advance of the 2008–10 academic years. Updates to catalog information are available in the quarterly *Schedule of Classes*, which is on the World Wide Web at reg.ucsc.edu/socl. (Additional web sites are referenced throughout this catalog. However, they are maintained by individual units and may not reflect approved general information, curricula, or course information.) In addition, several publications are available that include detailed information about specific subjects such as graduate programs, housing, and financial aid. Each college issues a handbook.

It is the responsibility of the individual student to become familiar with the announcements and regulations of the university that are printed in this catalog and other campus publications. The catalog is the document of record for undergraduate major requirements. It is updated annually on the web at reg.ucsc.edu/catalog.

More detailed information on particular subjects is available from appropriate campus units. (A list of key phone numbers appears on the inside back cover.) Most office hours are Monday through Friday, 8 A.M. to noon and 1 to 5 P.M. during the academic year; most offices close from noon to 1 P.M. and on weekends and holidays.

Campus information:

University of California, Santa Cruz
1156 High Street
Santa Cruz, CA 95064-1077
(831) 459-0111 (directory assistance)
Web: www.ucsc.edu

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Alternate formats of this document—such as large-print, audiotape, braille, or electronic—can be provided. Please call (831) 459-4446 for referral.

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Welcome

Welcome to UC Santa Cruz, a community of scholars dedicated to making a positive difference, both in their academic fields and in our society.

In just 43 years, our campus's distinguished faculty, staff, students, and alumni have earned for UCSC a national and international reputation for outstanding scholarship as well as an uncommon commitment to excellence in undergraduate and graduate education. As some of the most talented scholars in California and the United States, you will help advance this reputation as you prepare for leadership in the 21st century.

While at UCSC, you will encounter exceptional faculty. Many are leading innovators in their disciplines and members of prestigious professional organizations, such as the National Academy of Sciences, the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and many others.

These esteemed scholars and researchers are dedicated teachers who will guide you in your studies in classrooms, research laboratories, performance halls, and at field sites. Both our graduate and undergraduate students help discover new knowledge through close cooperation and collaboration with their professors.

At UC Santa Cruz, we are committed to increasing and celebrating diversity of every kind. You will study, work, and live with people who reflect a rich array of experiences and backgrounds, differing perspectives, exciting ideas, and new ways to solve problems. This engagement with such a diverse group of individuals will provide you with a competitive advantage in our multicultural society.

The quality of UC Santa Cruz's academic programs is underscored by the accomplishments of its graduates. Our alumni have achieved distinction in every field, profession, scholarly discipline, and artistic expression—and some day, I am confident that you and others among today's students will join that illustrious roster.

Again, congratulations on your choice of UC Santa Cruz as you continue your journey in learning. I have no doubt that through your studies and your other experiences at UCSC, your life, and the lives of all those you influence, will change for the better.

I look forward to congratulating you again on the occasion of your commencement.

With all best wishes,

George R. Blumenthal

George R. Blumenthal
Chancellor
August 2008

facing page: *McHenry Library, which houses the campus's collections in the humanities, arts, and social sciences. The photograph was taken in 1965—UCSC's first year—by the late Ansel Adams.*

Introducing UCSC

The University of California

The University of California was chartered as a land-grant college in 1868. From its rural beginning, the university has developed into one of the world's most distinguished universities, acclaimed for its research, scholarship, and dedication to undergraduate and graduate education. There are 10 University of California campuses located regionally throughout the state: Berkeley, Davis, Irvine, Los Angeles, Merced, Riverside, San Diego, San Francisco, Santa Barbara, and Santa Cruz. In addition, there are some 800 associated research institutes, laboratories, agricultural field stations, and extension centers serving California and the nation. The university is the primary state-funded academic agency for research. Its library collection, with 34 million volumes, is among the best in the country.

The University of California faculty, more than 8,500 in number, is distinctive in its 32 Nobel Laureates and 372 members of the National Academy of Sciences—more than any other college or university system. Faculty membership in the American Academy of Arts and Sciences totals 519.

There are more than 160,000 undergraduates culled from the top 12.5 percent of the state's high school graduates and approximately 50,000 graduate students. The 1.5 million living alumni enrich the nation with public service and leadership.

The Santa Cruz Campus

Since its inception in 1965, the University of California, Santa Cruz, has been dedicated to excellence in undergraduate education, graduate studies, and research. UCSC students can take advantage of innovative academic planning combined with the research resources and scholarship strengths of the University of California system. At UC Santa Cruz, a program of general education is enhanced with opportunities for academic specialization.

Among the faculty and emeriti drawn to UC Santa Cruz by the opportunity for innovative teaching and scholarship are 15 members of the National Academy of Sciences, 27 members of the American Academy of Arts and Sciences, and two members of the National Academy of Sciences' Institute of Medicine. Numerous faculty have been awarded Guggenheim Fellowships, and several have been awarded national awards for distinguished teaching. Furthermore, two faculty members, three bach-

elor's degree recipients, and two Ph.D. recipients have been named MacArthur Fellows, and since 1972, when UC Santa Cruz began participating in the program, about 115 Fulbright scholarships have been awarded to UC Santa Cruz students and alumni. Five UC Santa Cruz alumni have been awarded Pulitzer Prizes.

The planned enrollment of the campus for 2008–10 is approximately 15,000 students, of whom some 1,500 will be graduate students. UCSC seeks and welcomes students, faculty, and staff of diverse ethnic and cultural experiences. UCSC plans to increase both its enrollment and resources and to diversify its educational and research opportunities over the next few years. New facilities are being built to meet current and future needs. The Engineering 2 Building opened in 2004. The Physical Sciences Building on Science Hill opened in 2006. The Humanities and Social Sciences facility, a three-building complex adjacent to Cowell College, was completed in 2006.

The residential college is an important part of the Santa Cruz undergraduate experience. The ten colleges divide the university into smaller communities that serve as a social and intellectual gathering place for 1,200 to 1,600 students and 30 to 110 faculty fellows from a variety of academic disciplines. Every undergraduate student affiliates with a particular college while participating in a campuswide academic program. All academic majors are open to students from all colleges.

Each college has a distinctive quality derived from its core course and extracurricular programs, and its faculty and their academic disciplines. Detailed descriptions of the ten colleges begin on page 79.

Undergraduate education. The campus offers more than 60 major programs within the arts, engineering, humanities, physical and biological sciences, and social sciences—as well as interdisciplinary-major programs. A complete list of academic programs and concentrations appears on pages 8–9, and detailed descriptions begin on page 109.

The major programs are administered by departments. In most cases, departments are composed of faculty in the same field, but interdisciplinary programs draw on faculty from several fields. In addition to established major programs, individual majors are available.

At Santa Cruz, letter grades are assigned in all credit courses. In addition, academic performance in each course is recorded by a narrative performance evaluation. (See pages 34–36.)

Undergraduate education at Santa Cruz is focused on the individual student. UCSC's college core courses give first-year students

a small-seminar experience; intensive work in writing, discussion, and critical reasoning; as well as an orientation to academic life. To fulfill UCSC's rigorous comprehensive requirement, every senior must pass a comprehensive examination or complete an equivalent body of work.

Individual research is encouraged, and hundreds of research papers coauthored by Santa Cruz undergraduates and their professors have been published in journals.

Annually, about 500 Santa Cruz students broaden their academic careers through the UC Education Abroad Program (EAP), which allows students to incorporate full-time study abroad as UC credit toward their major. The EAP provides a vital international connection for academic preparation in an increasingly interdependent world (see page 40).

The UCSC campus strongly encourages undergraduate students to take advantage of the many opportunities for public service such as those provided through the campus's field programs, colleges, and Career Center. Individual studies, apprentice teaching, field studies, and internships can be important parts of the undergraduate experience. Over 1,400 students participate in the campus's field programs each year (see pages 40–43).

In a recent survey of graduating seniors, 73 percent indicated plans to continue their education in advanced-degree programs, and 40 percent planned to enroll in graduate or professional school soon after graduation. In a study of more than 60 elite Association of American Universities member schools, UCSC ranked 15th in the ratio of bachelor's degree recipients who went on to receive doctorates. UCSC alumni also display a strong commitment to providing service to others: UCSC ranks sixth nationwide among midsize universities in the number of students (more than 600) who have served in the U.S. Peace Corps. UCSC graduates excel both inside and outside the classroom.

Graduate education. The UCSC campus offers graduate programs in 33 fields, including recently established programs in statistics and applied mathematics, and film and digital media. Within the graduate programs, there are a range of options for concentrated study in a specialized field. Graduate study at Santa Cruz emphasizes close interaction between faculty and students, independent student research, supervised teaching experience, and interdisciplinary work. Further graduate information begins on page 47.

A number of major university research units are based or have a branch at the Santa Cruz campus: UC Observatories/Lick

Observatory, the Institute of Marine Sciences, the Santa Cruz Institute for Particle Physics, the Institute of Geophysics and Planetary Physics, the Institute for Quantitative Biomedical Research (QB3), and the Center for Information Technology Research in the Interest of Society (CITRIS). The campus supports other organized research endeavors ranging from Dickens studies to Chicano/Latino research to agroecology. Programs stem from existing academic strengths and the unique assets afforded the campus by its location in the Monterey Bay region (see page 55).

The central Santa Cruz campus occupies 2,000 acres on the west side of the city of Santa Cruz, on Monterey Bay, about 75 miles south of San Francisco and 35 miles southwest of San Jose. Expansive meadows at the campus entrance gradually slope up to a redwood forest that covers most of the site. Each residential college is within easy access of the campus's central core, which includes an extensive library, science laboratories, lecture halls, art studios, theater arts and music centers, a student union, and athletic facilities. Although the campus is spread out over many acres of hilly terrain, its

The UCSC campus (foreground) is located on 2,000 acres of forest and meadows overlooking the city of Santa Cruz and the Monterey Bay National Marine Sanctuary. Ten residential colleges surround a central core, which includes an extensive library, science laboratories, lecture halls, art studios, theater arts and music centers, a student union and bookstore, and athletic facilities featuring a fitness center, playing fields, and a 50-meter pool.



programs are accessible to people with mobility impairments (see page 39).

The city of Santa Cruz is a well-known recreational area and center for the arts. Mild weather, miles of beaches, and many cultural opportunities combine to make Santa Cruz an enjoyable place to study and live.

Accreditation. The University of California, Santa Cruz, is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), 985 Atlantic Avenue, Suite 100, Alameda, CA 95501, (510) 748-9001, an institutional accrediting body recognized by the Council for Higher Education and the U.S. Department of Education.

UC Santa Cruz is also accredited by the Accreditation Board for Engineering and Technology (Computer Engineering and Electrical Engineering), the American Chemical Society Committee on Professional Training (Chemistry), the California State Commission on Teacher Credentialing (Education), and the National Association for the Education of Young Children (Children's Center).

Persons interested in reviewing the accreditation documents should contact the Office of the Campus Provost and Executive Vice Chancellor, Kerr Hall, (831) 459-3885.

	Undergrad. Education				Graduate Education			
	B.A.	B.S.	Minor	Certificate	M.A.	M.S.	Ph.D.	Parenthetical
Italian studies (p. 313)	•		•					
Japanese language (p. 314)								
Jewish studies (pp. 314–315)			•					
Language studies (pp. 318–319)	•	•						
Chinese	c	c						
French	c	c						
German	c	c						
Italian	c	c						
Japanese	c	c						
Modern Hebrew	c	c						
Russian	c	c						
Spanish	c	c						
Latin American and Latino studies ⁷ (pp. 319–329)	•		•					
Latin language: <i>see</i> Latin (p. 319); Literature (p. 344)								
Latin literature: <i>see</i> Literature								
Legal studies (pp. 329–333)	•		•					
Linguistics (pp. 333–337) (<i>see also</i> Language studies)	•	•		•	•			
Applied linguistics	c							
Computational linguistics	c							
Psycholinguistics	c							
Theoretical linguistics	c			c	c			
Literature ⁵ (pp. 337–350)	•	•		•	•	•	•	
Creative writing	c							
English-language literatures	c			c	c			
French literature	c			c	c			
German literature	c							
Greek and Latin literatures	c							
Italian literature	c							
Modern literary studies	c			c	c			
Pre- and early modern studies	c			c	c			
Spanish/Latin American/Latino literatures	c			c	c			
World literature and cultural studies	c			c	c			
Marine biology (pp. 139–140)		•						
Marine sciences: <i>see</i> Ocean sciences								
Mathematics (pp. 350–357)	•	•		•	•			
Computational mathematics	c							
Mathematics education	c							
Pure mathematics	c			c	c			
Medieval studies (p. 337)								
Microbiology and environmental toxicology (pp. 358–361)						•	•	
Molecular, cell, & developmental biology (pp. 149–154)		•		•	•			
Music ⁶ (pp. 362–372)	•			•	•			
Electronic music			•					
Jazz			•					
Western art music			•					
Neuroscience and behavior (pp. 141–143)	•	•						
Ocean sciences (pp. 373–377)					•	•		
Biology (<i>see also</i> Marine biology)					c			
Biological oceanography						c		
Chemical oceanography							c	
Chemistry						c		
Earth sciences						c		
Geological oceanography							c	
Physical oceanography							c	
Physics						c		

	Undergrad. Education				Graduate Education			
	B.A.	B.S.	Minor	Certificate	M.A.	M.S.	Ph.D.	Parenthetical
Philosophy (pp. 377–384)	•		•		•		•	
Religious thought	c							
Photography: <i>see</i> Art								
Physics (pp. 386–393)		•	•			•	•	
Physics (Astrophysics) (pp. 129–133)		•						
Plant sciences (pp. 139–140)		•						
Playwriting: <i>see</i> Theater arts								
Politics (pp. 393–401)	•		•				•	•
Portuguese language (p. 403)								
Psychology ⁵ (pp. 404–414)	•		•				•	•
Cognitive psychology								c
Developmental psychology								c
Social psychology								c
Religious studies (pp. 414–415)								
Russian language (p. 415)								
Science communication: Science Writing (pp. 415–416)					•			
Social documentation (pp. 416–418)						•		
Sociology ⁵ (pp. 418–429)	•		•				•	•
Spanish for Spanish speakers (pp. 429–430)								
Spanish language (pp. 430–431)								
Spanish literature: <i>see</i> Literature								
Statistics (p. 350)			•					
Statistics and Stochastic Modeling						•	•	•
Theater arts (pp. 432–439)	•		•	•				
Asian theater							c	
Dance	c						c	
Design and technology	c						c	
Drama	c						c	
Dramatic literature							c	
Playwriting							c	
Western civilization (p. 337)								
Writing (pp. 439–442)								

Combined majors. In addition, students may complete a combined major leading to a B.A. degree in a number of designated fields. Combined majors currently available include those in Earth sciences/anthropology, environmental studies/biology, environmental studies/Earth sciences, environmental studies/economics, Latin American and Latino studies/global economics, Latin American and Latino studies/literature, Latin American and Latino studies/politics, and Latin American and Latino studies/sociology. Students also have the option of pursuing a double major (see page 32).

c = concentration, or emphasis, within a program. Some programs give students the option of following a general course of study or selecting a concentration; other programs require students to choose a concentration. Consult the program on the page indicated.

¹ Combined B.A./M.S. programs in business management economics, economics/applied economics and finance, and global economics are also available.

² A combined B.S./M.S. program in computer engineering is also available.

³ A master of fine arts (M.F.A.) degree is awarded in digital arts and new media.

⁴ Because California state law requires prospective teachers to earn a bachelor's degree in an academic discipline other than education, no undergraduate major is offered. All teaching credentials are earned postbaccalaureate. UCSC offers the professional clear Crosscultural, Language and Academic Development (CLAD) and Bilingual Crosscultural, Language and Academic Development (BCLAD) multiple subjects credentials, which are used in self-contained elementary classrooms (K–6) where all subjects are taught by the same teacher. UCSC also offers the CLAD and BCLAD single subjects credentials, which are used in departmentalized settings where the teacher is responsible for one subject (7–12).

⁵ An intensive major is also available.

⁶ A B.M. degree in music is also available. A doctorate of musical arts (D.M.A.) degree in composition is available.

⁷ Graduate parenthetical degree notations are available in this area. See program statement for more information.

Academic Calendar

Fall Quarter 2008

Fall quarter begins	September 20
Instruction begins	September 25
*Veterans Day	November 11
*Thanksgiving recess	November 27–28
Instruction ends	December 5
Final examinations	December 8–11
Fall quarter ends	December 11
Campus closure	December 24– January 1

Winter Quarter 2009

Winter quarter begins	January 5
Instruction begins	January 6
*Birthday of Martin Luther King Jr.	January 19
*Presidents' Day	February 16
Instruction ends	March 16
Final examinations	March 17–20
Winter quarter ends	March 20

Spring Quarter 2009

Spring quarter begins	March 30
Instruction begins	March 30
*Memorial Day holiday	May 25
Instruction ends	June 5
Final examinations	June 8–11
Spring quarter ends	June 11
Commencements	June 12–14

Fall Quarter 2009

Fall quarter begins	September 19
Instruction begins	September 24
*Veterans Day	November 11
*Thanksgiving recess	November 26–27
Instruction ends	December 4
Final examinations	December 7–10
Fall quarter ends	December 10
** Campus closure	December 24– January 1

Winter Quarter 2010

Winter quarter begins	January 4
Instruction begins	January 5
*Birthday of Martin Luther King Jr.	January 18
*Presidents' Day	February 15
Instruction ends	March 15
Final examinations	March 16–19
Winter quarter ends	March 19

Spring Quarter 2010

Spring quarter begins	March 29
Instruction begins	March 29
*Memorial Day holiday	May 31
Instruction ends	June 4
Final examinations	June 7–10
Spring quarter ends	June 10
Commencements	June 11–13

*Academic and administrative holiday

**Pending approval

Web: reg.ucsc.edu/calendar/



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Admission

Undergraduate admission to the University of California is based on two principles: that the best predictor of a student's success in the university is high scholarship in previous work and that the study of certain subjects gives a student good preparation for university work. Minimum admission requirements are the same for each UC campus, but each sets additional standards when the number of qualified applicants exceeds capacity. In 2008, UCSC received more than 33,000 applications for 3,700 places in the freshman class and 850 in the transfer class.

If you are considering applying to UC Santa Cruz, the Office of Admissions wants to help you learn more about the campus and its distinctive educational programs. Admissions counselors from UCSC visit many high schools and community colleges throughout California and are available to answer your questions about Santa Cruz.

If you are able to visit the campus, you may wish to take a student-led tour. The Office of Admissions offers tours on weekdays and selected Saturdays, and reservations are required. Visit our web site at admissions.ucsc.edu/campustours for information and reservations for campus tours. If you do not have Internet access, please call (831) 459-4008.

The University of California, Santa Cruz, continues to take positive steps to increase the diversity of the student population, including applicants coming from low socioeconomic backgrounds, students with disabilities, veterans, and non-traditionally aged students. The university does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (pregnancy, childbirth, and medical conditions related to childbirth), disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran in admission to or participation in its programs, activities, or services.

Educational Opportunity Programs at UCSC are designed to encourage students from educationally and/or economically disadvantaged backgrounds to prepare for and enter the university. For a description of these programs, see pages 37–38.

Admission by Exception. Special consideration may be given to a limited number of applicants who do not meet standard admission requirements. Admission by Exception

is granted to a very small percentage of those considered for admission each quarter. Such factors as academic accomplishments in light of a person's life experiences and/or special circumstances, socioeconomic background, special talents and/or achievements, contributions to the community, and the quality of the applicant's personal statement are taken into consideration when reviewing applicants seeking Admission by Exception.

Graduation rates. The following graduation-rate information is listed in compliance with the 1990 Title I: Federal Right-to-Know Act, Section 103. Forty-eight percent of the students who entered as first-year students in 2003 graduated in four years; 67 percent of those who entered in 2002 graduated in five years; and 68 percent of those who entered in 2001 graduated in six years. In recent years, students who entered as first-year students took an average of 4.19 years to graduate, and students transferring to UCSC as juniors averaged 2.29 years. These graduation rates are well above the national averages.

In accord with the Education Amendments of 1976, Section 493A, more detailed information regarding retention is available on the Institutional Research web site at planning.ucsc.edu/irps/retengrad.asp.

Admission Procedures

The University of California Application for Undergraduate Admission and Scholarships may be accessed through admissions.ucsc.edu.

In addition to the application, the above site includes a wealth of information for prospective UC students about undergraduate education, admission, financial aid, and various topics of interest.

The application can also be printed from this web site if you are unable to apply via the web. If you do not have web access, you can either e-mail ucinfo@ucapplication.net or call (831) 459-4008 to have a printed application mailed to you.

Application Filing Periods

You should submit an application for admission during the filing period for the quarter in which you want to attend the university. Enrollment opportunities for winter are more limited than for fall. Check with the Office of Admissions to see if UCSC is accepting applications for winter quarter.

Quarter of Attendance

Fall quarter 2009
Winter quarter 2010
Fall quarter 2010
Winter quarter 2011

Filing Period

November 1–30, 2008
July 1–31, 2009
November 1–30, 2009
July 1–31, 2010

Application Fees

The application fee is \$60 (\$70 for international nonimmigrant applicants) to apply to one campus of the university. For each additional campus you select, you must pay an extra \$60 fee (\$70 for international nonimmigrant applicants). These fees are subject to change and are not refundable. The online application includes payment instructions.

Fee Waivers

The University of California will waive application fees for up to four campuses for certain students who otherwise would be unable to apply for admission. To qualify for the fee waiver, you must meet specific requirements related to your family income and size. *The fee waiver is for U.S. citizens and permanent residents only.*

Students who qualify for fee waivers and who select more than four campuses must pay \$60 for each additional choice.

There are several ways to apply for a fee waiver, as described below. To qualify, you must meet the same income and family-size guidelines, regardless of the application method you use.

An online fee waiver form is available to applicants who apply for admission on the web. The online application can determine if an applicant is eligible for the fee waiver as soon as the necessary form is complete.

Other methods for waiving the application fee are listed below.

- High school students: Use the College Board fee waiver. It is available from your school counselor.
- EOPS community college students: If you are enrolled in Extended Opportunity Programs and Services (EOPS) at a California community college, obtain a fee waiver authorization from the EOPS Office.
- Other applicants: Qualified students may obtain a UC fee waiver authorization at a UC campus Admissions, Relations with Schools, or Educational Opportunity Programs Office. When requesting a fee waiver authorization, be prepared to answer questions about your gross family income and family size.

If you are unable to obtain a UC fee waiver authorization due to time constraints, you may attach a letter to your application for admission stating your gross family income and the number of family members supported by that income, and requesting consideration for an application fee waiver.

High School Preparation for University Work

A carefully planned program of high school study provides you with the best preparation for university work. It can give you a definite edge in your undergraduate course work and the opportunity to do advanced preparation for your chosen field of study. Most important, students who master certain basic knowledge and skills in high school substantially increase their chances of success at the university. (Requirements for transfer students are explained in the Admission as a Transfer Student section on page 16.)

Prospective university students should give priority to completing the high school courses required for admission—the “a-g” requirements section. You should understand, however, that the “a-g” requirements represent minimum admission standards. Demonstrating proficiency in these subjects will not automatically prepare you for freshman work in every discipline, much less in your major or program of study. The university strongly recommends, but does not require, that you complete advanced study in many of the “a-g” subjects.

A student who is well-prepared for university work will have mastered the equivalent of four years of English; four years of mathematics, including a course in the senior year; two to three years of a language other than English; two to three years of laboratory science; two or more years of history and social sciences; and one or more years of visual or performing arts.

You should also give careful thought to the general field of study, and perhaps the specific major, you want to pursue at the university. If you are able to make this decision in advance, plan to take additional courses in high school related to the field.

You should take courses beyond the minimum levels in reading, writing, and mathematics in order to be adequately prepared for basic university courses, such as English composition and calculus, that you may be expected to take in the freshman year. A lack of basic preparation can cause problems for students who do not choose a major until after they enroll or



Documentary filmmaker and associate professor of community studies Renee Tajima-Peña teaching a class in video production for documentary filmmaking. UCSC's Community Studies Department offers a master's program in social documentation, in which Tajima-Peña and others train students to use social science methodologies to analyze social problems and to capture people's lives and culture in visual, audio, or print media.

for those who prepare for one major and then decide to change to another.

Good study habits and skills are also essential for success at the university. These are often developed in more advanced courses in high school, but can also be gained in self-directed learning methods. University students are expected to know how to read a textbook effectively and master background material, how to take notes, and how to plan a proper study schedule.

Senior-Year Program. The more challenging your high school program, the better prepared you will be for university work. Prospective students should take particular care in planning the senior-year program. The senior year should be used to prepare students for their first year at the university and should include honors and advanced courses as well as courses that will strengthen overall preparation. A challenging, successfully completed senior-year program is a natural bridge between high school and uni-

versity course work in the intended major. A strong senior program will also strengthen your chances for admission to UC Santa Cruz.

Reading. Prospective university students need to develop the ability to read and understand scholarly publications. You will have to do more reading and more writing than in high school and will be required to learn more material in shorter periods of time. You should be able to analyze what you read and question yourself about an author's intentions, viewpoint, arguments, and conclusions. You should have experience reading commentaries and essays as well as textbooks. You should read a wide variety of other material—including literature, biography, nonfiction, and criticism—in addition to what you are required to read in class. You should become familiar and comfortable with the conventions of standard English and with various writing strategies and techniques.

Subject Requirements

a. History/social science—two years required. Two years of history/social science, including one year of world history, cultures, and geography; and one year of U.S. history or one half year of U.S. history and one half year of civics or American government.

b. English—four years required. Four years of college preparatory English that include frequent and regular writing, and reading of classic and modern literature. No more than one year of ESL-type courses can be used to meet this requirement.

c. Mathematics—three years required, four years recommended. Three years of college preparatory mathematics that include the topics covered in elementary and advanced algebra and two- and three-dimensional geometry. Approved integrated math courses may be used to fulfill part or all of this requirement, as may math courses taken in the seventh and eighth grades that your high school accepts as equivalent to its own math courses.

d. Laboratory science—two years required, three years recommended. Two years of laboratory science providing fundamental knowledge in at least two of these three foundational subjects: biology, chemistry, and physics. Advanced laboratory science courses that have biology, chemistry, or physics as prerequisites and offer substantial additional material may be used to fulfill this requirement. The last two years of an approved three-year integrated science program that provides rigorous coverage of at least two of the three foundational subjects may be used to fulfill this requirement.

e. Language other than English—two years required, three years recommended. Two years of the same language other than English. Courses should emphasize speaking and understanding, and include instruction in grammar, vocabulary, reading, composition, and culture. Courses in languages other than English taken in the seventh and eighth grades may be used to fulfill part of this requirement if your high school accepts them as equivalent to its own courses.

f. Visual and performing arts discipline (VPA)—one year required. A single yearlong approved arts course from a single VPA discipline: dance, drama/theater, music, or visual art.

g. College preparatory electives—one year required. One year (two semesters), in addition to those required in “a–f” above, chosen from the following areas: visual and performing arts (non–introductory level courses), history, social science, English, advanced mathematics, laboratory science, and a language other than English (a third year in the language used for the “e” requirement or two years of another language).

Writing. Prospective university students must learn to write clearly and skillfully. You will be expected to write papers for many university classes, and many examinations will include essays. You will have to think critically and analyze what you learn in class and in your outside reading, and present your ideas in a clear and persuasive manner.

By university standards, a student proficient in composition is able to understand the assigned topic, select and develop a theme by argument and example, use words and sentences that clearly and precisely express what he or she means, demonstrate an understanding of the rules of standard English, and punctuate and spell correctly.

Students who plan to attend UC Santa Cruz must take English courses in high school that require the development and practice of these skills. You must take at least four years of

English composition and literature with a focus on expository writing—the development of persuasive critical thinking on the written page.

Mathematics. Many students are unaware of the large number of fields that require preparation in mathematics beyond the three years necessary for admission to UCSC. Courses in calculus are included in all majors in engineering and the physical, mathematical, and life sciences, as well as in programs leading to professional degrees in fields such as medicine, dentistry, optometry, and pharmacy. Moreover, many majors in the social sciences and economics require statistics or calculus, and sometimes both.

The university highly recommends that students take four years of mathematics in high school, including precalculus in the senior year. Courses in mathematics should include basic operations with numerical and algebraic func-

tions; operations with exponents and radicals; linear equations and inequalities; polynomials and polynomial equations; functions and their graphs; trigonometry, logarithms, and exponential functions; and applications and word problems.

Admission as a Freshman

The university considers you a freshman applicant if you have graduated from high school and have not enrolled in a regular session at any college or university. If you attend a summer session immediately after graduating from high school, you are still a freshman applicant.

The admission and selection process for freshmen to UC Santa Cruz reflects the academic rigor and preparation needed for admission to a major research institution. Meeting the minimum eligibility requirements for the university *does not* guarantee you admission as a freshman. Students are encouraged to achieve well beyond the minimum requirements to enhance their chances for selection.

Information regarding the admission and selection process for UC Santa Cruz can be accessed at admissions.ucsc.edu. This site provides information on establishing UC eligibility for both residents and nonresidents of California. If you are unable to access the online information, please call the Admissions Office at (831) 459-4008.

High School Proficiency Examination

While the University of California expects freshman applicants to have graduated from high school, in lieu of the regular high school diploma, the university will accept the following:

- Certificate of Proficiency, awarded by the State Board of Education upon successful completion of the California High School Proficiency Examination
- Proficiency tests from other states
- General Educational Development (GED) Certificate

Transfer Credit

Transfer credit may be granted to a freshman applicant for an acceptable college course taken while still in high school if an official transcript is received from the college that conducted the course.

Transfer credit is granted for specified College Board Advanced Placement Examinations completed with a score of 3, 4, or 5 and for specified



For U.S. Navy veteran Josh Karnasch, who is originally from Bradford, Pennsylvania, the ultimate goal in going to UCSC is to help people. Until now, he has done that as a professional paramedic. He transferred into UCSC's psychology program from Sacramento City College with plans to eventually become an emergency physician. Currently a full-time student and part-time paramedic, Josh also coordinates a new program, VETS (Veterans Education Team Support), a peer advising program for newly enrolled military veterans.

International Baccalaureate Higher Level Exams completed with a score of 5, 6, or 7. A score of 30 or higher on the International Baccalaureate Diploma is also accepted for transfer credit.

Admission as a Transfer Student

The University of California defines a *transfer applicant* as a student who has been a registered student in a college or university, or in college-level extension classes following high school graduation. Summer session attended immediately following high school graduation is excluded in this determination. If you are a transfer applicant, you cannot disregard your college record and apply for admission as a freshman.

The admission and selection process for transfer students reflects the academic rigor and preparation needed for admission to a major research institution. UC Santa Cruz gives highest priority to junior-level transfers from California community colleges.

Information regarding the admission and selection process for UC Santa Cruz can be accessed at admissions.ucsc.edu. This site

provides information on eligibility and selection for both residents and nonresidents of California. If you are unable to access the online information, please call the Admissions Office at (831) 459-4008.

Credit for Courses Taken Elsewhere

The university gives unit credit to transfer students for courses they have completed at other accredited colleges and universities, including courses taken at recognized institutions outside of the U.S. To be accepted for credit, your courses must be comparable to those offered at the university, as determined by the UC Santa Cruz Admissions Office. The UC Santa Cruz department sponsoring your major decides which transfer courses may be used to satisfy major requirements.

Because a total of 70 semester units (105 quarter units) of credit toward a university degree may be earned at a community (two-year) college, only subject credit will be granted for courses taken in excess of these amounts.

Applicants will not be considered for admission if they have completed 90 semester units (135 quarter units) or more of

UC-transferable credit because it is not usually possible for these students to complete a bachelor's degree within UC Santa Cruz graduation requirements. Advanced Placement (AP) or International Baccalaureate Higher Level (IBH) credit is permitted to exceed the 90 semester unit maximum by the number of AP or IBH units granted.

Opportunities to take courses at UC Santa Cruz as a nonmatriculated student are available through Summer Session, Concurrent Enrollment through UC Extension, and Intersegmental Cross-Enrollment (see page 44).

UC Santa Cruz Transfer Services

The Admissions Office provides information to all students who wish to transfer to UC Santa Cruz.

Student-led guided tours happen year-round and both require advance reservations. Please see admissions.ucsc.edu/campustours to make a reservation. If you do not have Internet access, please call (831) 459-4008.

In addition, UCSC counselors make regular visits to many community colleges in California. Check with your counseling department or transfer center to determine whether a UCSC counselor will be visiting your community college.

Admission of International Students

The University of California welcomes applications from international students. The academic credentials of applicants from other countries are evaluated in accordance with the general regulations governing admission.

UC Santa Cruz accepts applications from international students for the fall quarter, and students should begin application inquiries a year before the quarter of desired admission. Openings for the winter quarter may be limited. If you are interested in applying for winter, check with the Office of Admissions. For information, write to admissions@ucsc.edu or the International Admissions Specialist, Office of Admissions, University of California, Santa Cruz, 1156 High Street, Santa Cruz, CA 95064.

Students whose native language is not English must certify proficiency in English by one of the following methods: earning a score of 83 or higher on the Internet-based Test of English as a Foreign Language (minimum 550 if paper-based TOEFL; minimum 220 if computer-based TOEFL), or earning a minimum score of 7.0 on the International English

Language Testing System (IELTS) exam, or completing two transferable English composition courses with grades of B or higher in a U.S. college or university.

A financial certificate and official academic records will be required if admitted to the university. Generally, nonimmigrant students must provide documentation that sufficient funds will be available to cover nonresident tuition, educational fees, and living expenses. The university does not offer financial assistance to international students.

For information about services for international students, see Office of International Education, page 40.

Readmission

If you are an undergraduate who wants to return to UC Santa Cruz after an absence of a portion of a quarter or more, you must file an Application for Readmission. The application form is available online at advising.ucsc.edu/student/read from your college office. The completed application should be filed, along with the nonrefundable \$60 application fee, with the Office of Admissions during the appropriate period:

Quarter of Attendance	Filing Period*
Fall quarter	November 1–July 31
Winter quarter	July 1–October 31
Spring quarter	October 1–January 31

*Filing deadlines for priority enrollment: fall, April 1; winter, October 1; spring, January 1.

If during your absence you attended another UC campus, an official transcript must be submitted to the Office of Admissions before your application will be sent to your college for approval. If you attended another collegiate institution, your UC Santa Cruz college may require a transcript. If you left for health reasons, clearance from the Cowell Student Health Center is required. *You must pay all outstanding bills owed to the university before you will be permitted to register.*

Admission to Special Categories

For information on applying for admission in the categories described below, please contact the Office of Admissions at admissions@ucsc.edu or University of California, Santa Cruz, 1156 High Street, Santa Cruz, CA 95064, (831) 459-2131.

Applications from students interested in pursuing a second baccalaureate or limited-status program will be considered as campus enrollment allows. Priority is given to applicants who have not yet had the opportunity to complete a bachelor's degree.

Second Bachelor's Degree

If your educational goals have changed substantially since receiving your bachelor's degree, you may be eligible to pursue a second undergraduate degree in an established major at UCSC.

You must meet regular university admission requirements, and your experience or previous scholarship record must show potential for academic success in your proposed area of study. Additional selection criteria may be applied. Admission is also subject to approval by the appropriate department and the selected college.

For a second degree, you must fulfill major and residence requirements, as well as system-wide requirements in American history and institutions and the Entry Level Writing Requirement (see pages 25–26). You must enroll for at least three quarters and are usually restricted to six quarters total.

Limited Status

If you have already completed an undergraduate degree and you have a particular reason to take specific undergraduate university classes, you may be eligible to enroll in a nondegree program as a limited-status student.

Your proposed program of study must either prepare you for graduate or professional school or satisfy some definite educational need or interest. Participants generally enroll full-time for a specified period that does not exceed three quarters. You must meet regular university admission requirements, and your experience or previous academic record must show potential for success in your proposed program. Additional selection criteria may be applied. Admission is subject to approval by the appropriate department or college.

Nondiscrimination and Affirmative Action Policies

Student-Related Matters

The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy, physical or mental disability, medical condition (cancer related

or genetic characteristics), ancestry, marital status, age, citizenship, sexual orientation, or service in the uniformed services as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, treatment in University programs and activities and employment.

University policy also prohibits retaliation for bringing a complaint of discrimination or participating in a complaint process or investigation pursuant to this policy.

Inquiries regarding the University's student-related nondiscrimination policies may be directed to Student Judicial Affairs at extension 9-1738, or e-mail sja.ucsc.edu.

Inquiries regarding UCSC's *Sex Offense Policy and Procedures for Reports of Sexual Assault(s) and Sexual Harassment* and/or violations of Title IX may be directed to Title IX Coordinator/Sexual Harassment Officer, (831) 459-2462, or e-mail rew@ucsc.edu.

Inquiries regarding the University's affirmative action, equal employment opportunity, and nondiscrimination policies for staff employment may be directed to the Equal Employment Opportunity/Affirmative Action Office, (831) 459-3676, or e-mail cbene@ucsc.edu. For academic employment, contact the Assistant Vice Chancellor for Academic Human Resources at (831) 459-4399, or e-mail pjpeters@ucsc.edu.

Student inquiries regarding disability or disability accommodations may be addressed to the Director, Disability Resource Center, (831) 459-2089 (voice); (831) 459-4806 (TTY); e-mail drc@ucsc.edu.

Employment-Related Matters

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the university on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including childbirth and medical conditions related to pregnancy and childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (special disabled veteran, recently separated veteran, Vietnam-era veteran, or any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized). This policy applies to all employment practices, including recruitment, selection, promotion, transfer, merit increase, salary, training and development, demotion, and separation.

This policy is intended to be consistent with the provisions of applicable state and federal laws and university policies. The University of California is an affirmative action/equal opportunity employer. The university undertakes affirmative action to ensure equal employment opportunity for underutilized minorities and women, for persons with disabilities, and for covered veterans (Vietnam-era veterans, special disabled veterans, recently separated veterans, or any other veterans who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized).

Employment-related discrimination complaints from student employees are processed in conformity with appropriate personnel policies. Inquiries regarding the university's equal employment opportunity policies may be addressed to the Equal Employment Opportunity/Affirmative Action Office, (831) 459-2349.

Sexual Harassment/Title IX

The university cherishes the free and open exchange of ideas and expansion of knowledge. To maintain this freedom and openness requires objectivity, mutual trust, and confidence; it requires the absence of coercion, intimidation, or exploitation. The principal responsibility for maintaining these conditions must rest upon those members of the university community who exercise the greatest authority and leadership: faculty, managers, and supervisors.

The university has therefore instituted a number of measures designed to protect its community from sexual and other forms of harassment. Students, faculty, and staff who want information, advice, to file a complaint, and/or copies of the *UCSC Policy on Sexual Assault*, the *UC Policy on Sexual Harassment*, and *Procedures for Reports of Sexual Assault(s) and Sexual Harassment* should contact Rita E. Walker, Title IX/Sexual Harassment Officer, 119 Clark Kerr Hall, (831) 459-2462 or via e-mail at rew@ucsc.edu. For detailed information about the services of the Title IX/Sexual Harassment Office, visit the web site at www2.ucsc.edu/title9-sh/. The Title IX/SHO is also available to investigate other violations of Title IX.



As an undergraduate, Matt Bromage developed SEA-LABS, a device that tracks environmental changes that are killing the world's coral reefs. Matt, now a Ph.D. student in computer engineering at UC Santa Cruz, plans to launch two SEA-LABS prototypes off the coast of Hawaii as part of his doctoral focus.

Expenses and Financial Resources

Expenses

In determining the cost of attending UCSC each quarter, students should consider both required fees and personal expenses. The figures below are provided to help you draw up a realistic personal budget. If you then conclude that you will need financial assistance in order to attend UCSC, you should read the Financial Aid section below. Fees and additional financial information for graduate students appear on pages 51–52. *Tuition, fees, and other charges are subject to change without notice by the UC Regents. For the most current fee information, check reg.ucsc.edu.*

Required Fees

Required fees are due and payable before the start of each quarter. At the beginning of each quarter, you will need sufficient funds to cover housing charges and book costs. For many financial aid recipients, however, fees and on-campus housing charges are paid automatically from approved student aid funds. If you are a financial aid recipient, please note that checks and direct deposits for scholarships, grants, and loans in excess of university charges are not available to you until after registration and enrollment each quarter.

The **University Registration Fee** funds student services that provide a supportive and enriching learning environment and that are complementary to, but not part of, the instructional program. Programs include, but are not limited to, services related to the physical and psychological health and well-being of students; social and cultural activities and programs; services related to campus life; and educational and career support.

The **Educational Fee** helps support student financial aid and related programs; admissions; registration; administration; libraries; operation and maintenance of plant; the university's operating budget; and all costs related to instruction, including faculty salaries.

Santa Cruz campus fees help support a wide range of student services, including college and campuswide student government, extracurricular programs and recreation facilities, campus child care, community and public service projects, Educational Opportunity Programs and scholarships, and free-fare use of the local transit systems. Campus fees paid by graduate students are provided on page 51.

In addition, all students, including foreign students, are assessed a mandatory **Health Insurance Premium**. The Cowell Student Health Center provides the primary care services for the plan while a contracted insurance company provides major medical and hospitalization insurance. There is an annual deductible, with most expenses covered at 80 percent of the customary and usual charge. Coverage includes, but is not limited to, hospital stays; surgical services; physician visits; emergency treatment; outpatient care; and pregnancy. Dependent coverage is also available. Detailed information is on the web at www2.ucsc.edu/healthcenter/billing/insurance.shtml or contact the Student Health Insurance Office, (831) 459-2389.

Waivers from the mandatory health insurance premium are available if you can show that your private insurance provides coverage equal to or better than the student health insurance plan. Deadlines for applying for a waiver are listed in the *Schedule of Classes* (reg.ucsc.edu/soc).

Some courses charge an additional **Course Materials Fee**. These fees recover the cost of materials, supplies, equipment, and support services not covered by the normal instructional budget. The fees are reviewed and approved annually by the Miscellaneous and Course Materials Fee Advisory Committee. The list of specific courses charging fees in 2008–09 is available in the quarterly *Schedule of Classes* and on the web at reg.ucsc.edu/coursefees.html.

Nonresident Tuition

If you are a resident of a state other than California or of another country, you must pay nonresident tuition, the nonresident educational fee, and other required fees (university registration and Santa Cruz campus fees). The criteria for residency appear in Appendix A.

Non-U.S. citizens note: Regardless of how long you live in California, only U.S. citizens and holders of immigrant visas may become qualified for resident classification.

Estimated Undergraduate Budget, 2008–09

On Campus	California Residents		Nonresidents	
	One Quarter	F-W-S Quarters	One Quarter	F-W-S Quarters
Required Fees				
University Registration Fee	\$ 288.00	\$ 864.00	\$ 288.00	\$ 864.00
Educational Fee ^a	2,088.00	6,262.00	2,282.33	6,849.00
Santa Cruz campus fees ^b	358.07	1,074.11	358.07	1,074.11
Health insurance (waivable)	348.00	1,044.00	348.00	1,044.00
<i>Subtotal</i>	\$3,082.07	\$9,244.11	\$3,276.40	\$9,831.11
Estimated Personal Expenses^c				
Room and board	\$4,346.00	\$13,038.00	\$4,346.00	\$13,038.00
Books and supplies	452.00	1,356.00	452.00	1,356.00
Miscellaneous	490.00	1,470.00	490.00	1,470.00
Transportation	280.00	840.00	280.00	840.00
<i>Subtotal</i>	\$5,568.00	\$16,704.00	\$5,568.00	\$16,704.00
Total Budget CA Residents	\$8,650.07	\$25,948.11		
Nonresident Tuition			\$6,674.00	\$20,022.00
Total Budget CA Nonresidents			\$15,518.40	\$46,557.11

^a Undergraduates who are unable to maintain a full-time program of study because of employment responsibilities, family obligations, or health problems may be eligible for a 50 percent reduction in the Educational Fee. One quarter at \$2088; two quarters at \$2,087.

^b One quarter at \$358.07; two quarters at \$358.02.

^c Estimated personal expenses for students living off campus total \$4,721 per quarter or \$14,163 for three quarters. Estimated personal expenses for students living with family total \$3,055 per quarter or \$9,165 for three quarters.



To bridge the gap between the cost of a UCSC education and what parents and students can reasonably afford to pay, the campus offers a wide variety of financial aid packages, including grants, scholarships, loans, and part-time employment. Each student requesting financial aid is assigned an adviser.

Late Fees

You may be assessed late fees if you fail to make university payments or enroll by the specified deadlines. For example, *late fees are assessed on a graduated basis for each month there is an unpaid balance on your university account*, and at \$50 each for a late registration payment and/or late enrollment and \$25 for a late housing payment. Deadlines are published in *The Navigator* (the undergraduate campus handbook) and the *Schedule of Classes*, both online at reg.ucsc.edu, and they appear on the Statement of Account.

Estimated Personal Expenses

The figures given for estimated personal expenses are for a single undergraduate living on campus. Expenses will be higher for married students, students with children, and graduate students. The information is as current and realistic as possible; however, expenses for students vary in accordance with lifestyles, priorities, and obligations.

Room and board (in college residences). Rates for room and board in the college residence halls are expected to range from about \$9,500 to \$13,275 per year, depending on the type of accommodation and meal plan. The room and board amount of \$13,038 in the Undergraduate Budget table on page 19 is based on the weighted average of on-campus contracts

and includes an allowance for additional meals and phone service. Anticipated rates for college apartments are comparable once food and phone costs are added.

Rates are paid quarterly. The rate ranges listed above do not cover periods of academic recess, nor does the budget on page 19. Housing charges are normally payable at the beginning of each quarter. However, students may arrange with the Campus Housing Office to pay monthly.

More detailed information on room and board expenses for the individual colleges appears in a brochure distributed as part of the admission process or available from the Campus Housing Office, 104 Hahn Student Services Building, (831) 459-2394.

Miscellaneous. This budget item covers a broad range of expenses including clothing, laundry, personal grooming, recreation, and health maintenance. It also covers minimum expenses for modest travel to visit family.

Fee Refunds

Students who cancel their registration before the first day of instruction in a given quarter are refunded all required fees minus a \$10 service charge. New undergraduate students who cancel their registration before the first day of instruction are entitled to a refund of all required fees except the nonrefundable \$100 undergraduate acceptance of admission fee (applied toward the university registration fee).

Once the quarter has begun, students must petition for withdrawal. The percentage of fees refunded is determined by the effective date of the withdrawal, according to the schedule at the left, in which day 1 is the first day of instruction. A student is not eligible for university services after the effective date of withdrawal.

A student entering the armed forces before the sixth week of the quarter is entitled to a full refund of the university registration fee—provided no course credit is received.

More detailed information on withdrawal and refund procedures is included in the quarterly *Schedule of Classes* and *The Navigator*, both online at reg.ucsc.edu, and in the *Graduate Student Handbook* (graddiv.ucsc.edu). Information on refunds of room and board charges is contained in the campus housing contract, provided to all applicants for on-campus housing. For more information on how withdrawing affects your financial aid, refer to *Your Guide to Financial Aid* (www2.ucsc.edu/fin-aid) or contact the Financial Aid Office.

Deferred Payment Plan

The Deferred Payment Plan (DPP) provides an alternative method of budgeting and pay-

Schedules of Refunds

All Continuing and Readmitted Students and New Students Not Receiving Federal Financial Aid

Number of calendar days	Percentage of fees refunded*
1st day of instruction	100
2-7	90
8-18	50
19-35	25
36 and over	0

New Students Who Receive Federal Financial Aid and Withdraw during Their First Academic Term

Number of calendar days	Percentage of fees refunded*
1st day of instruction	100
2-7	90
8-14	80
15-21	70
22-28	60
29-35	50
36-42	40
43 and over	0

*For new students, the nonrefundable \$100 Undergraduate Acceptance of Admission Fee is withheld from the University Registration Fee; the schedule of refunds applies to the balance of fees. Percentages listed (days 1-35 or days 1-42) should be applied individually to Nonresident Tuition, the Educational Fee, the University Registration Fee, and Santa Cruz campus fees. The Health Insurance Fee is nonrefundable.

ing registration fees. It allows these fees, to the extent not covered by scholarships, loans, or other financial aid, to be paid in monthly installments. Students have a choice of applying for a three-month plan for individual quarterly fees, or, at the beginning of the fall quarter only, for a nine-month plan to be used for the fall, winter, and spring quarters. A nonrefundable application fee of \$25 for the three-month plan, or \$60 for the nine-month plan, is required. Any student in good financial and academic standing may apply for DPP. Students receiving financial aid sufficient to cover registration fees in full are not eligible for this plan. For more information about how to apply for DPP, application deadlines, and campus policies regarding the program, contact the Office of Student Business Services, 203 Hahn Student Services Building, (831) 459-2107, e-mail oarinfo@ucsc.edu, or visit the web site at sbs.ucsc.edu.

Financial Aid

For undergraduate students who require financial assistance, the university maintains a broad-based financial aid program of grants, scholarships, loans, and part-time employment. Administered by the Financial Aid Office, these resources help bridge the gap between the cost of education and what parents and students can reasonably contribute.

If you are a dependent student, the amount of the contribution expected from you and your parents is determined through a careful analysis of your family's financial strength, considering such variables as income, number of dependents, allowable expenses, and assets (excluding the home you live in). Federal, state, and university procedures and campus policies are used in the evaluation. The same policies apply to married and independent students.

Application Deadlines

The Free Application for Federal Student Aid (FAFSA) may be filed beginning on January 1 preceding the academic year in which you wish to enroll. The deadline for applications is March 2 of the preceding academic year for which you are requesting aid. The FAFSA can be filled out online and filed electronically at www.fafsa.ed.gov. A "FAFSA on the Web Worksheet" is available in high school guidance and college financial aid offices throughout the country. You can also download and print a FAFSA at www.fafsa.ed.gov. Prior-year FAFSA applicants can use their PIN number to access their information and to complete their FAFSA on the web.

In some cases, the Financial Aid Office will require additional information from applicants. These applicants will be sent an e-mail instructing them to log onto the student portal at my.ucsc.edu and view their "To Do List," which will specify the required documents (e.g., copies of student and parent tax returns or other forms). These are mandatory requirements with a due date for each requested item on the "To Do List." Please be sure to keep your e-mail address current at my.ucsc.edu.

Applications received after the deadline will be reviewed after those received on time have been processed. Late applicants will be considered on a funds-available basis.

The admission notification date is the financial aid application deadline for students seeking to transfer to UCSC during the winter or spring quarter of the following academic year. Required supporting documents must be submitted by December 20.

First-year student applications will be processed first, and every effort will be made to provide frosh with an aid offer by May 1. The earlier the FAFSA is submitted after January 1, the earlier you will receive an offer. All other applicants will be notified as applications are processed after that date. If you are applying for winter or spring quarter, you will receive notification of your award as soon as possible after you are admitted and your aid application file is complete.

Types of Aid

If you apply for financial aid and you meet the application deadlines, as outlined above, you are considered for all the types of assistance described below. Depending on funds available and your financial need, your financial aid package may include a combination of grants, scholarships, loans, and work opportunities.

Grants

The following grants are available to undergraduates.

The *Cal Grant A* program, open only to California residents, will provide a maximum award of \$7,126 in 2008–09 to help offset mandatory registration fees for the academic year. Students are selected on the basis of academic achievement and financial need.

The *Cal Grant B* program, designed for California students from low-income families, will provide an annual living stipend of \$1,551 to all eligible freshman students in 2008–09. In 2008–09, to help offset mandatory registration fees and aid with annual living expenses, this grant will provide \$8,677 to students at the sophomore level and above.

All California residents seeking financial aid must apply for a Cal Grant by submitting

a FAFSA by March 2 and listing a California college in the information-release section of the FAFSA. New applicants for the Cal Grant must also file a GPA Verification form directly to the California Student Aid Commission by March 2. More information is available at www.csac.ca.gov.

Federal Pell Grants will provide a maximum of \$4,731 during 2008–09.

Federal Supplemental Educational Opportunity Grants are available to students with substantial financial need. The grants range from \$100 to \$4,000.

Federal Academic Competitiveness Grants provide up to \$750 for first-year college students and up to an additional \$1,300 for second-year students. To receive an Academic Competitiveness Grant, freshmen and sophomores must be Federal Pell Grant–eligible and have completed a program of rigorous high school course work as defined by their state (all regularly admitted UCSC students meet these criteria). In addition, sophomores must have earned a 3.0 GPA by the end of their freshman year. Visit federalstudentaid.ed.gov for more details.

Federal National Science and Mathematics Access to Retain Talent (SMART) Grants provide up to \$4,000. To receive a SMART Grant, juniors and seniors must be Federal Pell Grant–eligible majoring in designated science, technology, math, or critical foreign languages, and maintain a 3.0 GPA each term during the year. Visit federalstudentaid.ed.gov for more details.

UC Santa Cruz Grants are designed for students with substantial financial need. Funds for this grant program come in part from the educational fees paid quarterly by students at all campuses of the university.

Scholarships

A variety of scholarships, ranging from \$250 per year to an amount that covers full financial need, are available to undergraduates. Funding comes from many sources—private donors, corporations, professional associations, alumni, and the university itself.

The amount of the scholarship award is generally based on the student's demonstrated financial need. In cases where the student's established financial need exceeds the amount of the scholarship, the award may be supplemented by other types of financial aid.

Merit scholarships are awarded competitively on the basis of high academic achievement and potential. Other scholarships are restricted to students from particular geographic areas or family backgrounds or are limited to students in particular majors, classes, or colleges. The donors have different reasons for giving, and their varied interests are reflected in the

wide range of scholarships available. Merit and restricted scholarship awards range up to \$1,500. *Regents Scholarships* are awarded for periods of four years to entering frosh and for periods of two years to continuing or transfer students beginning their junior year at the university. These awards are based on academic achievement and promise, irrespective of financial need. For freshmen, the Regents Scholarship is \$20,000 paid over four years. For entering junior transfers, the Regents Scholarship is \$10,000 paid over two years. For continuing students, the amount varies based on grade level and year appointed.

Entering UCSC students apply for scholarships using the University of California Application for Undergraduate Admission. When filling out your UC application, answer the questions in the scholarship section. Your application essay will serve as your scholarship essay.

All continuing students will be automatically considered for UCSC scholarships based on cumulative GPA. Notifications will be e-mailed in August.

Need-Based Loans

Student loan funds are administered by UC in accordance with the regulations of the federal government. There is no interest on need-based student loans as long as the student is enrolled in college at least half-time. To qualify, students must be enrolled in a degree program and demonstrate financial need. To apply for these loans, students must submit the FAFSA.

Through the Federal Perkins Loan Program, students who demonstrate financial need may borrow up to \$20,000 for undergraduate study. Repayment begins nine months after graduation or withdrawal from higher education. The interest rate is 5 percent per year.

William D. Ford Federal Direct Subsidized Student Loans are administered by the UCSC Financial Aid Office. Students must demonstrate financial need, and annual limits for dependent students are \$3,500 for first-year students, \$4,500 for second-year students, and \$5,500 for all other undergraduates. The annual limit for graduate students is \$8,500. Students may borrow up to \$23,000 for undergraduate study and up to \$65,500 for undergraduate and graduate study combined. Students pay an origination fee of up to 2.0 percent. Repayment begins six months after graduation or withdrawal from higher education. The interest rate is 6.0 percent fixed on all loans made in 2008–09.

Non-Need-Based Loans

William D. Ford Federal Direct Unsubsidized Student Loans are administered by the Financial Aid Office. These loans are available to students who do not qualify for the subsidized loans (above), and students must first be determined ineligible for a Federal Direct Subsidized Student Loan. Interest is charged on unsubsidized loans from the date the loan is made. The interest rate is fixed at 6.0 percent on all loans made in 2008–09.

The borrower must pay an origination fee of up to 2.5 percent, which is deducted from the amount of the loan. Eligibility is calculated by subtracting any financial assistance awarded the student from the cost of education as defined by the Financial Aid Office (see Undergraduate Budget, page 19). Dependent students may borrow \$2,000 in Federal Direct Unsubsidized Student Loans in addition to the annual subsidized loan limits. The aggregate total loan limit for undergraduate study is \$31,500.

Independent students have higher combined Federal Direct Subsidized and Unsubsidized Student Loan limits than do dependent students. The annual limits for independent students are as follows: \$9,500 for first-year students; \$10,500 for second-year students; \$12,500 for other undergraduates; and \$20,500 for graduate students. Students may borrow up to \$57,500 for undergraduate study and \$138,500 for undergraduate and graduate study combined.

Students may begin repaying principal and interest on Federal Direct Unsubsidized Student Loans immediately, pay only interest immediately, or defer both principal and interest until they are no longer enrolled in school at least half-time.

Through *Federal Direct Parent Loans for Undergraduate Students*, parents may borrow up to the full cost of education as defined by the UCSC Financial Aid Office, less any financial assistance the student receives. Parents must demonstrate creditworthiness for loan approval. Borrowers pay an origination fee of up to 4 percent, which is deducted from the loan amount. Loan payments begin 60 days after the last disbursement. The interest rate is fixed at 7.9 percent on all loans made in 2008–09.

Other loans. The UCSC Financial Aid Office provides information about other privately sponsored education loans at www2.ucsc.edu/fin-aid or upon request.

Further Information

For more information about applying for financial aid, deadlines for filing applications and supporting documents, and campus policy regarding refunds of overpayments, contact the Financial Aid Office, 205 Hahn Student Services Building, (831) 459-2963, e-mail fin_aid@ucsc.edu, or visit www2.ucsc.edu/fin-aid, where you may download and print the publication *Your Guide to Financial Aid*.

Veteran Services

The Veteran Services staff acts as a liaison between the Department of Veterans Affairs and students who, as veterans, veterans' dependents, or reservists, receive education benefits. The staff also assists with the California Department of Veterans Affairs' college fee-waiver program for children of veterans who have service-connected disabilities or who have died from service-related causes. Students who are California residents apply for the college fee-waiver program through their home county Veterans Services Office.

Students who are veterans or veterans' dependents should contact Veteran Services as soon as they receive notification of admission to UC Santa Cruz to ensure timely processing of their benefit claims.

Veteran Services staff members are located at 160 Hahn Student Services Building. An appointment may be arranged by calling (831) 459-2709 or by e-mail at registrar@ucsc.edu. During their transition to the university and while they are enrolled as UCSC students, military veterans are provided a broad range of academic and support services by Services for Transfer and Re-Entry Students (STARS). The main STARS office is located in room 216A of the Academic Resources Center. Contact staff at (831) 459-2552, or visit the STARS web site, stars.ucsc.edu.

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Planning Your Academic Program

At UC Santa Cruz, the academic year is organized on the quarter system. Three quarters—fall, winter, and spring—constitute the regular academic year. Most UCSC courses are equivalent to 5 quarter credits and require approximately equal amounts of work: about 15 hours per week per course. You are normally expected to enroll in 15 credits each quarter; enrolling in a reduced or expanded course load requires special approval. If you maintain a B average at UCSC, you may enroll in more courses without special approval. For specific information on how courses are organized, see page 109.

You are normally expected to graduate in four years. To do so, you must pass an average of 45 credits per year, for a total of 180 credits. In order to complete certain majors with extensive course requirements, junior transfer students may need to spend more than two years at UC Santa Cruz.

The requirements for a bachelor's degree are explained in the following section. Your adviser can help you plan a program that fulfills these requirements efficiently while meeting your own educational goals (see Advising: From Course Selection to Careers, pages 36–40).

Here is what you can expect during four years at Santa Cruz:

During your freshman year, you complete your college core course and satisfy the Entry Level Writing Requirement. You also begin to fulfill the general education requirements, which expose you to a range of disciplines, and you may begin courses in your field.

If you are uncertain about your choice of major, you may explore several fields of study during your first two years at Santa Cruz. You are expected to declare your major by the end of your sophomore year. Students interested in majors requiring heavy course prerequisites, such as music and most majors in the physical and biological sciences and engineering, should be certain they start the appropriate sequences in the first year; contact the department for advising.

During your junior and senior years at Santa Cruz, you concentrate on the upper-division requirements for your major and complete your comprehensive requirement, as well as complete your general education requirements. If you entered UCSC without having fulfilled the requirement in American history and institutions, you will need to do so before you graduate.

Transfer students should complete any lower-division requirements for their intended major that are offered at their current campus and may also find it helpful to complete courses

that fulfill campus general education requirements. The Office of Admissions can help you select appropriate courses, and you should also consult with your community college adviser.

Graduation Requirements

To qualify for a bachelor's degree, you must meet the following conditions, which are explained in more detail in the following sections:

- Earn a minimum of 180 credits, each with a grade of D or better (or Pass)
- Satisfy the university requirements in American history and institutions and in Entry Level Writing (English composition)
- Meet the UCSC residence requirement
- Satisfy each of the campus general education requirements with a course grade of C or better (or Pass)
- Satisfy requirements of your UCSC college
- Complete an approved major program, including its comprehensive requirement, with grades of Pass, C, or better in all courses satisfying major requirements. In some majors, courses graded Pass may not be used to satisfy major requirements.
- Have a grade-point average of at least 2.0 in all letter-graded courses taken at UCSC and other University of California campuses
- Have no more than 25 percent of your UCSC credits graded on a Pass/No Pass basis. This includes any credits completed in the Education Abroad Program or on another UC campus in an intercampus exchange program. Departments may require that some or all courses used to satisfy the major must be taken for a letter grade.

As a Santa Cruz student, you are responsible for selecting the courses necessary to fulfill graduation requirements and prepare for advanced study or a career. It is essential that you consult regularly with academic advisers about course selection (see pages 36–40).

Keep copies of your own records, including your transcripts from other institutions, admission test scores, Transfer Credit Summary, UCSC quarterly academic record reports, and performance evaluations.

Transfer students may be able to use some of the courses they completed at other schools to help meet the 180-credit requirement. (Semester-system credits can be multiplied by 1.5 to derive equivalent quarter-system credits.) The UCSC Office of Admissions determines which courses are transferable.

University Requirements

The Santa Cruz campus administers three requirements for graduation from the University of California: (1) American history and institutions, (2) Entry Level Writing Requirement, and (3) UCSC residence. These requirements are described in detail below.

American History and Institutions

Every candidate for a bachelor's degree must demonstrate a knowledge of American history and institutions.* You may fulfill this requirement in *one* of the following ways:†

- By achieving a score of 550 or higher on the SAT Subject Examination in U.S. History
- By achieving a score of 3, 4, or 5 on the College Board Advanced Placement Examination in U.S. History, or by achieving a score of 5, 6, or 7 on the IBH History of the Americas Examination
- By achieving a score of 3, 4, or 5 on the College Board Advanced Placement Examination in American History, or by achieving a score of 5, 6, or 7 on the IBH History of Americas Examination
- By satisfactorily completing a college-level course in American history and institutions
- By certification of completion of the requirement on a transcript from an accredited California institution of higher education
- By completing an acceptable history or government course in high school that satisfies the subject requirement for admission to the university, described on page 15

Entry Level Writing Requirement

Every candidate for a bachelor's degree must demonstrate an acceptable level of ability in English composition. Before your fourth quarter of enrollment, you must fulfill this requirement in one of the following ways:

- By achieving a score of 680 or higher on the Writing component of the SAT Reasoning Examination
- By achieving a score of 3, 4, or 5 on the College Board Advanced Placement Examination in English Language or

*Foreign students with an F (student) or J (exchange visitor) visa are exempted from the American history and institutions requirement at the time they declare their candidacy for graduation. You can verify your exemption by bringing your passport to the Office of International Education, 205 Classroom Unit Building. Call (831) 459-2858 for more information.

†Alternatives for satisfying this requirement vary among the campuses of the University of California. If you plan to transfer to another UC campus, consult its general catalog for information on this point.

Literature, or by achieving a score of 5, 6, or 7 on the IBH English Language A1 Examination

- By achieving a score of 8 or higher on the systemwide UC Analytical Writing Placement Examination
- By demonstrating an acceptable level of proficiency on UCSC's Writing Placement Examination, given several times each year
- Prior to first enrollment at UC, by completing at another institution an acceptable college-level course of at least 4 quarter credits, or the equivalent, in English composition with a grade of C or better.

California high school seniors who have been admitted to UCSC must take the systemwide UC Analytical Writing Placement Examination given in May, unless they have already satisfied the requirement.

Residence

Every candidate for a bachelor's degree must be registered at UCSC for a minimum of three terms. (A term is a fall, winter, or spring quarter in which a student completes 6 or more credits. Each UCSC Summer Session in which you complete at least 2 credits is the equivalent of half a term's residence.) In addition, of the final 45 quarter credits, 35 must be in regular courses of instruction that you have taken as a registered student at UCSC. No more than 18 of the 35 credits may be completed in Summer Session. Courses taken through University Extension or the Intercampus Visitor Program do not constitute regular courses and therefore do not satisfy residence requirements.

The credit requirement for residence is applied differently to students participating in the Education Abroad Program (EAP) and the University of California in Washington, D.C. (UCDC), program. Students may satisfy the requirement in either of two ways. The first way is for students to complete 35 of their final 45 credits before leaving the Santa Cruz campus to participate in EAP or UCDC. In this scenario, students do not have to return to Santa Cruz for any additional course work after they have finished EAP or UCDC. The second way to fulfill the residence requirement is for students to complete 35 of their last 90 credits at the Santa Cruz campus, with a minimum of 12 credits completed at UCSC after their return from EAP or UCDC.

General Education Requirements

The general education requirements are designed to introduce you to various kinds of information, reasons for learning, and approaches to acquiring knowledge, as well as to promote responsible use

of what is learned. Obviously, general education requirements alone cannot achieve these ends. You are urged to look for as many opportunities as possible to gain a richer understanding of your own cultural heritage and social situation; insight into countries, societies, and eras besides your own; proficiency in another language; understanding of the nature of ethical and moral choice; and expanded knowledge of science and technology. The formal requirements described here should be considered foundations for exploration.

There are nine categories of general education requirements (see table below, Types of General Education Requirements). Each category has a general education code associated with it, and only those courses carrying that code satisfy the requirement. The codes appear in the course descriptions in this catalog and in the *Schedule of Classes*. A list of Courses That Fulfill General Education Requirements appears on pages 29–30. The list is subject to change. You should check the *Schedule of Classes* (reg.ucsc.edu/soc) each quarter for the most up-to-date information.

Some courses satisfy more than one general education requirement, so the total number of required courses may be 10 to 15.

Types of General Education Requirements

Category	General Education Code	Number of Required Credits
Introductions to disciplines—humanities and arts area* (from two different disciplines)	IH	10
Introductions to disciplines—natural sciences and engineering area* (from two different disciplines)	IN	10
Introductions to disciplines—social sciences area (from two different disciplines)	IS	10
Topical courses (one course from each of the three academic areas; appropriately designated college courses fulfill this requirement)	T	15
Quantitative course	Q	5
Composition course**	C or C1/C2	5–10
Writing-intensive course	W	5
Arts course	A	5
U.S. Ethnic minorities/non-Western society course	E	5

*For purposes of the general education requirements, humanities and arts are combined in one academic area, as are natural sciences and engineering.

**Students who enter in fall 2005 or thereafter are required, in addition to satisfying the entry level writing requirement, to complete a sequence of two 5-credit courses (C1, C2), or the equivalent in composition and rhetoric. These courses shall usually be

taken in a student's first year and must be completed before the student enrolls in the seventh quarter.

Students admitted prior to fall quarter 2005 are required to complete one 5-credit course in English composition in addition to satisfying the entry level writing requirement.

Introductions to disciplines (IH, IN, and IS codes).

These courses introduce a discipline's content, scope, and methodology. Introductory courses from two different departments are required in each of three academic areas: humanities and arts (IH code), natural sciences and engineering (IN code), and social sciences (IS code). Only one language course may be used to satisfy an IH requirement, as all languages are considered to be part of the same discipline. Similarly, only one literature course may be used, and English (transfer) courses are considered to be literature. Only one of the two IH courses may be from the arts (art, film and digital media, history of art and visual culture, music, and theater arts). Transfer courses designated IN from Anatomy, Botany, Physiology, and Zoology Departments are considered to be "biology" courses for general education purposes.

Topical courses (T code). These courses expose students to introductory-level themes of broad social or intellectual relevance. Three courses are required, no more than one from each academic area. For information on which disciplines are in each area, see Arts, page 129; Engineering, page 207; Humanities, page 312; Physical and Biological Sciences, page 384; and Social Sciences, page 418; see also the list of courses on pages 29–30. College core courses are labeled topical and carry the designation of the appropriate academic area.

Quantitative course (Q code). These courses provide methods for acquiring quantitative reasoning that involve use of advanced algebra, statistics, or calculus. One course is required.

Writing courses (C, C1, C2, and W codes).

These courses stress explicit attention to the craft of writing. Having satisfied the Entry Level Writing Requirement by the end of your first year of enrollment at UCSC (see page 25 for a description of the Entry Level Writing Requirement), you must complete two to three courses in writing. One of these must be a writing-intensive course (W code) that provides instruction and extensive practice in writing applied to a particular subject. For some courses, only certain sections are writing intensive (look for the "W" in the *Schedule of Classes* when enrolling). You must take this course at UCSC.

Students satisfy the other part of the writing requirement through a placement exam, by passing a composition course (C code), or by passing two composition courses (C1 and C2 codes).

Advanced Placement (AP)/International Baccalaureate Higher Level (IBH) Examinations, 2008–09

AP credit earned with a score of 3, 4, or 5 is applicable toward the total credits required for graduation and the UCSC campus-wide general education (GE) requirements as indicated below. Please note restrictions. IBH credit requires a score of 5, 6, or 7. If AP and IBH exams and/or college courses are taken in the same subject area, credit may be limited.

<i>Subject Exam</i>	<i>Quarter Credits</i>	<i>General Education Requirements</i>
IBH Visual Arts AP Studio Art Drawing, 2-D Design, or 3-D Design	8	Satisfies A.
AP Art History	8	Satisfies one IH and A.
IBH Biology or AP Biology	8	Satisfies one IN.
IBH Chemistry or AP Chemistry	8	Satisfies one IN.
IBH Classical Languages Latin, Greek, Vergil	8	Does not satisfy any GE
AP Latin	4	Does not satisfy any GE. Both AP exams may be taken for credit.
IBH Computer Science AP Computer Science	8	Satisfies one IN.
A	2	AB exam satisfies one IN. Maximum of 4 credits granted for both AP exams.
AB	4	
IBH Economics AP Economics Microeconomics or Macroeconomics	8	Satisfies one IS.
	4	Either AP exam satisfies one IS. Both exams earn credit.
IBH English Language A1 AP English Language and Composition or Literature and Composition	8	Satisfies one IH, Entry Level Writing Requirement, and C1.
	8	Either AP exam satisfies one IH and Entry Level Writing Requirement. AP score of 4 or 5 satisfies C1. Maximum of 8 credits granted for both AP exams.
AP Environmental Science	4	Does not satisfy any GE.
IBH Film	8	Satisfies one IH and A
IBH Geography AP Human Geography	8	Does not satisfy any GE.
	4	Does not satisfy any GE.
AP Government and Politics United States or Comparative	4	Either exam satisfies one IS. Both exams earn credit.
IBH History Africa, Americas, East & Southeast Asia/Oceania, South Asia/Middle East, or Europe	8	Satisfies one IH.
AP History European, United States, or World	8	Any AP exam satisfies one IH. All exams earn credit
IBH Language A1, A2, B Second Language AP French, German, Spanish Language	8	Does not satisfy any GE. All languages earn credit.
	8	Does not satisfy any GE. All languages earn credit.
AP French, Spanish Literature	8	Does not satisfy any GE. Both languages earn credit.
AP Chinese, AP Italian, AP Japanese Language and Culture	8	Does not satisfy any GE. Both languages may be taken for credit.
IBH Mathematics AP Mathematics	8	Satisfies one IN and Q.
Calculus AB	4	Either AP exam satisfies one IN and Q.
Calculus BC	8	Maximum of 8 credits granted for both AP exams.
IBH Music or AP Music Theory	8	Satisfies A.
IBH Philosophy	8	Satisfies one IH.
IBH Physics AP Physics	8	Satisfies one IN.
B	8	Any one exam satisfies one IN. Maximum of 8 credits granted for all AP exams.
C Mechanics or C Electricity and Magnetism	4	
IBH Psychology AP Psychology	8	Satisfies one IS.
	4	Satisfies one IS.
IBH Social/Cultural Anthropology	8	Satisfies one IS.
AP Statistics	4	Satisfies one IN and Q.
IBH Theater Arts	8	Satisfies one IH and A.

Note: A maximum of one IH will be granted from the arts (art history, film, and theater arts). A maximum of one IN will be granted from mathematics and statistics. No credit is granted for lower division language and literature other than English if it is the student's native language and at least nine years of education have been completed in that language.

You must fulfill the composition requirement prior to the seventh quarter of enrollment and before you can enroll in a writing-intensive course.

Arts course (A code). These courses provide the exposure to creative or artistic expression necessary for a liberal arts education. One designated arts course is required; most are offered through art, film and digital media, history of art and visual culture, music, and theater arts.

Ethnic minorities/non-Western society course (E code). These courses are intended to increase knowledge of ethnic minorities in the United States and non-Western cultures; improve cross-cultural awareness, and explore relationships between ethnicity and other aspects of a liberal arts curriculum. One course is required. For additional ways to pursue ethnic studies, see page 270.

Courses of fewer than 5 credits. Students usually meet the general education requirements with 5-credit courses. Several related arts courses of fewer than 5 credits with the same code may be used to satisfy the arts (A) general education requirement if they total at least 5 credits.

Advanced Placement and International Baccalaureate Examinations

The university grants credit for College Board Advanced Placement (AP) Examinations on which a student scores 3, 4, or 5 and for International Baccalaureate Higher Level (IBH) Examinations on which a student scores 5, 6, or 7. The university does not grant credit for IB standard or subsidiary level exams. Students completing the International Baccalaureate Diploma with a score of 30 or higher receive 30 quarter credits. The credit is applied toward the total credits required for graduation and toward the UCSC campuswide general education requirements, as indicated in the table at left, Advanced Placement (AP)/International Baccalaureate Higher Level (IBH) Examinations. Students should be aware that AP, IB, and college-level courses will not be granted duplicate credit. In these cases, the university will award credit for only one.

AP and IBH Examination Credit toward Degree Requirements

Certain departments also allow prospective majors to obtain waivers for prerequisite courses. (Please see table, page 28). In all cases, a student should contact the particular department to discuss his or her plans with an adviser. Please note that approval is not automatic; a petition must be filed with most departments.

(continues on p. 31)

Advanced Placement (AP)/International Baccalaureate Higher Level (IBH) Examinations: Prerequisite Course Waivers, 2008–09

Academic departments use certain scores on specific AP/IBH examinations in granting waivers or substitutions for prerequisite courses. **Unit-level credit is not affected by these equivalencies.** Students should contact the department as noted below to discuss their academic plans.

<i>Subject Exam</i>	<i>Score</i>	<i>UCSC Course Equivalency</i>	<i>Advisory Notes</i>
AP Art History	3, 4, 5	One lower-division art-history course	One course waived for the Art major but may not be used in lieu of lower-division courses for the History of Art and Visual Culture major.
AP Studio Art	3, 4, 5		
IBH Biology	5, 6, 7	Biology 3	Enrollment in the Biology 20 series is recommended.
AP Biology	3, 4, 5	Biology 3	Enrollment in the Biology 20 series is recommended.
AP Chemistry	4, 5	Environmental Studies 23	Contact the Environmental Studies department.
	5		Allows enrollment into Chemistry 1B.
IBH Computer Science	5	Computer Science 12A Computer Science 12L	
	6, 7	Computer Science 12A Computer Science 12L Computer Science 12B Computer Science 12M	
AP Computer Science A	4, 5	Computer Science 12A Computer Science 12L	Contact the School of Engineering.
AP Computer Science AB	4, 5	Computer Science 12A Computer Science 12L Computer Science 12B Computer Science 12M	
AP Economics: Macroeconomics	4, 5	Economics 2	
AP Economics: Microeconomics	4, 5	Economics 1	
IBH Mathematics	5, 6, 7		Allows enrollment in Math 20A, 22, or 23A.
AP Mathematics: Calculus AB	3	Applied Mathematics and Statistics 3 Mathematics 3	Allows enrollment in Math 11A or 19A.
	4, 5	Applied Mathematics and Statistics 3 Mathematics 3 Mathematics 11A Mathematics 19A	Allows enrollment in Math 11B, 19B or 20A. Enrollment in first quarter calculus is recommended for proposed majors in mathematics or the physical and biological sciences.
AP Mathematics: Calculus BC	3	Applied Mathematics and Statistics 3 Mathematics 3 Mathematics 11A Mathematics 19A	Allows enrollment in Math 11B, 19B or 20A. Enrollment in first quarter calculus is recommended for proposed majors in mathematics, physical and biological sciences, and the School of Engineering.
	4, 5	Applied Mathematics and Statistics 3 Mathematics 3 Mathematics 11A Mathematics 11B Mathematics 19A Mathematics 19B	Allows enrollment in Math 20A, 22 or 23A. Enrollment in Mathematics 23A is recommended for proposed majors in the School of Engineering.
AP Psychology	4, 5	Psychology 1	
AP Statistics	4, 5	Applied Math and Statistics 5 Psychology 2	

Courses That Fulfill General Education Requirements

Refer to the course listings beginning on page 109 to identify general education courses offered in fall quarter.

Introductions to disciplines, humanities, and arts (IH code)—two courses from different departments required (10 credits)

Only one IH requirement may be satisfied with a course (equivalent to 5 credits) from the Arts Division (art, film and digital media, history of art and visual culture, music, theater arts); only one language course may be used to satisfy an IH requirement; and only one literature course may be used to satisfy an IH requirement. *Note:* Transfer courses designated IH from English departments are considered to be literature courses for general education purposes.

American Studies 10
 Chinese 4, 5, 6, 50, 107, 108
 Cowell 118B
 Feminist Studies 1
 Film and Digital Media 20A, 20B, 20C
 French 4, 5, 6
 German 4, 5, 6
 Hebrew 4, 5
 Hindi 4, 5, 6
 History 1, 2A, 2B, 5A, 5B, 10A, 10B, 11A, 11B, 13, 14, 30, 40A, 40B, 41, 43, 44, 62A, 62B, 65A, 65B, 66, 70A, 70B, 70C
 History of Art and Visual Culture 10D, 10E, 10F, 10G
 Italian 4, 5, 6
 Japanese 4, 5, 6, 50
 Linguistics 50, 52, 53, 55
 Literature 1, 61F, 61H, 61M, 61P, 61R
 Spanish Literature 60
 Music 11A, 11B, 11C, 11D
 Philosophy 9, 11, 22, 24, 26, 28
 Portuguese 60B, 65A, 65B
 Russian 4, 5, 6
 Spanish 4, 5, 5M, 6, 56
 Spanish for Spanish Speakers 61, 62, 63
 Theater Arts 10, 19, 20, 30, 32, 33, 36, 40, 61, 122, 136

Introductions to disciplines, natural sciences and engineering (IN code)—two courses from different departments required (10 credits)

Transfer courses designated IN from Anatomy, Botany, Physiology, and Zoology Departments are considered to be biology courses.

Anthropology 1
 Applied Mathematics and Statistics 5, 7, 11A, 11B
 Astronomy and Astrophysics 2, 3, 4, 5, 12, 13, 14, 15, 16, 18
 Biomolecular Engineering 5
 Biology: MCD 20A
 Chemistry and Biochemistry 1A, 1B, 1C
 Computer Engineering 3, 8, 12
 Computer Science 2, 5C, 5J, 5P, 10, 12A, 12B, 13H
 Earth Sciences 1, 3, 5, 6, 7, 10, 20, 65, 119
 Economics 11A, 11B
 Environmental Studies 23, 24
 Mathematics 11A, 11B, 19A, 19B, 20A, 20B
 Ocean Sciences 1
 Physics 1, 2, 5A, 5B, 5C, 6A, 6B, 6C, 7A, 7B

Introduction to disciplines, social sciences (IS code)—two courses from different departments required (10 credits)

Anthropology 2, 3, 4

Biology: MCD 89, 89W
 Community Studies 10, 100B, 100E, 100J, 100K, 100M, 100P, 100S, 100T, 100V, 100X
 Economics 1, 2
 Education 92A, 92B
 Environmental Studies 25
 Latin American and Latino Studies 1, 126A, 126B
 Legal Studies 10
 Politics 1, 3, 4, 7, 15, 17, 20, 25, 43, 70, 72, 73, 75
 Psychology 1, 65
 Sociology 1, 10, 15, 20

Topical courses (T code)—three courses required (15 credits)

Students entering UCSC with fewer than 45 transferable credits must take three topical courses in residence at UCSC. UCSC Summer Session courses can be used to satisfy topical requirements.

Choose one course from each academic area: natural sciences (2), social sciences (3), and humanities and arts (4). Courses labeled 5, 6, and 7 satisfy topical requirements in two different academic areas; students can apply this kind of topical course to either academic area indicated. The three topical course requirements must be satisfied with three different courses. In the *Schedule of Classes*, courses that carry a T general education code are listed as follows:

- 2—Natural Sciences Area
- 3—Social Sciences Area
- 4—Humanities and Arts Area
- 5—Humanities and Arts *or* Social Sciences Area
- 6—Natural Sciences *or* Humanities and Arts Area
- 7—Natural Sciences *or* Social Sciences Area

T2—Natural Sciences

Astronomy and Astrophysics 80A, 80D
 Biology: EE 80N, 80P
 Biology: MCD 80A, 80E, 80H, 80J
 Biomolecular Engineering 80H
 Chemistry and Biochemistry 80H
 Computer Engineering 80H, 80N, 80U
 Computer Science 80B, 80C, 80G, 80K, 80V
 Earth Sciences 80A, 80B, 80C, 80D, 80G
 Electrical Engineering 80J
 Linguistics 80G
 Microbiology and Environmental Toxicology 80E
 Ocean Sciences 80A, 80B
 Physics 80A

T3—Social sciences

Anthropology 80B, 80G, 80H, 80I, 80J, 80K, 80N, 80P
 College Eight 80A, 80B
 College Nine 80A, 80B
 College Ten 80A, 80B
 Community Studies 80A, 80B, 80H, 80L
 Crown College 80G
 Economics 80A, 80G, 80H
 Feminist Studies 80R
 Latin American and Latino Studies 80A, 80B, 80C, 80D, 80E, 80H, 80I, 80Q, 80S, 80T
 Merrill College 80A, 80B, 80X
 Psychology 80A, 80B
 Sociology 80E, 80Z

T4—Humanities and arts

Art 80A, 80C, 80D, 80V
 Cowell College 80A, 80B
 Crown College 80A, 80B
 Feminist Studies 80S
 Hebrew 80
 History 80H, 80K, 80N, 80W, 80Y
 History of Consciousness 80A, 80B, 80E, 80I,

80L, 80M, 80T, 80U
 Languages 80D, 80F
 Latin American and Latino Studies 80E
 Linguistics 80B, 80V
 Literature 80A, 80K, 80L, 80M, 80N, 80X
 Music 80A, 80F, 80G, 80H, 80I, 80J, 80K, 80N, 80O, 80P, 80Q, 80S, 80V, 80X
 Oakes College 80H
 Philosophy 80E, 80F
 Porter College 80A, 80B, 80E, 80W
 Stevenson College 80H
 Theater Arts 80A, 80B, 80D, 80E, 80G, 80H, 80L, 80M, 80N, 80O, 80P, 80Q, 80S, 80U, 80V, 80W, 80X, 80Z

T5—Humanities and arts or social sciences

American Studies 80E, 80F, 80G
 Crown College 80J, 80K
 Economics 80J
 Feminist Studies 80F, 80K, 80P, 80Y
 Film and Digital Media 80A, 80S
 History of Art and Visual Culture 80A, 80D, 80E, 80G, 80N, 80S, 80T, 80V, 80X
 History of Consciousness 80J, 80N, 80O, 80Q
 Kresge College 80A, 80B, 80T
 Latin American and Latino Studies 80X
 Linguistics 80C, 80D
 Merrill College 80C, 80Z
 Oakes College 80A, 80B
 Philosophy 80L, 80M
 Porter College 80L
 Stevenson College 80A, 80B, 80T, 81A, 81B

T6—Natural sciences or humanities and arts

Art 80F
 Biology: MCD 80R
 Biomolecular Engineering 80G
 Computer Engineering 80E
 Music 80C, 80L, 80R
 Philosophy 80G, 80R, 80S
 Physics 80D
 Porter College 80K

T7—Natural sciences or social sciences

Computer Engineering 80A
 Computer Science 80J, 80S
 Crown College 80C, 80F
 Electrical Engineering 80S, 80T
 Environmental Studies 80A, 80B
 Information Systems Management 80C
 Physics 80C
 Sociology 80V

Composition courses (C code)—one course required for students entering prior to fall 2005 (5 credits)

Writing 1

Composition courses (C1 and C2 code)—one course each required for students entering fall 2005 (5 credits)

C1	C2
College Eight 80A	College Eight 80B
College Nine 80A	College Nine 80B
College Ten 80A	College Ten 80B
Cowell College 80A	Cowell College 80B
Crown College 80A	Crown College 80B
Kresge College 80A	Kresge College 80B
Merrill College 80A, 80X	Merrill College 80B, 80Z
Oakes College 80A	Oakes College 80B
Porter College 80A	Porter College 80B
Stevenson College 80A	Stevenson College 80B, 81B
	Writing 2

Writing-intensive courses (W code)—one course required (5 credits)

American Studies 100, 105A, 114B, 125H
 Anthropology 150, 152, 170, 172, 190C, 194A, 194B, 194C, 194E, 194I, 194K, 194L, 194M, 194N, 194P, 194S, 194T, 194U, 194V, 194X, 194Y, 196A-B (A: 3 credits; B: 3 credits)
 Art 150C
 Astronomy and Astrophysics 80D
 Biology: EE 141L, 145L, 150L, 151B, 158L, 159A, 161L, 183L, 188
 Biology: MCD 89W, 100L, 105L, 105M, 109L, 110L, 115L, 119L, 186L
 Chemistry and Biochemistry 122
 Community Studies 160, 194
 Computer Engineering 185
 Crown College 123
 Earth Sciences 195
 Economics 106, 107, 108, 109, 128, 142, 165, 166B, 183, 184, 188, 195
 Education 180A
 Environmental Studies 100L (concurrent enrollment in 100 required), 104A, 109B, 156, 157, 172
 Feminist Studies 117, 127, 194I, 195
 Film and Digital Media 120, 150, 196B
 History 190A, 190B, 190C, 190D, 190E, 190F, 190H, 190I, 190K, 190L, 190N, 190O, 190P, 190R, 190S, 190T, 190U, 190V, 190W, 190X, 194A, 194B, 194E, 194G, 194H, 194J, 194K, 194M, 194N, 194R, 194S, 194U, 194Y, 195B, 196A, 196C, 196E, 196G, 196I, 196J, 196K, 196N, 196O, 196P, 196R, 196S, 196T, 196U, 196W, 196Y
 History of Art and Visual Culture 100A, 187A
 Information Systems Management 158
 Kresge College 80T
 Latin American and Latino Studies 194P, 195A
 Legal Studies 128, 183, 196
 Linguistics 101, 113, 114, 197
 Literature 1, 101
 Microbiology and Environmental Toxicology 151
 Oakes College 112
 Philosophy 120, 127, 190L, 190M, 190S, 190Y
 Physics 195B
 Porter College 80W
 Psychology 110, 119A, 119C, 119G, 119H, 119M, 125
 Sociology 103B, 134, 195C
 Stevenson College 80T
 Theater Arts 157, 159
 Writing 64, 101, 102, 103, 104, 110A, 161, 163, 165, 166A, 166B, 166D, 167

Quantitative courses (Q code)—one course required (5 credits)

Applied Mathematics and Statistics 2, 3, 5, 7, 10, 11A, 11B, 80A, 113, 131, 162
 Astronomy and Astrophysics 2, 3, 4, 5, 12, 13, 14, 15, 16, 18
 Chemistry and Biochemistry 1A, 1B, 1C
 Computer Engineering 8, 12, 16
 Computer Science 80B
 Earth Sciences 80B, 80C, 111
 Economics 11A, 11B, 113
 Electrical Engineering 80T
 Mathematics 3, 4, 11A, 11B, 19A, 19B, 20A, 20B, 21, 110
 Ocean Sciences 1
 Philosophy 9
 Physics 1, 2, 5A, 6A, 7A, 80A, 80D
 Psychology 2, 181
 Sociology 103A, 103B

Arts courses (A code)—one course or equivalent required (5 credits)

Courses carrying fewer than 5 credits may be combined for credit toward satisfaction of the A requirement if they total at least 5 credits.

Anthropology 81A, 81B, 81C
 Art 10G, 10H, 20, 21, 22, 23, 24A, 24B, 26, 27, 28, 30, 39, 40, 60, 70A, 70B, 70C, 80A, 80C, 80D, 80F, 80V, 102, 107, 109, 112, 113, 114, 118, 119, 123, 126, 135, 136, 141, 161
 Community Studies 125, 147
 Cowell College 70A, 70B, 70C
 Feminist Studies 80S, 123
 Film and Digital Media 20A, 20B, 20C, 20P, 80A, 80S, 132A, 132B, 136A, 136B, 151, 160, 165A, 170A, 170B, 176, 185D
 History of Art and Visual Culture 10D, 10E, 10F, 10G, 80A, 80D, 80E, 80G, 80M, 80N, 80S, 80T, 80V, 80X, 100A, 100E, 104A, 105E, 105P, 105R, 106A, 106D, 106I, 106X, 107A, 107B, 110A, 110B, 114, 115, 120A, 121A, 121C, 121D, 124, 126, 131, 136, 137, 138, 139, 140, 140A, 142, 149A, 150A, 151A, 153, 154A, 154B, 154C, 154D, 155, 156, 159B, 159D, 160, 161, 163A, 163B, 168, 169, 172, 174C, 175, 177, 178A, 179, 180, 181, 182, 183, 185A, 185B, 185C, 186B, 187A, 189D, 189N, 189V, 189Y, 189Z, 190A, 190B, 190C, 190D, 190F, 190G, 190H, 190I, 190M, 190O, 190P, 190Q, 190R, 190S, 190T, 190U, 190W, 190Y, 191B, 191C, 191D, 191E, 191H, 191P, 191S, 191X
 Latin American and Latino Studies 81A, 81B, 81C, 161P, 171
 Literature/Creative Writing 10, 52, 53, 170, 180, 183
 Music 1A, 2, 3, 5A, 5B, 5C, 6, 10, 11A, 11B, 11C, 11D, 51, 54, 75, 80A, 80C, 80F, 80G, 80H, 80I, 80J, 80K, 80L, 80N, 80O, 80P, 80Q, 80R, 80S, 80V, 80X, 102, 103, 159A, 159B, 160, 180A, 180B
 Music Sequence Courses: 1C-1C-1C, 2-2-2, 3-3-3, 4A-4A-4A, 4B-4B-4B, 4A-4A-4B, 4A-4B-4B, 8-8-8, 9-9-9, 166-166-166
 Philosophy 152
 Porter College 14, 20A, 20C, 20D, 21A, 21C, 22, 22A, 22F, 22G, 23A, 23B, 23C, 28, 32A, 33, 33A, 34B, 35, 35A, 38B, 39, 80E, 80G, 80L, 83, 120, 121, 121C, 121D
 Theater Arts 10, 12, 14, 17, 18, 18C, 19, 20, 21, 22, 23, 30, 31C, 31P, 32, 33, 35, 36, 37, 40, 50, 52, 61, 80A, 80B, 80D, 80E, 80G, 80H, 80L, 80M, 80N, 80O, 80P, 80Q, 80S, 80U, 80V, 80W, 80X, 80Z, 100A, 100B, 100C, 100G, 100H, 100I, 100L, 100M, 100W, 104, 105, 110, 113, 114, 115A, 115B, 116A, 116B, 117, 117A, 118, 119, 121, 122, 124, 126, 128, 129, 130, 131, 131C, 131P, 132, 135, 136, 136C, 137, 138, 139, 142, 151, 152, 155, 157, 159, 160, 161C, 161D, 161M, 161P, 161Q, 161R, 161S, 161T, 161U, 161V, 161Y, 162, 163A, 163E, 163G, 163Y, 164, 165, 193, 193F
 U.S. ethnic minorities/non-western society courses (E code)—one course required (5 credits)
 American Studies 10, 80E, 101, 121C, 123F, 123H, 123M, 123T, 123X, 123Z, 125A, 125E, 125G, 125H, 125X, 126B, 126C, 127A, 127C, 127D, 127E, 127F, 127K, 190H
 Anthropology 80B, 80D, 80G, 80I, 80P, 130A, 130B, 130C, 130E, 130F, 130G, 130H, 130I, 130L, 130M, 130N, 130T

Community Studies 20, 80A, 80B, 80H, 100E, 100J, 100P, 114, 132, 152
 Computer Science 80S
 Economics 120, 128
 Education 92C, 128, 141, 164, 175, 181
 Feminist Studies 80F, 80P, 80R, 80Y, 102, 110, 115, 117, 120, 123, 124, 132, 139, 145, 151A, 194F, 194M
 Film and Digital Media 132C, 162A, 165B, 165D, 185E
 Hebrew 106
 History 5A, 11B, 14, 30, 40, 40A, 41, 43, 45, 74, 74A, 75, 80H, 80W, 80Y, 101A, 101B, 106A, 106B, 109A, 111, 121A, 121B, 123B, 126, 127, 128, 130, 131, 132, 134A, 134B, 137A, 137B, 137C, 140C, 140D, 141A, 141B, 145, 147A, 147B, 148, 150C, 155, 185A, 185B, 185D, 185E, 190A, 190B, 190C, 190D, 190E, 190L, 190N, 190O, 190R, 194G, 194H, 194N, 194U, 194Y, 196N, 196Q
 History of Art and Visual Culture 10E, 80G, 80M, 80N, 80T, 100E, 105E, 105P, 106A, 107A, 107B, 121C, 121D, 139, 142, 151A, 155, 156, 160, 161, 172, 182, 185A, 185B, 185C, 187A, 189D, 190B, 190C, 190O, 190U, 191C, 191F, 191P
 History of Consciousness 118
 Languages 80F
 Latin American and Latino Studies 1, 10, 80A, 80B, 80C, 80D, 80E, 80F, 80G, 80H, 80I, 80Q, 80S, 80T, 80X, 100A, 100B, 101, 110B, 111, 120, 123A, 123B, 126A, 126B, 127, 128, 129, 140, 141, 142A, 142B, 143, 144, 145, 146, 147, 148, 152, 160, 161P, 162, 163, 164, 166, 167, 168, 169, 170, 173, 175, 176, 178, 180, 194C, 194D, 194E, 194F, 194G, 194J, 194K, 194L, 194M, 194N, 194P, 194R, 195A
 Legal Studies 127, 128, 135, 136
 Literature 61R, 80L, 80X
 English-Language Literatures 103I, 130C, 150C, 150F, 150G, 155D, 190D
 French Literature 134
 Modern Literary Studies 125D, 125L, 144G, 180B, 180F
 Spanish Literature 60, 102B, 130E, 131H, 134C, 134L, 134N, 135A, 135C
 World Literature and Cultural Studies 109, 112, 117, 118, 124, 135, 136, 190A, 190B
 Merrill College 80A, 80B, 80X, 151
 Music 11B, 11D, 80A, 80F, 80I, 80K, 80P, 80Q, 80X, 180A, 180B
 Oakes College 80A, 80B, 80H, 175
 Philosophy 80E
 Politics 127, 140C, 140D, 141, 146, 156
 Psychology 110, 119B, 143, 157, 158
 Sociology 15, 20, 133, 156, 169, 170, 174, 175, 188
 Spanish 156A
 Stevenson College 80H, 80T, 81A, 81B
 Theater Arts 22, 80A, 80D, 80M, 100A, 100B, 100C, 100I, 100L, 100W, 161D, 161P, 161R, 163Y

(continued from p. 27)

Credits for Transfer Students

General Education Requirements

Transfer students may apply courses taken at other institutions toward the general education requirements with two exceptions: The writing-intensive course (W code) must be taken at UCSC. Also, transfer courses are not applied to the topical requirement (T code), but topical courses are waived at entrance according to the following formula: 45–83.9 transferable quarter credits, one course waived; 84–104.9 transferable quarter credits, two courses waived; 105 or more transferable quarter credits, all three courses waived. If one topical course is required in residence at UCSC, it may be chosen from any of the three academic areas (humanities and arts, natural sciences and engineering, and social sciences). If two are required, they must be from two different areas.

Please note that beginning with students entering UCSC in fall quarter 2010, the topical requirements will need to be satisfied with specific transfer courses. UCSC is currently in the process of identifying appropriate courses offered through California community colleges (www.assist.org) beginning in September 2007.

If you are currently attending one of the California community colleges, consult with the UCSC Office of Admissions or your current counselor to determine which college courses satisfy UCSC general education requirements.

Transfer students who have satisfied the general education or breadth requirements of another UC campus prior to transfer will be considered to have completed the UCSC general education requirements. Completion of the Intersegmental General Education Transfer Curriculum (IGETC) prior to enrollment at UCSC will also be accepted in lieu of the campus general education requirements.

Intersegmental General Education Transfer Curriculum (IGETC)

The Intersegmental General Education Transfer Curriculum (IGETC) is a series of courses prospective California community college transfer students may complete to satisfy the lower-division breadth/general education requirements at any University of California or California State University (CSU) campus (see table, this page). This curriculum is the result of an agreement, by the University of California, the California State University, and the California community colleges, aimed at simplifying the transfer process for community college students. The IGETC is intended exclusively for California community college transfers and is not an option for continu-

ing UCSC students or for students transferring from four-year colleges or universities.

Students must *complete* the IGETC prior to transfer or they will be required to satisfy the UCSC general education requirements. All courses must be completed with a grade of C (2.0) or better. A grade of Credit or Pass may be used if the community college's policy states that it is equivalent to a grade of C (2.0) or better.

IGETC is not recommended for majors that require extensive course preparation, such as any major in the Jack Baskin School of Engineering or the Division of Physical and Biological Sciences.

Major Requirements and Course Prerequisites

Students who believe they have taken courses at other institutions that satisfy major requirements or UCSC course prerequisites should contact the sponsoring department for review.

College Requirements

You must fulfill the requirements of your college in addition to those of your major and of the university. Each college has established a core course, which all first-year students are required to complete. Students admitted as transfer students are exempt from the core course requirement but may take the course at their option on a space-available basis. College requirements are outlined below. The core courses are described more fully in the individual college descriptions, pages 76–106.

College Eight

- College Eight 80A, *Introduction to University Discourse: Environment and Society*, fall quarter or College Eight 80B, *Rhetoric and Inquiry: Environment and Society*, fall quarter

College Nine

- College Nine 80A, *Introduction to University Discourse: International and Global Issues*, fall quarter, or College Nine 80B, *Rhetoric and Inquiry: International and Global Issues*, fall quarter

College Ten

- College Ten 80A, *Introduction to University Discourse: Social Justice and Community*, fall quarter, or College Ten 80B, *Rhetoric and Inquiry: Social Justice and Community*, fall quarter

Cowell

- Cowell 80A, *Introduction to University Discourse: Imagining Justice Past and Present*, fall quarter, or Cowell 80B, *Rhetoric and Inquiry: Imagining Justice Past and Present*, fall quarter

Crown

- Crown 80A, *Introduction to University Discourse: Ethical Issues in Emerging Technologies: Participatory Evolution from Human to Post-Human*, fall quarter, or Crown 80B, *Rhetoric and Inquiry:*

IGETC Subject and Unit Requirements

Subject Area	Courses Required	Units/Credits Required
1. English Communication One course in English composition and one course in critical thinking/English composition. (Students transferring to CSU must take an additional course in oral communication.)	2 courses	6 semester units or 8–10 quarter units
2. Mathematical Concepts and Quantitative Reasoning	1 course	3 semester units or 4–5 quarter units
3. Arts and Humanities Three courses with at least one from the arts and one from the humanities.	3 courses	9 semester units or 12–15 quarter units
4. Social and Behavioral Sciences Three courses from at least two disciplines or an interdisciplinary sequence.	3 courses	9 semester units or 12–15 quarter units
5. Physical and Biological Sciences One physical science course and one biological science course, at least one of which includes a laboratory.	2 courses	7–9 semester units or 9–12 quarter units
6. Language Other Than English Proficiency equivalent to two years of high school in the same language. (Not required of students transferring to CSU.)	Proficiency	Proficiency
Total	11 courses	34 semester units

Source: Student Academic Services, Office of the President, University of California, 1991.

Ethical Issues in Emerging Technologies: Participatory Evolution from Human to Post-Human, fall quarter

Kresge

- Kresge 80A, *Introduction to University Discourse: Power and Representation*, fall quarter, or Kresge 80B, *Rhetoric and Inquiry: Power and Representation*, fall quarter

Merrill

- Merrill 80A, *Introduction to University Discourse: Cultural Identities and Global Consciousness*, fall quarter, Merrill 80B, *Rhetoric and Inquiry: Cultural Identities and Global Consciousness*, fall quarter

Oakes

- Oakes 80A, *Introduction to University Discourse: Values and Change in a Diverse Society*, fall quarter, or Oakes 80B, *Rhetoric and Inquiry: Values and Change in a Diverse Society*, fall quarter

Porter

- Porter 80A, *Introduction to University Discourse: Writing Across the Arts*, fall quarter, or Porter 80B, *Rhetoric and Inquiry: Writing Across the Arts*, fall quarter

Stevenson

- Stevenson 80A, *Introduction to University Discourse: Self and Society*, fall quarter, or Stevenson 80B, *Rhetoric and Inquiry: Self and Society*, fall quarter
- Stevenson 81A, *Self and Society 2*, winter quarter, or Stevenson 81B, *Rhetoric and Inquiry: Self and Society 2*, winter quarter

Major and Minor Requirements

To qualify for a bachelor's degree at UCSC, you must complete the minimum requirements for a major program, as well as satisfy university, campus, and college requirements.

At UCSC, you have the option of pursuing a single major, a double major, or a combined major. The minimum requirements for an established major program are set by the sponsoring department. (If you are a transfer student, the department will determine which of your transferable courses may be used to satisfy major requirements.) The major involves substantial work in the discipline and requires no fewer than 40 upper-division or graduate credits. Only courses in which you earn a grade of Pass, C, or better satisfy major or minor requirements.

Declaring a Major

The field of interest you indicate on your application to UCSC does not automatically place you in a major. You are advised to declare your major as soon as possible. You are *required* to file a study plan and declare a major *before* enrolling in the equivalent of your third year,* in consultation with the appropriate academic advisers. You will not be allowed to enroll in classes for the equivalent of your third year until you have declared a major. Certain majors have a limit on the number of students they can serve. Be sure you are aware of all the necessary criteria for qualifying for the major. It is wise to apply for major status as soon as you feel sure of the field you wish to enter. Junior transfer students must file a study plan and declare a major during their second quarter at UCSC by the deadline printed in the Academic and Administrative Calendar in the *Schedule of Classes*.

You should determine the requirements for possible major choices as soon as possible because certain majors require substantial preparation, with many interlocking course sequences. If you intend to pursue such a major, you should start work toward it early in your undergraduate career. (Review majors that interest you in the Programs and Courses section, pages 109–442.) Academic advisers can offer assistance in selecting courses appropriate to your individual needs (see pages 36–39).

**Note:* This is the year you would become a junior given normal progress to degree. For example, if you transfer to UCSC as a beginning sophomore, it is your second year here.

Comprehensive Requirement

Every major at UCSC includes a senior exit requirement designed to integrate the knowledge and skills learned throughout the curriculum. This capstone requirement may be a senior thesis, senior seminar, comprehensive examination, or some other integrative experience designed for the major. Choices for satisfying this requirement are specified with the requirements for each major.

Minor Programs

See pages 8–9 for undergraduate minors currently offered at UC Santa Cruz. Completion of a minor is optional. If you wish, you may complete more than one minor.

The sponsoring department establishes the course requirements for a minor. The minor involves substantial work in the discipline and requires no fewer than 25 upper-division or graduate credits. The minor appears on your official transcript but not on your diploma.

Additional Majors or Minors

To complete multiple majors and minors, you must fulfill all of the requirements for all majors and minors declared, including the comprehensive requirement for each major. In general, a single thesis may not be used for more than one major. You may count courses for more than one major or minor, as long as each major includes 40 unique (not double-counted) credits of upper-division course work and each minor includes 25 unique (not double-counted) credits of upper-division course work.

The diploma of a student who has completed a double major in history and music, for example, would read “Bachelor of Arts with Majors in History and Music.”

Combined Major

A combined major allows you to complete a course of study involving two disciplines offered as regular programs at UC Santa Cruz.

Examples of combined majors include environmental studies/economics and Latin American and Latino studies/politics. A combined major is designed by faculty representatives from both disciplines. In general, fewer courses are required than for a double major, and students complete the comprehensive requirements as specified for each combined major. Combined majors currently available are listed in the footnotes on page 9.

The diploma of a student who has completed a combined major in environmental studies and economics, for example, would read “Bachelor of Arts with a Major in Environmental Studies/Economics.”

Individual Major

Students may also work with three faculty members to define an individual major specific to his or her academic goals. Proposals for individual majors require considerable effort to develop, and students are advised to consider double major, combined major, and major/minor alternatives. College advising offices can provide information on the individual major proposal and approval process.

Catalog Rights

Effective for all undergraduates who entered in fall quarter 1993 or after, students may follow the degree requirements from either the *UCSC General Catalog* published at the time of entering UCSC or subsequent catalog(s). Students need not follow a catalog in its entirety but may elect to follow different catalog years for their college requirements, university and general education requirements, requirements of their major(s), and requirements of any minor(s).

Catalog year will initially be set for the first year of enrollment at UCSC. Students may elect to follow requirements from other catalog year(s) when filing the Proposed Study Plan/Declaration of Major/Minor. All requirements for graduation outlined in the catalog(s) selected must be met before graduation. Changing catalog year(s) is done by submitting a new Proposed Study Plan/Declaration of Major/Minor.

Students transferring from other collegiate institutions may elect to meet as graduation requirements one of the following:

- those in effect at the time of transfer to UCSC;
- those subsequently established; or
- those in effect when the student entered a previous collegiate institution, provided that entry was not more than three years prior to the time of transfer to UCSC.

Students who seek readmission to UCSC after a break in attendance greater than two years (six regular quarters) must adhere to the graduation requirements in effect at the time of readmission or those subsequently established.

Students who entered prior to 1993 should see an adviser. Their catalog year(s) for graduation, whether the year they entered UCSC or subsequent year(s), will be decided at the discretion of their major department and/or their college.

Institutional Responsibility

Undergraduate students who have made significant progress toward a degree in a specific major can assume that a degree will be granted if they meet all catalog degree requirements and maintain continuous enrollment and progress.

Should UCSC find it necessary to discontinue a specific major, every effort will be made to allow currently enrolled majors to complete their degrees within a reasonable period of time. This may include (1) movement to a similar or related degree track; (2) substitution of requirements; (3) development of an individual major proposal; or (4) completion of courses at another University of California campus through the Intercampus Visitor Program. Students with questions concerning this policy should contact their major and college advising offices.

In all cases, any financial obligations are the responsibility of the individual student involved.

Evaluating Academic Performance

UC Santa Cruz has one of the more comprehensive systems for evaluating students' academic performance of any research university in the United States. The evaluation system consists of two major components: the assignment of a final grade in the course and an accompanying evaluation of your performance.

Evaluations

In each course for which you receive a grade of D or better (or P), you should receive an evaluation of your academic performance. An evaluation may

- describe the strengths and weaknesses of your performance in the various areas of class activity (discussion, laboratory work, term papers, examinations)
- assess your general understanding of the course content
- recognize additional or particularly outstanding work

Evaluations are used at UCSC in academic advising, reviewing scholarship applications, and awarding College Honors and Honors in the major. Evaluations are a permanent part of your academic record. All students may request transcripts either with or without evaluations.

Grades

At the end of each course, you will receive one of the following grade notations:

A	excellent
B	good
C	fair
D	poor
F	fail
P	passing
NP	not passing
I	incomplete
IP	in progress
W	withdrawal

The grades of A and B may be modified by a plus (+) or a minus (-). The grade of C may be modified by a plus only. You will not receive credit for graduation in any course in which you receive a final grade of F or NP. The grades I and IP are temporary grades used in special circumstances. The final notation W indicates that you officially withdrew from the course before completing it.

Grade Points

Grade points are assigned to a letter grade as follows:

4.0 = A+
4.0 = A
3.7 = A-
3.3 = B+
3.0 = B
2.7 = B-
2.3 = C+
2.0 = C
1.0 = D
0.0 = F

The grades P and NP are not included in calculating your GPA and so are not assigned grade points. Courses in which the interim grades I and IP are assigned earn no grade points or credit until the interim grade is replaced by a final letter grade.

Grade-Point Average (GPA)

Undergraduates entering UCSC in fall 2001 and thereafter have a UCSC cumulative grade-point average calculated from UCSC courses, courses taken through the Education Abroad Program, and courses taken at another UC campus as part of the Intercampus Visitor Program.

A grade-point average is determined by dividing the number of grade points earned by the number of units attempted for a letter grade. In calculating your UCSC GPA, the interim grades IP and I are not included in the computation because you do not earn those credits until they are replaced with a final grade. (However, when checking for whether you have satisfied the 2.0 UC GPA requirement for graduation [see page 25], these interim grades are included and counted as courses with grade F [or NP]).

If you repeat a course in which you have received a D or F, only the last grade recorded shall be computed in your GPA for the first 15 credits of repeated work. After the 15 credit maximum is reached, the GPA will be based on all grades assigned and total credits attempted.

Undergraduates who entered UCSC for the first time in or after fall 1997 and before fall 2001 have a UCSC cumulative grade-point average only if they have elected letter grades in at least two-thirds of the cumulative credits attempted. Undergraduates who entered UCSC prior to fall 1997 cannot have an official UCSC grade-point average calculated.

Pass/No Pass Option

Students in good academic standing may request to take specific courses on a Pass/No Pass basis. Students receive a P (Pass) for work that is performed at C level or better. Work performed at below a C level receives a notation of NP on the student's transcript, and no academic credit is awarded for the course. Requests for Pass/No Pass grading must be submitted and confirmed by the Grade Option deadline printed in the Academic and Administrative Calendar (reg.ucsc.edu/calendar). If you request P/NP grading in a course and you are later placed on academic probation, your P/NP grading request will be canceled.

At least 75 percent of your UCSC credits applied to graduation (including Education Abroad Program and Intercampus Visitor Program credits) must be taken for a letter grade. Students must be careful about the use of the Pass/No Pass option. Some courses may only be taken Pass/No Pass, and therefore count against the 25 percent Pass/No Pass limit. Several majors require all or most major requirements to be taken for a letter grade; read the major requirements section carefully before using the Pass/No Pass option for any course in a major you are considering.

Incomplete

The notation I may be assigned when your work for a course is of passing quality but for which some specific required work has not been completed. You must make arrangements with the instructor before the end of the course in order to receive an Incomplete. To remove the Incomplete, you must submit the remaining course work and file a petition by the deadline printed in the Academic and Administrative Calendar (generally the end of the following quarter). If you do not meet the deadline, the Incomplete lapses to a No Pass or an F, depending on the grading option selected at the beginning of the quarter.

The notation IP (In Progress) is reserved for a single course extending over two or three terms of an academic year. The grade for such a course may be awarded at the end of the course and shall then be recorded as applying to each of the terms of the course. A student satisfactorily completing only one or two terms of a course extending over two or three terms of an academic year will be given grades for those terms. The grade option selected in the first quarter of the multiple-term sequence applies to all quarters of the sequence.

Grade changes (except for I and IP, as above) are allowed only to correct clerical or calculation errors by the instructor and must be submitted

to the Office of the Registrar by the instructor in charge of the course within one year of the close of the quarter for which the original grade was submitted.

Student Responsibility

Students are responsible for using the Academic Information Systems (AIS) to set and confirm choices for grading options and for ensuring timely completion of all requirements. Students view their schedule at my.ucsc.edu.

Course Loads

The usual course load for UCSC undergraduates is 15 to 19 credits, most often as three 5-credit courses and associated laboratories and sections. After the advanced enrollment period, students with a UCSC GPA of 3.0 may enroll in up to 22 credits without special approval and may seek approval for higher loads from their college advising office. Students in their first quarter or with a lower GPA must seek approval from their college advising office for enrollment in more than 19 credits.

College approval is required to carry fewer than 15 credits.

Academic Progress

Academic progress is a measure of the completion of courses with a D or better, or Pass. Colleges monitor academic progress to ensure you are progressing toward your degree, which must be earned within five years.

Minimum progress is based on length of time at UCSC. The minimum acceptable progress is completion of 36 credits for each academic year, 12 credits for each additional full-time term, and four-fifths of credits attempted for each part-time term. Progress is measured cumulatively, not term by term. For example, a full-time student must complete 48 credits by the end of the first quarter of the second year.

If you do not maintain minimum progress, your college may require you to take higher course loads, complete Summer Session courses, or make other adjustments to your study plan.

Academic Standing

Academic standing is a measure of performance in completed courses. You must maintain a 2.0 UCSC GPA in order to remain in good academic standing.

If your UCSC term or cumulative GPA falls below 2.0 at the end of any term, you will be placed on academic probation for the next

term. You will need to work with your college and major advisers to determine the best way to return to good academic standing. Be sure to take full advantage of the many learning support services available at UCSC.

If your UCSC GPA for any term falls below 1.5, or if you are on academic probation and your cumulative GPA at the end of a term is below 2.0, you are also subject to disqualification. This means that your enrollment at UCSC may be barred for a specific period of time, or you may be disqualified indefinitely from attending the University of California. In many cases, a specific study plan can be developed with your college that will enable you to remain enrolled at UCSC.

For students who entered UCSC prior to fall 2001, academic standing and progress are calculated differently. Contact your college office or see *The Navigator* (reg.ucsc.edu/navigation) for more information.

Maximum Credits and Years

Students are expected to complete their degree objective(s) within at most 225 credits and five academic years (Advanced Placement and International Baccalaureate units are not counted). Students who transfer with advanced standing are expected to complete their degree objective(s) within at most 135 UCSC credits and three academic years.

Colleges may make exceptions to the credit maximum for students in certain cases. Such exceptions are conditional on maintaining academic standing, minimal progress, and progress toward the degree objective(s).

Students in danger of exceeding the credit limit or the five-year or three-year limit may be required to modify their degree objective, such as by completing a major without a minor or double major, or completing a related major with fewer course requirements.

Repeating Courses

Undergraduates may repeat courses in which they earn a D, F, or No Pass. Courses in which a D or F is earned may not be repeated on a Pass/No Pass basis. Courses in which a grade of No Pass is earned may be repeated on the same basis or for a letter grade. For the first 15 credits of repeated courses, the original grade and corresponding grade points earned are excluded in calculating the GPA, and only the grade and grade points from the repetition are used. After the 15-credit maximum is reached, the GPA will be based on all grades assigned and grade points earned. However, credit is not awarded

more than once for the same course. The grade assigned each time the course is taken will be permanently recorded on the official transcript. Repetition of a course more than once requires approval of the student's college.

Academic Integrity

The university is dedicated to the unhindered pursuit of knowledge and its free expression. It is essential that faculty and students pursue their academic work with the utmost integrity. This means that all academic work produced by an individual is the result of the sole effort of that individual and acknowledges the contributions of others explicitly. It is the responsibility of students and faculty to be absolutely clear about what constitutes plagiarism, cheating, or other violations of academic integrity. Violations of academic integrity by students result in both academic sanctions (e.g., failing the course) and disciplinary sanctions (e.g., suspension or dismissal). Consult Appendix G of the campus's *Student Policies and Regulations Handbook* (www2.ucsc.edu/judicial/) for more discussion and information.

Undergraduate Honors Program

UC Santa Cruz awards several honors for outstanding academic achievement.

Deans' List Honors

Students will be eligible for quarterly Dean's Honors if they have earned a minimum of 15 units that quarter, of which at least 10 are graded, with a term grade point average (GPA) equal or higher than that required for University Honors at graduation in their group* for the current academic year. The notation "Dean's Honors" will appear on the transcript.

**Note:* GPA thresholds for Baskin School of Engineering majors are calculated separately from those of majors in all other divisions.

Honors at Graduation

Honors at graduation are awarded by the university and by the separate majors and colleges based on a review of their graduates' academic records. In general, honors are limited to 15 percent of the graduating class. University Honors are based solely on the cumulative UC GPA. Faculty review for major and college honors may involve additional criteria.

University Honors

To be considered for University Honors at graduation, students must have completed 70 or more units at the University of California and have attained in their group* a UC GPA that places them in the rankings as follows: Summa Cum Laude, top 2 percent; Magna Cum Laude, next 3 percent; Cum Laude, next 10 percent. Each year and for each group, the registrar will calculate the GPA thresholds required for these levels of University Honors, based on the GPAs of recent graduates. The notation "University Honors" will appear on the diploma and transcript.

**Note:* GPA thresholds for Baskin School of Engineering majors are calculated separately from those of majors in all other divisions.

Honors in the Major

At graduation, the department sponsoring a student's major program may confer Honors or Highest Honors in the major. This notation appears on the transcript as well as on the diploma. In general, no more than 15 percent of the graduation class in a major will be awarded Honors at graduation.

College Honors

Colleges review their graduating students for academic achievement and according to criteria set by the college faculty reviewers. In general, no more than 15 percent of the graduating class of a college will be awarded Honors at graduation.

Deadlines

To be considered for honors in the major or college honors, students must apply to graduate by the Registrar's deadline.

Any Student who has a reportable disciplinary sanction for a violation of academic integrity policies may be ineligible for any honors designation, at the discretion of the agency that awards the designation.

Honor Societies

Many UC Santa Cruz students are members of departmental, professional, local, and national honor societies whose goals are to recognize and improve scholastic standing in an area of interest. Among these are Phi Beta Kappa, the oldest national society that advances scholarship and recognizes excellence in the liberal arts and sciences; Tau Beta

Pi, the engineering honor society that recognizes students of distinguished scholarship, exemplary character, and dedication to service; and Psi Chi, which encourages, stimulates, and maintains excellence in scholarship, and advances the science of psychology.

Awards and Scholarships

UC Santa Cruz has a variety of scholarship and award opportunities that are designed to reward, encourage, and assist students in pursuing academic excellence and leadership roles. Students can find such opportunities through their colleges, departments, divisions, and various external agencies.

The Office of Undergraduate Education provides administrative support to a variety of prestigious scholarships and awards such as the Karl S. Pister Leadership Opportunity Award, Dean's and Chancellor's Award, Steck Foundation Award, Donald A. Strauss Scholarship, Fulbright Scholarship, Marshall Scholarship, and Jack Kent Cooke Scholarship. Acknowledgment of scholarship and award recipients are given at the Undergraduate Academic Achievement Award Ceremony at the end of each academic year.

Transcripts

Academic records are maintained by the Office of the Registrar, which will issue an official transcript only on your written request.

For information on ordering transcripts, please refer to the following URL: reg.ucsc.edu.

If you have outstanding financial obligations to the university, a hold may be placed on your transcript. The Office of the Registrar does not provide unofficial copies of transcripts.

Transcripts for UCSC Extension courses should be requested from UCSC Extension Records, 1101 Pacific Avenue, Suite 200, Santa Cruz, CA 95060-7507 (831) 427-6600.

Privacy of Records

UCSC students are informed annually of the federal Family Educational Rights and Privacy Act (FERPA) and its provisions. This act, which the institution follows, was designed to protect the privacy of education records and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings. Students also have the right to file complaints with the Family Educational Rights and Privacy Act Office concerning alleged failures by the institution to comply with the act.

UCSC policy explains in detail the procedures to be used by the institution for compliance with the provisions of the act. FERPA guidelines are available in *The Navigator*, the student handbook. The full text of the University of California policies applying to the Disclosure of Information from Student Records is online: reg.ucsc.edu/guidelines.html.

Questions concerning the Family Educational Rights and Privacy Act may be referred to the Office of the Registrar, 190 Hahn Student Services Building.

Advising: From Course Selection to Careers

Attending Summer Orientation is one of the most important steps a new student takes in preparing for the transition to university life. Summer Orientation provides the academic advising you need to make informed decisions about classes and majors, and the opportunity to ask questions regarding financial aid and housing.

Orientation begins the process of academic advising and provides a comprehensive introduction to all aspects of UCSC. While at Orientation, you will be introduced to continuing students, faculty, and staff who will assist you in attaining academic and personal success at the university.

Summer Orientation is held several times over the course of the summer and includes separate programs for first-year and transfer students, as well as concurrent programs for parents and family members.

New students reserve their place in Summer Orientation online through the UC Santa Cruz portal at my.ucsc.edu.

Fall Welcome Week, occurring during the first week of fall quarter, is the next step in the

orientation and advising process for new students entering fall quarter. It provides you with an opportunity to settle into life at UCSC, take advantage of important services, and continue your academic advising.

For new students entering in the winter quarter, an Orientation session is offered in December.

Questions can be directed to the Office of Campus Orientation Programs at (831) 459-5468, or via e-mail to orientation@ucsc.edu. Web: admissions.ucsc.edu/orientation.

Important information on particular majors may be viewed on individual departmental web sites. The sites will give you contact information and office hours. Advisers provide detailed information regarding requirements for the major and assist you in planning a program of study. The department adviser can also assign you to an appropriate faculty adviser who may serve as a mentor in your field, recommending courses and helping you refine your educational goals.

It is also important to seek departmental advising for assistance in planning your overall academic program. For transfer students and for students in many majors (such as those in the physical and biological sciences, engineering, arts, and environmental studies), it is necessary to obtain departmental advising prior to or at the start of the first quarter on campus.

For more general academic questions, make an appointment with a college adviser. Each college has specialized staff members, called academic preceptors, who advise students on everything from general education requirements to choosing a major.

For help in assessing career interests and exploring and choosing career options, contact the Career Center. The staff also will assist with résumé preparation, interviewing skills, applying for an internship, and job-search strategies. Many students find that participation in internships and field programs, described on pages 41–43, gives them a practical basis for making career decisions. The Career Center offers workshops, an online database, and publications on many internship opportunities. The office's Career Advice Network (CAN) will connect you with UCSC alumni professionals who help students achieve their career goals.

If you plan to go on to graduate school, consult with faculty in your major. Faculty advisers are the best people to ask about the quality of graduate programs in your field of interest. In addition, the Career Center offers advising and workshops on applying to graduate school. A letter-of-reference service enables you to maintain your recommendation letters at the Career Center.

If you intend to pursue graduate study in a field not offered as a major at Santa Cruz,

you can prepare for your intended program through one of the campus's regular majors. You must plan your studies carefully, however, and advising will be especially important. The Career Center library has information that will help prepare you for graduate and professional programs. The following are some fields in which UCSC alumni have pursued graduate study and successful careers:

- Architecture
- Business
- Conservation
- Film
- Finance
- Guidance and counseling
- High-tech industry
- Human resources
- Industrial and labor relations
- International relations
- Law
- Marketing
- Museum administration
- Public administration
- Urban planning

If you plan to pursue a career in medicine or another health-related field (including dentistry, nursing, nutrition, occupational therapy, optometry, osteopathic medicine, pharmacology, physical therapy, public health, and veterinary medicine), contact the Division of Physical and Biological Sciences' Health Career Resource Office at (831) 459-2954. Ethnic-minority students may also be eligible for the MARC/MBRS Programs, described below.

If you are interested in the field of law, the prelaw adviser for UCSC is at the Career Center, (831) 459-2957.

A number of programs provide additional academic advising and comprehensive support services to students with specific needs. Educational Opportunity Programs (EOP), Services for Transfer and Re-Entry Students (STARS), the Disability Resource Center, and International Programs are described below. If you need assistance in another area, check to see if it is listed in the Index, pages 483–487. For additional information, check with your college office or consult *The Navigator* or *Schedule of Classes* (reg.ucsc.edu).

Counseling on personal and family issues is available through Counseling and Psychological Services, described on page 101.

Career Center

UC Santa Cruz graduates find success in many different career fields, and their superior educa-

tion is the foundation for this success. The staff at the Career Center will help you link your educational experience to the world of work. The center provides a variety of employment and career-development services to help students obtain rewarding and successful careers.

Students are encouraged to visit the Career Center early during their first year on campus. The first step is to meet with a career adviser to begin developing a focused career plan. Simply sign in at the reception desk for a drop-in advising appointment. Your career adviser will show you how to research and discover the many opportunities that are available to UC Santa Cruz students and graduates. Workshops offered by the Career Center include Selecting an Internship, Résumé and Cover Letter Writing, Job-Interviewing Techniques, the Graduate and Professional School Information Workshop, Applying to Law School, and special workshops on specific majors or career fields.

Your college experience is likely to include a part-time job or internship in your area of interest. The Career Center has hundreds of opportunities available. Off-campus and on-campus employment opportunities (both work-study and non-work-study) are posted on the Career Center's web site. For your convenience, you may apply for on-campus jobs online.

An internship is one of the best ways to gain practical work experience in your area of interest. The Career Center has a database with over 1,000 internship opportunities in a wide variety of career fields. The center's resource library contains some of the best internship directories available, listing local, national, and international opportunities. While visiting the center, be sure to check out the **Professions Training Program (PTP)** and the **Chancellor's Undergraduate Internship Program (CUIP)**. These two unique internship programs are designed to give participants a professionally enriching work experience in the community (PTP) or directly on campus (CUIP) in one of the university's colleges, administrative units, or academic departments. For information, visit the web: intern.ucsc.edu.

Another interesting and challenging position is the UC Student Regent, with an annual recruitment process. For information, e-mail cyndi@ucsc.edu or visit the web: www2.ucsc.edu/careers/jobs/regent.html.

The Career Center's resource library contains material organized in the following manner: Career Exploration, Graduate and Professional Schools, Job Search, Career Fields, Internships, and Employer Information. A computer lab links you to the top career-development sites on the web. However, the most exciting part of the computer lab is the Career Advice Network

database. The Career Advice Network (CAN) contains career profiles of over 500 UCSC alumni. The members of the network have volunteered to answer questions and give career advice pertaining to their particular career field. You may contact CAN members to obtain information on educational preparation, job responsibilities, résumé preparation, and tips on how to conduct your job search.

UC Santa Cruz students and alumni looking for full-time career opportunities need look no further than NACELink—an online site that lists job openings targeted to UCSC graduates. You may connect to NACELink on the Career Center web site. Another way to obtain a career position is to participate in the On-Campus Interview Program. Corporate recruiters visit campus every fall, winter, and spring to interview and hire students. The Career Center web site has a list of participating companies.

The Career Center sponsors several major events every academic year. The Graduate and Professional School Fair brings hundreds of graduate and professional school representatives from the nation's top universities to campus to share information about their advanced-degree programs. Job fairs, which bring hiring companies to campus, take place several times a year. Students looking for a job or internship will want to come prepared with a great résumé. Other events include the Student Employment Recognition Awards Program Ceremony, where outstanding student employees are recognized and rewarded for their hard work and dedication, and the Multicultural Career Conference, which brings students and alumni together to develop mentor relationships and explore careers.

The Career Center—located at the Bay Tree Building, Room 305, in Quarry Plaza—can be reached at (831) 459-4420. Office hours are 8 A.M. to 5 P.M. Visit the center's web site at www2.ucsc.edu/careers.

Educational Opportunity Programs (EOP)

The Educational Opportunity Programs (EOP) provide a variety of academic and personal support programs designed to promote the retention, academic success, and graduation rates of California residents who are first-generation college students from low-income and educationally disadvantaged backgrounds. EOP programs and services are designed to ensure that students successfully complete their undergraduate education and acquire the skills that will prepare them for leadership roles and graduate or professional school opportunities.

Advising Programs and Services

EOP advising programs work to enhance student academic and personal success. These programs and services include academic and personal counseling; time-management and study-skills strategies; academic workshops; referrals to resources, programs, and opportunities; peer advising; and community events. Students have access to three EOP academic counselors who provide academic advising and personal counseling to facilitate the students' academic, social, and personal transition/adjustment to the university. The counselors also work closely with the college, department, and financial aid advisers to ensure that students access and utilize all available resources to become "B or Better Scholars." EOP also organizes programs and events to promote and support the students' achievement and advancement. The events include Academic Success Workshops, a Holiday Event, and an Academic Excellence Reception. Other academic programs include the EOP Bridge Program for a select group of entering first-year students. Bridge is an academic-year program to help frosh make a smooth transition from high school to the university. The program includes a summer orientation and instruction, academic advising, learning support, and community-building activities throughout the academic year.

Pregraduate Programs

The pregraduate programs are designed to increase the placement of EOP students in doctoral programs in preparation for the pursuit of academic careers. The two pregraduate programs are the Faculty Mentor Program (FMP) and the Graduate Information Program (GIP).

GIP offers general graduate and professional school advising. GIP activities focus on informing and preparing students for educational opportunities beyond the baccalaureate degree. Through workshops and individual sessions, GIP outlines the process of how to apply to graduate school and helps students make important faculty, staff, and resource connections. The GIP web site offers a comprehensive step-by-step guide to all aspects of the process of preparing for and applying to graduate school, including identifying research interests, searching for graduate schools, securing letters of recommendation, and identifying internships. GIP also maintains a graduate school resource library and sponsors field trips to conferences and forums within the local area to connect to UC-wide resources. Students can visit the GIP web site at www2.ucsc.edu/eop/gip.

The Faculty Mentor Program is a two-quarter undergraduate research program designed to encourage and prepare students to undertake future graduate study within the arts, humani-

ties, and social sciences. FMP includes research writing, workshops on applying to graduate school, and hands-on research experience under the guidance of a UCSC faculty sponsor. Students receive academic credit for participation in a weekly seminar along with a 10–15-hour commitment to faculty-sponsored research.

For more information about the Educational Opportunity Programs, drop by the Academic Resources Center, call (831) 459-2296, or visit the web site: www2.ucsc.edu/eop.

MARC/MBRS Programs

The Division of Physical and Biological Sciences sponsors two National Institutes of Health grant programs: the Minority Access to Research Careers (MARC) Program and the Minority Biomedical Research Support (MBRS) Program. Though separately funded, the projects share a similar mandate: to increase the number of well-prepared ethnic-minority students who are admitted to graduate or professional schools in biomedical sciences. The program seeks students from groups that have traditionally been denied equal access to educational opportunities in the science professions.

Continuing students who have successfully completed specific introductory courses in biology, chemistry, and mathematics are invited to apply for the MARC/MBRS Programs, which begin in the summer and introduce students to program faculty, their research, and research techniques. After students successfully complete the summer program, they have the opportunity to work in a faculty lab for the following academic year. Financial compensation is available for laboratory placements and participation in the summer program.

The MARC/MBRS Office also works with other campus offices to help make the most of campus resources and provide practical assistance with the graduate and professional school admission process. In addition, the staff maintains an information file on summer enrichment programs, which can provide you with vital research or clinical experience or help you prepare for the Graduate Record Examination.

The program's well-equipped student office provides additional academic support and a convenient place for students to meet. The staff encourages students to make use of this study space and assists them in learning to use the office's personal computers.

For further information, contact the MARC/MBRS Office, 377 Thimann Laboratories, (831) 459-4770, or e-mail malika@biology.ucsc.edu. Web: marcmbrs.ucsc.edu.

Academic Excellence Program (ACE)

ACE is supported by the Division of Physical and Biological Sciences and has as its goal to increase diversity among students receiving bachelor's degrees in mathematics, science, and engineering by offering discussion sections for selected mathematics and science courses. These discussion sections replace registrar-scheduled secondary discussion sections for ACE students.

The program received the 1999 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. This award, presented by the White House and administered by the National Science Foundation, is given to individuals or programs that have demonstrated outstanding and sustained mentoring efforts for students underrepresented in science, mathematics, and engineering.

Helping students excel in gateway mathematics and science courses is ACE's focus. The ACE sections provide a structured, workshop setting where students learn by teaching each other. This collaborative method reinforces critical thinking and problem-solving skills. Enrollment in ACE is limited. A professional section leader with an academic background in the subject facilitates these workshops. In addition, undergraduate coleaders/peer mentors who have excelled in the course assist the section leader. This brings the student to teacher ratio to 12:1. Students also meet with a peer mentor, who shares study tips and techniques, as well as opportunities for undergraduate research internships. Other opportunities available through ACE include office hours, study groups, and career counseling. ACE scholars join a community of scholars dedicated to academic excellence and success.

Applications are accepted quarterly for the upcoming term. For more information, visit the web site: ace.ucsc.edu.

Multicultural Engineering Program (MEP)

The Baskin School of Engineering's Multicultural Engineering Program (MEP) promotes diversity and facilitates the success of engineering students.

MEP provides academic and personal support for engineering students who are first-generation college students, are the first in the family to pursue engineering or computer science studies, or are from a low-income (limited financial resources) or educationally disadvantaged background. MEP's academic learning community supplements students' undergraduate experience and encourages students to continue their education into graduate school.

MEP has a strong support system and engages students' full participation in a variety of services and activities. These include academic advising, personal counseling, tutorial services, drop-in assistance, individual and small-group study, study-skills workshops, peer-support networks, community-building activities, scholarships, and an engineering Summer Bridge program for a select group of entering first-year and transfer students.

MEP's well-equipped study center and computer lab provides 24-hour access to computer workstations and printer, textbooks, individual lockers, and a place for students to gather and study. Students who have participated in preuniversity service programs (e.g., Early Academic Outreach, Upward Bound, MESA, Talent Search, Puente, DEEP, Smith Scholastic Society) are encouraged to apply to MEP.

For further information, call (831) 459-2868, visit the web site mep.soe.ucsc.edu, or drop by the School of Engineering Undergraduate Affairs Office, 225 Baskin Engineering Building.

Services for Transfer and Re-Entry Students (STARS)

Services for Transfer and Re-Entry Students (STARS) offers a broad range of personal and academic support services for all transfer and re-entry students (undergraduates 25 years and older, graduate students 29 years and older), students who are parents regardless of age, and military veterans. These services include admissions information; orientations for new students; academic seminars courses; study-skills workshops; tutorial services; informal academic advising; drop-in assistance; social, recreational, and cultural programs; scholarships; newsletters; and study centers with computer workstations. STARS also acts as a clearinghouse for information about campus and community resources for UCSC's large transfer and re-entry student populations.

STARS oversees two resource centers housed in different locations on campus. All current and prospective re-entry and transfer students are invited to visit. Hours are 8 A.M. to 5 P.M., Monday through Friday. STARS main offices are in the Academic Resources Center, Rooms 206 and 216. STARS at Kresge is located at the entrance to Kresge College.

Veterans Education Team Support (VETS) is a STARS program for veterans returning to school. In this peer mentor program, veterans meet each other and receive assistance as they navigate admission and transition into university life. Ongoing personal and academic sup-

port and outreach to prospective students are also offered.

The Smith Renaissance Scholars Program, which helps foster and former foster youths pursue their educational goals, is affiliated with STARS.

STARS also coordinates the Lifelong Learners program, a UC/community organization dedicated to continuing education. The organization hosts monthly meetings with university faculty and offers a wide variety of interest groups. Some members take campus courses for a minimal fee through UCSC Extension's Concurrent Enrollment.

For further information regarding all the STARS programs, call (831) 459-2552. For current programs and activities, view the STARS web site: stars.ucsc.edu.

Part-Time Program

If you are unable to attend the university full-time because of family obligations, employment responsibilities, or health problems, you may qualify for the Part-Time Program. This program enables students to pursue a bachelor's degree part-time in any major offered at UC Santa Cruz. To participate, undergraduate students must file a Part-Time Program application by the appropriate deadline. Full-time students normally take three 5-credit courses per quarter; part-time students may enroll in a maximum of 10 credits.

Students approved for enrollment on a part-time basis pay the same fees as full-time students but pay only one-half of the educational fee. Part-time nonresidents pay one-half of non-resident tuition. Financial aid awards may be affected by enrolling part-time. Students who use the part-time fee reduction may not also use the UC employee reduction.

Applications for undergraduates are available from the Office of the Registrar, 190 Hahn Student Services Building. For more information, call (831) 459-4412 or e-mail registrar@ucsc.edu. Web: reg.ucsc.edu/students/part-time.html.

Disability Resource Center (DRC)

The campus accommodates students with documented disabilities and welcomes their attendance at UCSC. The Disability Resource Center (DRC) provides the following to help meet the needs of students with disabilities: counseling and advising; parking accommodations; assistance with registration and enrollment; testing accommodations; alternative media such as audiobooks; adaptive equipment loans; notetaker and interpreter services; and liaison and referrals to appropriate resources, services, and agencies.

The Disability Resource Center is located at 146 Hahn Student Services Building and can be reached by telephone at (831) 459-2089 (voice) or (831) 459-4806 (TTY), or by e-mail at drc@ucsc.edu. Web: drc.ucsc.edu.

Campus access for people with mobility impairments. Transportation and Parking Services, in coordination with the DRC and Cowell Student Health Center, provides accessibility maps, vans equipped with wheelchair lifts that can transport students to any point on campus, and authorization to use parking spaces for the disabled, which are adjacent to all campus buildings. Most buildings on campus have wheelchair-accessible ramps, modified rest rooms, and other facilities. If necessary, classes are rescheduled to meet accessibility needs.

Questions and concerns about

- program accessibility should be addressed to the director of the Disability Resource Center, at (831) 459-2089 (voice); (831) 459-4806 (TTY)
- transportation, physical, or computing access to the campus should be directed to (831) 459-3759 (voice/TTY)
- accommodating job applicants or current employees with disabilities should be directed to (831) 459-2349 (voice)

ROTC and Military Affairs

Reserve Officer Training Corps (ROTC) is not available on the UC Santa Cruz campus. However, interested UCSC students have the option of attending programs at Santa Clara University, San Jose State University, and UC Berkeley.

To find out about the Army ROTC program, contact the Department of Military Science, Santa Clara University, 500 El Camino Real, Santa Clara, CA 95053-0631 or (408) 554-4034, e-mail Captain Alex Kerkow at akerkow@scu.edu, or visit www.scu.edu/rotc.

For information on the Air Force ROTC program, contact the Department of Aerospace Studies, AFROTC Det 045, One Washington Square, San Jose State University, San Jose, CA 95192-0051 (408) 924-2960, e-mail Det045@maxwell.af.mil, or visit the web: www.sjsu.edu/depts/AFROTC/homepage.html. Students may call or inquire about program prerequisites, scholarship availability, and class schedules at the Department of Aerospace Studies.

UC Berkeley offers a variety of courses in military affairs, including those offered by the Departments of Naval Science, Military Science, and Aerospace Studies, subject to departmental approval. (See UC Berkeley General Catalog, Military Officers' Education

Program, sis.berkeley.edu/gc/curricula.html.) These courses are offered to cadets and non-cadets.

Arrangements for all ROTC programs are made on an individual basis with the appropriate sponsoring campus.

Undergraduate Research

At the best research universities, professors bring knowledge and creativity from their cutting-edge research into the classroom, integrating the canon of the discipline with its future directions. UC Santa Cruz takes this further with a special tradition of undergraduate research outside the classroom. UC Santa Cruz, its departments, and faculty offer undergraduates many ways to get involved in research and creative activities. These opportunities develop advanced skills and insights and an early introduction to the nature of graduate studies. Research projects can help students launch careers, secure admissions to top graduate schools, and truly impact society.

Many majors incorporate research in their senior comprehensive requirement, with options or requirements of a senior thesis, capstone project, or other creative endeavor based on students' individual research. Other opportunities for undergraduates exist through structured internships or research programs, by joining ongoing faculty research or creative projects, or by developing their own projects under faculty supervision. The next sections discuss a sampling of UCSC's international education, field-study, and exchange programs, which enable students to deeply enrich their undergraduate experience and education as they learn by doing.

UC LEADS

After being selected as UC LEADS scholars, students begin a two-year program of scientific research and graduate school preparation guided by individual faculty mentors. Scholars are provided with an excellent opportunity to explore their discipline, experience a research environment, and improve their opportunities for future study in their chosen field. Each scholar is mentored by a member of the UC faculty, who assists the student in designing a plan of research and enrichment activities tailored to his or her individual interests and academic goals. To learn more about eligibility

requirements and the UC LEADS program, visit graddiv.ucsc.edu/ucleads or stem.ucsc.edu.

National Science Foundation Research Experiences

UC Santa Cruz faculty host four National Science Foundation Research Experiences for Undergraduates (NSF REU) sites. These events typically are 9–10 week summer programs and provide housing and a stipend. The UCSC programs include chemistry's SURF (Summer Undergraduate Research Fellowship) program and a separate international REU in Thailand (www.chemistry.ucsc.edu/Projects/SURF), as well as the School of Engineering's SURF-IT (Information Technology, surf-it.soe.ucsc.edu). There are hundreds of other NSF REU programs nationwide (www.nsf.gov/crssprgm/reu), and faculty and advisers can help you apply.

MARC/MBRS

The MARC/MBRS programs, funded by the National Institutes of Health and discussed elsewhere (see page 38), seek to increase the number of well-prepared ethnic-minority students who are admitted to graduate and professional schools in the biomedical sciences (marcmbrs.ucsc.edu).

International Education

The Office of International Education (OIE) oversees the UCSC Education Abroad Program (EAP) and International Scholar and Student Services (ISSS).

For further information, contact the Office of International Education, 107 Classroom Unit Building, (831) 459-2858, EAP: oie@ucsc.edu, ISSS: visa@ucsc.edu. Web: oie.ucsc.edu.

Education Abroad Program

The Education Abroad Program (EAP) offers undergraduate and graduate students the opportunity to study at 115 host universities and colleges in 34 countries as part of their regular UC academic program. The program serves students at all UC campuses and is administered by the University Office of the Education Abroad Program in Santa Barbara: eap.ucop.edu.

UCSC endeavors to bring this program within reach of all students. Extension of studies up to 15 quarters is possible when related to the educational benefits of participating in EAP.

Students receiving financial aid can apply their award to a program abroad.

International Scholars and Students

The International Scholar and Student Services (ISSS) office supports the international teaching and research mission of the university. This office serves as the official campus liaison between the UC Santa Cruz international population and the U.S. government agencies that have jurisdiction over immigration matters. ISSS assists international faculty, scholars and students with visa and immigration issues while they are at UCSC. In addition to preparing the necessary documents to apply for a U.S. visa, ISSS assists students, scholars and faculty in maintaining their legal status while in the United States. ISSS also provides orientations, travel and employment workshops, and information and referrals regarding financial, personal, cultural, and academic concerns. ISSS serves more than 1,000 international clients and their accompanying family members who come to the campus each year.

Fulbright Grants for Graduate Study and Research Abroad

The Division of Undergraduate Education facilitates the Fulbright annual awards competition for the Graduate Study and Research Abroad Program for currently enrolled UCSC students. Web: <http://vpdae.ucsc.edu/scholarships.htm>

Field and Exchange Programs

UCDC Program at the UC Washington Center

The UCDC Program at the UC Washington Center in Washington, D.C., supervises and supports students who pursue internships and academic study in the nation's capital. The program is open through a competitive application process to students in all majors who will have upper-division status by the quarter in which they participate. (Physical and biological sciences and engineering majors are eligible to participate in their sophomore year with department approval.) Students enroll for fall, winter, or spring quarter, earn 12 to 15 course credits, and continue to be registered as full-time students. (In addition, see Residence, page 26.) Courses are taught by faculty from the Berkeley, Davis, Irvine, Los Angeles, Merced, Riverside, San

Diego, Santa Barbara, and Santa Cruz UC programs in Washington and by visiting faculty from the Washington area. Applicant selection is based on academic record, a written statement, letters of recommendation, and in some cases a personal interview.

Financial-aid eligibility is maintained, and students who are eligible for financial aid may qualify for a President's Washington Scholarship to help cover supplemental costs.

Students live in the UC Washington Center with students from all the participating UC campuses. This provides a social and intellectual community throughout the quarter.

Interested students with strong academic records are encouraged to apply. For further information, contact the UCDC coordinator, 5 Merrill College, (831) 459-2855.

The UCDC Program also offers a unique opportunity for UCSC faculty members and graduate students to teach and pursue research in the Washington, D.C., area. Faculty members and graduate students in residence advise students regarding their internships and course work. Along with faculty from the other UC programs, UCSC faculty offer upper-division courses in diverse academic fields. To inquire about participation in UCDC, contact the UCSC coordinator, (831) 459-2855. Web: <http://politics.ucsc.edu/ucdc>.

UC Center in Sacramento (UCCS)

The Scholar Intern Program at UCCS gives students a chance to spend a quarter in Sacramento being fully immersed in the world of legislative and/or community-service programs. Students intern a minimum of 24 hours per week at sites in the Assembly, Senate, Governor's Office, and with state agencies and nonprofit organizations. This opportunity is for students from any major and available to juniors, seniors, and graduate students. Students must be in good academic standing and have a GPA of 3.0 or above. Scholar Interns enroll for full-time credits, comprising an internship plus the *Sacramento Seminar* course and an optional elective course. All courses are taught at the UC Center in Sacramento one block from the Capitol.

For more information, contact the UCSC Career Center Internship Program, 305 Bay Tree Bldg. E-mail: intern@ucsc.edu; phone: (831) 459-2184; web: <http://intern.ucsc.edu/ucsc.html>

Intercampus Visitor Program

UCSC students may take advantage of educational opportunities at other campuses of the

University of California through the Inter-campus Visitor Program. This program enables you to take courses not available at Santa Cruz, to participate in special programs, or to study with distinguished faculty at other campuses.

To qualify for participation in this program, you must be in good standing after completing at least three quarters in residence at Santa Cruz. Each host campus establishes its own criteria for accepting students from other campuses as visitors. You must also have the approval of your college. Consult with your department about how courses taken at the host campus may apply to your major requirements.

Applications are available at the Office of the Registrar (Web: <http://reg.ucsc.edu/students/intercampus.html>). The application form contains a great deal of useful information about the program and how and when to file; please read it carefully. A nonrefundable application fee of \$60 is due when the application is filed. For further information, contact the special programs assistant in the Office of the Registrar, 190 Hahn Student Services Building, (831) 459-3459, or by e-mail at registrar@ucsc.edu.

Domestic Exchange Programs

UCSC has exchange programs with the University of New Hampshire (UNH) and the University of New Mexico (UNM). UNH is located near the New Hampshire seacoast in the picturesque colonial town of Durham, a little more than an hour from Boston, Massachusetts. UNM is located in Albuquerque, a city of approximately half a million population, situated on the banks of the Rio Grande. Both schools give students the opportunity for an educational experience in an entirely different environment.

While enrolled in the exchange program, students maintain their status at UCSC, and they are expected to return to complete their studies following enrollment at UNH or UNM. Both universities are on the semester system, so students usually participate in the exchange program for the entire academic year. But the option exists for students to participate during fall quarter only, or during winter and spring quarters.

Participants are selected from among students who are in good academic standing. Selection for 2009–10 will take place during winter quarter 2009. Selection for 2010–11 will take place during winter quarter 2010. Each department of study determines the applicability of UNH and UNM courses toward requirements for the major. Letter

grades earned while at UNH and UNM will not be calculated into the UCSC GPA or the UC GPA. Further information is available from the exchange program coordinator in the Office of the Registrar, (831) 459-4412. Web: reg.ucsc.edu/students/exchange.html.

Field Programs

Many UCSC students complement their major programs with field experience or off-campus internships, which also provide opportunities for students to become involved in public service activities in the local community and throughout the world. Most of the field programs described below are open to students in a range of majors, although some are restricted to students pursuing a designated area of study. Students in all majors may apply for internships sponsored by the Career Center (see page 37).

In addition to the off-campus placements provided by the programs described below, independent field study is available through some colleges and departments. Public service activities can be arranged through field programs.

Community Studies Field-Study Program

Community studies is an interdisciplinary undergraduate major that examines social change in the context of community. Each student in the program designs his or her curriculum around a six-month field study or internship with a community organization or agency.

The core curriculum for the major includes courses in field-study preparation as well as theory and analysis. Students complete the major by preparing a senior project integrating field study, classroom work, and research. The major has no lower-division prerequisites and usually takes about two years to complete.

With the guidance of a faculty adviser, community studies students choose field placements related to one of the areas of the department's focus. (See the listings of *Theory and Practice Seminars*, Community Studies 100A–Z, for descriptions of these areas of focus.) Most field placements are in California, although students may do their field placements throughout the U.S. and the world. Students have been placed with health centers, radio and television stations, newspapers, city planning departments, political parties, neighborhood organizations, civil rights groups, battered women's shelters, legal clinics, child care centers, programs for seniors, tenants' unions, government agencies, the offices of elected officials, trade unions, and

other organizations working for social change in communities.

The practical experience gained from the six-month field study provides graduates with many choices. About half go on to graduate work in urban studies, public administration, social work, planning, law, policy studies, medicine, or academic disciplines like sociology, anthropology, and politics. Others enter the work world directly, in many cases continuing with agencies such as those in which they did their field study. Community studies graduates are also doctors, community organizers, program directors, public officials, lawyers, university teachers, therapists, nurses, librarians, social workers, news directors, forest management consultants, reporters, day care teachers, union officials, and labor organizers.

One-quarter, 2- to 10-credit field studies are also available to all UCSC students through community studies. For more detailed information, see page 166, or contact the Community Studies Department Office, 231 Oakes College, (831) 459-2371, or the community studies field-study coordinator, 218 Oaks College, (831) 459-4601. E-mail: openup@ucsc.edu. Web: communitystudies.ucsc.edu.

Economics Field-Study Program

The Economics Department offers its majors the opportunity to integrate their academic knowledge with career-related work. The field-study program places students in internships under the supervision of a faculty sponsor and a professional in the workplace. Students can select from a wide variety of field placements such as accounting firms, community nonprofits, government agencies, brokerage firms, marketing agencies, banks, and businesses in Santa Cruz and beyond. Students apply and prepare for field study a quarter in advance. Acceptance into the field-study program is determined by academic standing, class level, and successful completion of Economics 100A, 100B, and 113 (see page 192). Students may earn a maximum of 10 credits and complete up to two quarters in a field placement.

Along with the training and supervision by a professional in the workplace, students receive guidance from a faculty sponsor who directs their academic project. Completion of this project and the job supervisor's evaluation of performance earn the student credit. *Economics Field Study* (course 193 or 198, see page 195) does not satisfy an upper-division requirement for the major and is available on a passing/not passing (P/NP) basis only.

Interested students should make an appointment or stop by the Economics Field-Study Office: 401 Engineering 2 Bldg.; call (831)

459-2028; or e-mail econintern@ucsc.edu.
Web: econ.ucsc.edu

Environmental Studies Field and Internship Program

Open to all UCSC students, the Environmental Studies Field and Internship Program is an integral academic component of the environmental studies major, and it augments the research and professional development of undergraduate students (see page 261). Interns are placed, individually and in groups, in both on-campus and off-campus agencies, where their work results in publications and resource documents and in many cases serves as the primary basis for policy formation. Placements have included research with small businesses and farms, state agencies, nongovernmental organizations, and planning departments; assignments as natural history interpretive guides for state and national parks; and apprentice positions with consultants, architects, solar-energy designers, agroecologists, resource specialists, and teachers. Student interns also have been sent to work with small coffee growers in Costa Rica and Nicaragua.

Part- and full-time placements are available, and students may receive 2 to 15 course credits for their work. Each student's placement is supervised by a faculty adviser, a field sponsor, and the internship coordinator. Students spend 12 to 15 hours each week on their assignments for every 5 credits they receive.

Internships and fieldwork are designed to complement a student's course work and are available for both lower- and upper-division credit. Often, the internship leads to employment after graduation. Qualified environmental studies majors may undertake a senior internship to fulfill the department's comprehensive requirement. In addition, internships provide a fieldwork component for some environmental studies courses. Undergraduates are also afforded ample opportunities to intern on faculty and graduate-student research projects.

Further information is available from the Environmental Studies Field and Internship Program Office, 491 Interdisciplinary Sciences Building, (831) 459-2104, e-mail: ckrohn@ucsc.edu. Web: envs.ucsc.edu/internships.

Global Information Internship Program

The Global Information Internship Program (GIIP) is an instructional program at UCSC sponsored by the Center for Global, International and Regional Studies (CGIRS, see page 61). Guided by administrative and technical support from staff and faculty, GIIP is organized as a student-managed service-learning program that transfers the benefits of information technology to the world's excluded majority. The program

places highly motivated interns—trained in social science and information technology—with nongovernmental organizations and civic groups in the U.S. and abroad. GIIP's mission is twofold: to upgrade the informational capacity of excluded communities while nurturing a new generation of information-savvy student leaders committed to advancing the public good.

GIIP interns acquire their skills by enrolling in 140 hours of instruction in Sociology 30A-B-C (see page 423) over a nine-month period. Sixty hours of technical training consists of computer-based instruction. The other 80 hours are devoted to working on projects involving one of GIIP's six themes: Global Justice, Women's Empowerment, Sustainable Environments, Human Rights, Peace and Conflict Resolution, and Education and Social Enterprise.

For more information, visit: giip.ucsc.edu or call (831) 459-1572.

Health Sciences Internship Program

A requirement of the major, the Health Sciences Internship Program offers students a unique opportunity for personal growth and professional development. Paired with a professional mentor, students spend one quarter interning in a community health care setting. Placement opportunities cover a broad range, from individual physicians to community clinics and hospitals, hospices, and public health agencies. The Health Sciences Internship Coordinator works with students to prepare them for their internship and maintains a database of appropriate placements. Junior and senior health sciences majors only are eligible to apply. Applications are due at least one quarter in advance. For further information, contact the Health Sciences Internship Coordinator, Caroline Berger, at (831) 459-5647 or cmberger@ucsc.edu.

Latin American and Latino Studies Fieldwork

A variety of field-study and internship opportunities can be arranged through the Latin American and Latino Studies (LALS) Department. Field studies are independent, community-based study projects for academic credit, done under faculty sponsorship and arranged on an individual basis. It is possible to do full-time field study for one quarter for full academic credit, as well as do field study as an extension of the Education Abroad Program (see page 40). Projects vary widely, but students who want to develop a field-study proposal are expected to prepare for it by acquiring fluency in the appropriate language, prior cross-cultural experience, and upper-division course work on the region and/or topic that is to be the focus

of the study. Students are encouraged to take the *Field-Study Seminar* (LALS 196, see page 328) and work with the field-study coordinators. Local field study can be arranged in Santa Cruz, Watsonville, and Salinas with agencies and organizations, schools, and newspapers and radio stations that serve Chicano/Latino communities. While conducting field study for academic credit, students are expected to be concurrently enrolled in an individual studies course of between 5 and 15 credits with a faculty adviser. Upon approval, this course work is applicable toward up to three upper-division course requirements for the LALS major. Petitions to enroll in an individual studies course can be obtained from the LALS Department Office. For more information, contact the field-study coordinators at (831) 459-4430 (borrego@ucsc.edu) or 459-2119 (breaana@ucsc.edu).

Psychology Field-Study Program

The Psychology Field-Study Program provides qualified students an opportunity to integrate what they have learned in the classroom with direct service to a community agency. Each year, more than 200 students develop new skills and clarify personal and professional goals by working as interns in schools, criminal justice programs, and mental-health and other social-service agencies, where they are supervised by a professional within that organization. Psychology faculty members sponsor field-study students, helping them to synthesize their intern experience with psychology course work and guiding them through an academic project.

Junior and senior psychology majors in good academic standing are eligible to apply for this competitive program (see page 406). Applications can be obtained from the Field-Study Office, 273 Social Sciences 2 Building, and are due one quarter in advance. There is a minimum commitment of two quarters. Information can be viewed on the web at psych.ucsc.edu/field_study, or phone (831) 459-4410.

Education Field Programs

The M.A. in education/California Teacher Credential program provides students with the necessary credential preparation for K–12 teaching in the California public schools. Cross-cultural (CLAD) and Bilingual Cross-cultural (BCLAD) emphases are included for the preparation of elementary and secondary math, science, English, and social science teachers.

Students pursuing an M.A. in education (which includes the CLAD/BCLAD teaching credential) must complete an extensive student-teaching course sequence. Student-teaching



The MARC/MBRS programs, sponsored by the Division of Physical and Biological Sciences and funded by the National Institutes of Health, seek to increase the number of well-prepared ethnic-minority students who are admitted to graduate and professional schools in the biomedical sciences (marcmbrs.ucsc.edu).

placements are restricted to enrolled students. The student-teaching sequence consists of five courses: Education 200, 201, 201A (single subject only), 202A, B and C. The first and second quarters of the sequence involve part-time placements in public schools in Santa Cruz County. The third quarter of student teaching is a full-time experience in which students gradually take over full responsibility for the daily instructional program of the classroom in which they are placed. Substantial fieldwork is also incorporated in other courses required for the teaching credential.

The minor in education is an undergraduate program in which students explore the history of educational thought and philosophy, the politics and economics of education, learning theory and pedagogy, and issues of cultural and linguistic diversity. As a part of the six-course minor sequence, students engage in field study in schools through Education 180, *Introduction to Teaching*.

For more information, see Education, page 198, or contact the Education Department, 217 Social Sciences 1 Building, (831) 459-2589 (reception). E-mail address: education@ucsc.edu; web: education.ucsc.edu.

M.S. in Computer Engineering (Network Engineering)

The Department of Computer Engineering offers a distance-learning version of its M.S. in computer engineering, with a concentration in network engineering, in collaboration with UCSC Extension. Required and elective courses are presented in Silicon Valley using real-time video technology and faculty in person. This part-time University of California M.S. degree program can be completed in three years. For further information, contact msce@soe.ucsc.edu.

Summer Programs

Summer Session at UC Santa Cruz is offered from mid-June through the end of August. Registration fees are the same for California residents and nonresidents. Please contact the Summer Session Office, UC Santa Cruz, 1156 High Street, Santa Cruz, CA 95064, for further information about Summer Session programs listed below. To request a Summer Session catalog, telephone (831) 459-2524 or fax (831) 459-3070. For additional information, telephone (831)

459-2524 or e-mail summers@ucsc.edu. Visit our home page: summer.ucsc.edu.

Summer Session Courses

Undergraduate credit courses are offered in the arts, engineering, humanities, physical and biological sciences, and social sciences during two five-week Summer Sessions. The sessions run from mid-June through July, and late July through late August. Students may enroll in several classes, with a recommended maximum of 15 credits per session.

Shakespeare Santa Cruz Internship

Shakespeare Santa Cruz (SSC), a professional theater company in residence at the Theater Arts Center at UCSC, offers internships in acting, design, directing, dramaturgy, stage management, and production. Interns attend classes and work closely with artistic, technical, and stage management staff in support of the summer season productions, backstage in rehearsal, and in performance. Acting interns are part of the ensemble and/or understudies in the professional productions and perform in an intern production during the summer sea-

son. The 5-credit classes, which are part of the SSC Internship Program and offered through UCSC Summer Session, include acting, directing, voice, and stage management. These classes are taught by SSC company members. Interns thus have a direct link with top theater professionals, exposure to the latest skills and techniques, professional theater experience to list on their résumé, and an inside advantage for marketing new skills. For more information on internships, contact SSC's administrative and education coordinator at (831) 459-5810 or visit the web: shakespearesantacruz.org.

UCSC Extension

University of California Extension is the statewide, year-round continuing education service linking the university with the people, businesses, and communities of the state.

Extension programs vary in length and format from one-day seminars to short lecture series to 10-week courses. Certificate programs include practical study and hands-on exercises designed for immediate application. Most certificates can be completed within one year. The programs provide opportunities to pursue the following:

- Education for professional or career advancement
- Intellectual and cultural interests
- Updates of professional and technical skills
- Personal growth

Most extension programs are open to any adult who can benefit from university-level study. The instructors are professionals working in the fields that match the subject areas they teach, faculty from UC and other educational institutions, as well as other authorities.

Credit and noncredit programs are offered in Santa Clara, Santa Cruz, Monterey, and San Benito Counties; most courses are held at UCSC Extension's facilities in Silicon Valley or online.

University Extension also offers professional continuing education through its Corporate Training Division, which provides technical and management courses on-site at area businesses, and through English Language and International Programs, which offers English language, American culture, and global business courses for students from around the world.

Enrollment for degree credit in extension courses numbered 1–199 is permitted for regularly enrolled UCSC students. Upon submission of the extension transcript to the Office of Admissions, the course credit may be applied toward a bachelor's degree at UCSC. Extension courses numbered other than 1–199 are *not* applicable to a UCSC degree.

Course offerings are listed on the web at ucsc-extension.edu. To be placed on the mailing list for a catalog, call (800) 660-8639 or (831) 427-6600. The mailing address is UCSC Extension, University Town Center, 1101 Pacific Avenue, Suite 200, Santa Cruz, CA 95060-7507.

Concurrent Enrollment

Concurrent Enrollment through Extension is a cooperative arrangement between UC Santa Cruz and UCSC Extension that enables members of the public to enroll in one or two regular UCSC undergraduate or graduate courses per quarter for credit. The program is administered by UCSC Extension, and course credit granted appears on a UCSC Extension transcript. Participants must meet certain criteria outlined in the Concurrent Enrollment application. An application fee is charged for each quarter of enrollment in addition to course fees. A first-time application filed at least one week prior to the first day of instruction for the quarter has a \$55 fee; subsequent applications filed at least one week prior to the first day of instruction for the quarter have a \$10 fee. Applications filed later than one week prior to the first day of instruction for the quarter have a \$100 fee.

Concurrent Enrollment through Extension may be used as a path toward a part-time or full-time degree program or as a way of studying subjects of personal or occupational interest. Credit earned through this program may be used toward degree requirements, when applicable, if participants subsequently seek admission to the university and are accepted.

Seniors 62 and older pay reduced fees and do not pay the application fee.

Financial aid is not available to participants in the Concurrent Enrollment program.

For further information and to obtain the application packet, contact UCSC Extension, 1101 Pacific Avenue, Suite 200, Santa Cruz, CA 95060-7507, (831) 427-6600 or go to www.ucsc.edu-extension.edu/ucscgeneralinfo/enrollment/concurrent.jsp.

High School Scholars Program

The High School Scholars Program, offered through University Extension, provides an opportunity for qualified seniors who attend Santa Cruz County high schools to take UC Santa Cruz academic courses. The program is administered through University Extension in cooperation with Cowell College. Program advisers help the participants select appropriate courses from those available.

Intersegmental Cross-Enrollment

This program permits a student who is currently enrolled in a California community college or a California State University campus and who meets certain eligibility criteria to enroll in one undergraduate course at UCSC each term, on a space-available basis. A student is qualified to participate in this program if he or she meets the following requirements:

- has completed at least one term at the home campus as a matriculated student and is enrolled in at least 6 credits at the home campus during the term in which he or she seeks to cross-enroll;
- has a grade-point average of 2.0 for work completed;
- has paid tuition or fees required by the home campus for the academic term in which he or she seeks to cross-enroll;
- has appropriate academic preparation as determined by the host campus, consistent with the standard applied to currently enrolled students;
- is a California resident for tuition purposes at the home campus; and
- has not previously been admitted to and registered at UCSC.

Interested students may obtain additional information and an application from the registrar at their home campus.

Graduate Studies

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Young-Shin Choi, an award-winning Korean composer and teacher, was attracted to the doctorate of musical arts program in music composition at UC Santa Cruz because of the collaborative nature of the program, generous financial package, and “perfect California weather.”



Graduate Education

UC Santa Cruz offers graduate study in more than 30 academic fields. About 1,500 graduate students are enrolled at the certificate, master's, and doctoral levels. The small size of the UCSC graduate programs encourages close working relations between students and faculty in an informal atmosphere conducive to rapid learning and professional growth. Many graduate programs have interdisciplinary components, and students are encouraged to explore the conceptual connections between related fields as they acquire mastery in their areas of specialization.

Research facilities at UCSC are excellent, and there are extensive opportunities for graduate students to engage in significant independent study and research (see Resources for Learning and Research, pages 53–75). Graduate students are also encouraged to obtain teaching experience, primarily as supervised teaching assistants. They are highly valued members of the UCSC community, contributing substantially to the research and teaching conducted on the campus.

Degrees and Programs

The University of California, Santa Cruz, offers graduate programs leading to advanced degrees or certificates in the following areas:

Anthropology	Ph.D.
Astronomy and astrophysics	Ph.D.
Bioinformatics	M.S./Ph.D.
Biology	
ecology and evolutionary.....	M.A./Ph.D.
molecular, cell, and developmental.....	M.A./Ph.D.
Chemistry and biochemistry	M.S./Ph.D.
Computer engineering	M.S./Ph.D.
Computer science	M.S./Ph.D.
Digital arts/new media	M.F.A.
Earth sciences	M.S./Ph.D.
Economics	
applied	M.S.
international	Ph.D.
Education	
teaching.....	M.A.
research	Ph.D.
Electrical engineering	M.S./Ph.D.
History	M.A./Ph.D.
History of consciousness	Ph.D.
Linguistics	M.A./Ph.D.
Literature	M.A./Ph.D.
Mathematics	M.A./Ph.D.
Microbiology and environmental toxicology	M.S./Ph.D.
Music	M.A./D.M.A./Ph.D.
Ocean sciences	M.S./Ph.D.

Philosophy	M.A./Ph.D.
Physics	M.S./Ph.D.
Politics	Ph.D.
Psychology (with emphasis in social, developmental, or cognitive)	Ph.D.
Science communication (writing) ...Certificate	
Social documentation	M.A.
Sociology	Ph.D.
Statistics and applied mathematics	M.S./Ph.D.
Theater arts	Certificate

Program Descriptions

Descriptions of individual programs appear under the specific disciplines in the programs and courses section, which begins on page 109. Application materials for all programs are available online at graddiv.ucsc.edu.

All of our graduate programs have information on the web at www.ucsc.edu/academics. Inquiries about part-time study should be directed to the individual departments. If there are any problems with the online application process, please e-mail gradadm@ucsc.edu.

Administration

At UCSC, the individual graduate programs are directed by departments. Overall policy is determined by the Graduate Council, and coordination and record keeping for matters common to all graduate students—such as admission applications, fellowships, and advancement to candidacy—are the responsibility of the Division of Graduate Studies. The dean of graduate studies is the chief administrative officer. The *Graduate Student Handbook*—containing graduate policies and other information—can be found online at graddiv.ucsc.edu/regulations/handbook.php.

Catalog Rights

Students matriculating in a given graduate program will select the *UCSC General Catalog* they will follow to meet their requirements to be either the one published the year they enter the program, or any subsequent catalog published prior to the year they are awarded the sought degree. Should the student choose to follow catalog requirements for a year for which the catalog is not printed in hard copy, the requirements will include any online catalog update for that year. A student must follow the chosen catalog in its entirety, including both the individual degree program and general university requirements. General university requirements may be found in the *Graduate*

Student Handbook, graddiv.ucsc.edu/regulations/handbook.php.

Evaluation of Performance

Graduate students are graded Satisfactory/Unsatisfactory (S/U) or, at student option, A, B, C, D, F. The grade A, B, or S is awarded for satisfactory work. A graduate student receiving a grade of C, D, or U will not be able to use the credit for that course to satisfy any course requirement for a graduate degree. Courses in which a graduate student receives a grade of C, D, F, or U may be repeated. Credits will be counted once, and the most recently earned grade will determine whether a degree requirement has been met. Repeating a course more than once requires the prior written approval of the dean of graduate studies.

Graduate student performance in all courses taken for credit at UC Santa Cruz is also evaluated according to the Narrative Evaluation System. A narrative evaluation usually runs from one to four paragraphs in length and describes (1) the nature and requirements of the course, (2) the student's strengths and weaknesses in the various aspects of the course (e.g., discussion, laboratory work, term papers, and examinations), and (3) the student's general understanding of the course content. Evaluations may be used by academic advisers and become part of the student's official academic record.

Please also refer to the statement on Academic Integrity, page 35; Appendix F, Graduate Student–Faculty Adviser Relationship Guidelines, page 481; and Appendix O, Official University Policy on Academic Integrity for Graduate Students, published in the *Student Policies and Regulations Handbook* at www2.ucsc.edu/judicial/handbook06-07/appendixo.htm.

Graduate Opportunity Program

Applicants assisted by the Graduate Opportunity Program must be U.S. citizens or permanent residents. During the application process, the Graduate Opportunity Program can help students by requesting an application fee waiver for cases of hardship, by providing insight into the application process, and by distributing information about the various graduate academic and fellowship programs. The primary goals of the program are to increase the number of applicants through extensive outreach and to increase the number of enrolled students from diverse backgrounds through effective recruitment. Applicants who feel that their acceptance into the academic community at UC Santa Cruz will contribute to the diversity of the

institution should call (831) 459-4108 early in the application process.

Diversity-Enhancement Programs

The Eugene Cota-Robles Fellowship is a merit-based diversity-enhancement program that provides financial support for students from diverse backgrounds to pursue and successfully complete a graduate degree. This fellowship is awarded to entering doctoral students who have overcome significant obstacles to achieve a baccalaureate-level degree, and whose economic, educational, or social background contributes to intellectual diversity of the graduate student population. Applicants should refer to the information under Financial Support in the application to gain a better understanding of this fellowship. Fellowship recipients must be U.S. citizens or permanent residents.

The Eugene Cota-Robles Fellowship and the Dissertation-Year Fellowship are part of the University of California's Academic Career Development Program. The Dissertation-Year Fellowship is available to continuing students. Enrolled students are assisted through formal and informal group orientations, individual advice about academic matters, financial aid, postdoctoral opportunities, and the provision of information about career planning, health care, and housing.

If you have questions, call the Division of Graduate Studies, (831) 459-4108.

Intercampus Exchange Program

A graduate student in good standing at Santa Cruz who wishes to take advantage of educational opportunities available only at another campus of the university may become an inter-campus exchange graduate student for a quarter or more. This program also permits students to take courses on more than one campus of the university during the same quarter.

To participate in the program, a student must have the approval of his or her faculty adviser, the dean of the Division of Graduate Studies at UC Santa Cruz, and the graduate dean on the campus to be visited. Application forms may be obtained from the Division of Graduate Studies and should be submitted three weeks before the quarter in which the exchange begins.

Student Life

The campus offers a variety of programs to enhance the quality of student life, all available to graduate students. These include child care, sports and recreation, health services, cultural events, transportation services,

and the UCSC Women's Center. See pages 76–106 for information on these services and a description of the local community. See page 39 for services available to students with disabilities.

College Affiliation

Graduate students at Santa Cruz have the opportunity to affiliate with one of the 10 colleges on campus (college descriptions begin on page 77). Participation in the activities of a college may include taking an occasional meal there, living at the college, or participating in the college's educational and preceptorial programs or in its extracurricular activities.

Graduate Student Association

The Graduate Student Association (GSA) is an organization of all graduate students at UCSC. It seeks to advance the general welfare of the graduate student body and is responsible for promoting extracurricular activities on campus.

Graduate students elect a GSA steering committee, which coordinates activities and their funding. In past years, the steering committee has sponsored student social gatherings, musical events, poetry readings, lectures by visiting scholars, and other activities of special interest to graduate students. A portion of the college student government fee, paid by all students, is available to the association for this purpose. The steering committee also recommends graduate students for appointment to university committees.

Housing

As at all other UC campuses, finding housing is a challenge. Students who wish to reside on campus should submit their application as soon as possible, to secure housing in a timely manner. Likewise, students who wish to live off campus will find this task challenging. Often, single students share housing as a means of lowering expenses. However, married students or students with dependent children do not always have the option of sharing housing with other students.

Twenty apartments for single graduate students are located on the west side of campus between Kresge College and the Baskin Engineering Building. City and campus bus stops are nearby. On-site parking is available.

The apartments were designed with privacy, energy conservation, and aesthetics in mind. The wood-frame units have cedar exteriors and are bordered by redwood forest on two sides.

Four students share each apartment, which has a living and dining room, a kitchen, two bathrooms, four single bedrooms, an outdoor deck, and abundant closet and cabinet space.

The units contain solid oak and maple furniture, although residents must supply their own linens, cooking utensils, and household supplies. Common facilities include a laundry room and lounges with computer terminals and a large-screen television.

The apartment rental rate is \$7,510 per single room for the 2008–09 academic year. Students may stay for the summer at additional cost. First-year graduate students are usually given priority.

Graduate students may also apply to the individual colleges for a limited number of resident preceptorships. These positions offer an on-campus apartment as a stipend and the opportunity to participate in a college community.

Married students and students with dependent children may live in Family Student Housing, a complex of two-bedroom unfurnished apartments located on the west side of campus. These apartments are in great demand, and students often wait up to a year for a vacancy. Interested students should apply as soon as possible.

Another on-campus option is UCSC's 42-space camper park, available to students who own appropriate recreational vehicles.

To assist students in locating living accommodations in the surrounding communities, the Community Rentals Office maintains a list of available rentals. Students intending to live off campus should begin their search at least four weeks before classes begin.

See pages 98–99 for more detailed information about on- and off-campus housing.

Application and Admission

Application Deadlines

Students may apply for *only one* UCSC graduate program at a time. The list below shows the date set by each program as the final deadline for submission of all documents. Applications are limited to programs of study beginning in fall quarter (except the M.A. program in education). Please visit our web site at graddiv.ucsc.edu for the most current information on applying to UCSC graduate programs and for application deadlines for 2010–11.

Anthropology	December 15, 2008
Astronomy and astrophysics	January 5, 2009
Bioinformatics	December 15, 2008
Biology ecology and evolutionary ..	December 15, 2008
molecular, cell, and developmental	December 15, 2008

Chemistry and biochemistry	January 15, 2009
Computer engineering	January 2, 2009
Computer science	January 2, 2009
Digital arts/new media	February 15, 2009
Earth sciences	January 5, 2009
Economics applied	February 1, 2009
international	January 15, 2009
Education teaching (M.A.)	January 15, 2009
research (Ph.D.)	December 15, 2008
collaborative leadership (Ed.D.) application closed
Electrical engineering	January 2, 2009
Environmental studies	December 15, 2008
History	December 15, 2008
History of consciousness	December 1, 2008
Linguistics	December 15, 2008
Literature	December 1, 2008
Mathematics	January 15, 2009
Microbiology and environmental toxicology	January 2, 2009
Music	January 15, 2009
Ocean sciences	January 15, 2009
Philosophy	January 15, 2009
Physics	January 15, 2009
Politics	January 15, 2009
Psychology	December 15, 2008
Science communication (writing)	April 1, 2009
Social documentation	January 15, 2009
Sociology	December 15, 2008
Statistics and applied mathematics	January 2, 2009
Theater arts	March 1, 2009

The dates listed here are the official deadlines, but students are strongly advised to submit applications in October or November. If an application deadline falls on a weekend or holiday, materials should arrive **before** the deadline.

To be considered for fellowship support for fall quarter, the admission application and all supporting materials must arrive at the Division of Graduate Studies by the program's deadline or by February 1, 2009, **whichever is earlier**.

Admission Requirements

To be admitted with graduate status at UCSC, a student must have completed a bachelor's degree or its equivalent from an accredited undergraduate institution of acceptable standing and demonstrate ability to pursue a program of study leading toward an advanced degree. Preparation must provide an adequate foundation for advanced study, as determined by the department for the program in which the student intends to enroll. If the bachelor's degree is not in the same

discipline as the graduate program, the student must have sufficient preparation in the intended area of study to undertake graduate-level work.

To apply for admission, the items described below must be submitted before the deadline date to the Division of Graduate Studies. UC Santa Cruz requires that applicants complete an online application to be considered for admission to a graduate program. The Graduate Studies Division will provide access to a printed version for those who qualify under the Americans with Disabilities Act. The application and the accompanying materials should be complete and accurate.

1. Admission application form. Application materials for all programs are available online at *graddiv.ucsc.edu*. The completed application is paid for online with either a credit card or e-check. This application fee is not refundable. Application fee waivers are available for cases of hardship. International applicants are not eligible for fee waivers.

Applicants to the programs in anthropology, computer engineering, computer science, and electrical engineering also need to conform to the admission guidelines posted on the web pages for these departments. These pages can be accessed from the graduate studies home page: graddiv.ucsc.edu.

2. Statement of purpose. This should be a concise, well-written account of the applicant's background and reasons for pursuing graduate study in the field chosen. Selection committees place particular importance on the statement of purpose. It exhibits the applicant's ability to present ideas in clear, coherent language. The statement of purpose should indicate all of the following:

- How knowledgeable the applicant is in the desired field of study
- How undergraduate studies and other experiences (work, community involvement, and so forth) serve as a foundation for graduate study
- How and why the applicant intends to build on this foundation of knowledge and apply the training to social or theoretical problems

3. Official transcripts. Official transcripts of all previous course work since high school, including certification of degrees received or documentation of status upon leaving each institution, should be obtained. UC Santa Cruz requires only one transcript from each institution. **Official evidence that the applicant has received a bachelor's degree from an accredited institution of higher education must be presented. All of the official transcripts and documentation should be requested well in advance of the program deadline to be sent to Graduate Application Processing.** Only

official transcripts bearing the signature of the registrar and the seal of the issuing institution will be accepted. If work is in progress at the time of application, a final transcript of such work must be submitted before the student can be officially enrolled at UC Santa Cruz. If the bachelor's degree is in a field other than that in which the student intends to apply, evidence of course work sufficient to prepare for graduate study in the intended field must be shown.

4. Letters of recommendation. Three letters of recommendation should be included in the online application packet, or the applicant should have them forwarded to Graduate Application Processing. These letters should be prepared by professors or others who are in a position to analyze the applicant's abilities and academic promise in the chosen field of graduate study.

5. Graduate Record Examination scores. Individual departmental requirements for the Graduate Record Examination (GRE) follow:

Anthropology: GRE General Test

Astronomy and astrophysics: GRE General Test; GRE Subject Test in Physics or Mathematics strongly recommended

Bioinformatics: GRE General Test; Subject Test in major strongly recommended

Biology (ecology and evolutionary or molecular, cell, and developmental): GRE General Test and GRE Biology Test or Biochemistry, Cell, and Molecular Biology Test

Chemistry and biochemistry: GRE General Test required; GRE Subject Test in any of the following strongly recommended: Biochemistry, Cell, and Molecular Biology; Chemistry; Computer Science; Physics

Computer engineering: GRE General Test required; GRE Computer Science Test or Subject Test in major strongly recommended

Computer science: GRE General Test required; GRE Computer Science Test or Subject Test in major strongly recommended

Digital arts/new media: No GRE required

Earth sciences: GRE General Test

Economics

applied: GRE General Test

international: GRE General Test

Education:

teaching (M.A.): No GRE required

research (Ph.D.): GRE General Test

Electrical engineering: GRE General Test required; GRE Subject Test in major strongly recommended

Environmental studies: GRE General Test required; GRE Subject Test in disciplinary field of student's choice strongly recommended

History: GRE General Test

History of consciousness: GRE General Test

Linguistics: GRE General Test

Literature: GRE General Test

Mathematics: GRE General Test and GRE Mathematics Test

Microbiology and environmental toxicology: GRE General Test required; GRE Subject Test in major strongly recommended

Music: GRE General Test and UCSC's Music Graduate Entrance Examination for M.A., D.M.A., and Ph.D. applicants with a bachelor's degree; GRE General Test for Ph.D. applicants with a master's degree

Ocean sciences: GRE General Test and GRE Subject Test in major

Philosophy: GRE General Test

Physics: GRE General Test and GRE Physics Test

Politics: GRE General Test

Psychology: GRE General Test

Science communication (writing): GRE General Test and GRE Subject Test in Biochemistry, Cell, and Molecular Biology; Biology; Chemistry; Computer Science; Geology; Mathematics; or Physics

Social documentation: No GRE required

Sociology: GRE General Test

Statistics and applied mathematics: See Computer Science for details

Theater arts: No GRE required

If the applicant is applying for admission to a program that requires the GRE, *the scores must be received by UC Santa Cruz Graduate Application Processing before the application deadline.* It is strongly recommended that all applicants complete testing by November, since December test scores will not reach the division prior to application deadlines.

The Educational Testing Service should be asked to forward the test scores directly to the division. UC Santa Cruz's school code is 4860. *Test results are electronically submitted to UC Santa Cruz Division of Graduate Studies four to six weeks after the exam has been taken.*

6. Additional required material. Many of the graduate programs have special application requirements, such as writing samples, portfolios, auditions, or personal interviews.

- *Education* requires a supplemental application.
- *Environmental studies* requires that a substantial writing project (undergraduate or master's level) be submitted with the application materials. Also, as part of the application process, applicants are required to contact faculty regarding sponsorship.
- *History of consciousness* requires a writing sample of not more than 10 pages.
- *Literature* requires a writing sample of 10 to 20 pages.
- *Ocean sciences* requires that applicants contact faculty directly about sponsorship as part of the application process.
- *Music*
 - **M.A.:** writing or composition sample (e.g., term paper or senior thesis, scores, or other projects) and a CD, DVD, or audio- or videocassette of one or more recent performances as instrumentalist, vocalist, conductor, or performances of original compositions.
 - **D.M.A.:** writing or composition sample (e.g., term paper or senior thesis, scores, or other projects) and three composition scores with recordings (if available) on CD, DVD, or VHS. For works involving improvisation, digital audio, or other approaches, one of the three compositions may be submitted in the form of a recording with brief notes on the media and/or performance conditions. Applicants interested in the computer-assisted composition track should include an example of a computer program they have written (a source code for the program plus documentation describing its use) or other evidence of technical competence with computers.
 - **Ph.D.:** *applicants with a bachelor's degree:* writing sample (e.g., term paper, senior thesis, or other class paper) and optional materials demonstrating musical skills (e.g., compositions, a performance or lecture-recital on CD, DVD, or VHS, etc.); *applicants with a master's degree:* writing sample of substantial length (e.g., an excerpt from a master's thesis or a set of class research papers) and optional materials demonstrating musical skills (e.g., compositions, a performance or lecture-recital on CD, DVD, or VHS, etc.)
- *Philosophy* requires a 10- to 15-page writing sample
- *Politics* requests that the writing sample (ideally not to exceed 20 pages) be a term paper, thesis, article, conference paper, or problem solution; it need not be in politics
- *Social documentation* requires an analytical writing sample (e.g., research paper, professional report, or substantial essay). Sample documentary production work is recommended but not required (e.g., a video or audio recording, photographic essay, web page). Preferred format for submission of production work is web, DVD, or CD-ROM (provide URLs to publications and documentary productions where possible).
- *Sociology* requests a writing sample, preferably in sociology or a related field
- *Theater arts* requires a portfolio of projects along with the application. The brochure or web site for the program to which the student is applying should be consulted and all of the requirements specified should be fulfilled.

Duplication of Higher Degrees

It is the policy of the Santa Cruz campus to prohibit the pursuit of duplicate advanced degrees. However, applicants may petition the graduate dean for an exception to this policy if the degree sought is in a field of study distinctly different from the field in which the original advanced degree was attained.

In order for a student who already holds the doctorate to be admitted or readmitted to work toward a second Ph.D.—or toward an academic master's degree—all of the following conditions must be met:

1. The applicant must petition the graduate dean in writing prior to the application deadline for the program in question.
2. The department sponsoring the program to which admission is sought must support the applicant's petition.
3. The department must present the graduate dean with a clear and complete outline of the program required for the degree sought, and must explain the intellectual separateness of the proposed program from that completed by the applicant in attaining the earlier degree.

The graduate dean will review all materials submitted and decide whether or not to admit the applicant, consulting with the Graduate Council when appropriate.

Admission to a professional master's program after a Ph.D.—or to an academic master's program after a professional doctorate—is not subject to these restrictions.

Transfer of Credit

UC Santa Cruz does not automatically grant credit for graduate-level work undertaken at other universities. Each department determines credit transferability on an individual basis.

International Applicants

Applicants from other countries must meet standard admission requirements and provide satisfactory evidence of financial support before they may obtain the necessary visa documents. Because it normally takes much longer to process international applications, such students are urged to apply as early as possible. A

Certificate of Eligibility (I-20) will not be issued by the UC Santa Cruz Office of International Education until all requirements are satisfied and the student has been formally admitted.

Please note that international students are eligible for neither need-based financial aid nor application fee waivers.

Applicants from countries where English is not the primary language must take the Test of English as a Foreign Language (TOEFL). A minimum score of 550 on the paper-based TOEFL or 220 on the computer-based test is required. Chemistry and biochemistry, computer engineering, computer science, and electrical engineering require 570 on the paper-based test or 230 on the computer-based test.

All official academic records must be issued in the original language and be accompanied by English translations prepared by the issuing institution. If translations are not available from the institution itself, translations may be prepared by government or official translators. In order for translations to be acceptable, they must bear the stamp or seal of the issuing institution or governmental agency and the original signature of the translator. They must be complete and exact word-for-word translations of the original documents, not interpretations. Grades must not be converted to the American scale. Specially prepared English versions are not acceptable in place of documents issued in the original language. Records submitted to the Division of Graduate Studies may not be borrowed, returned, or sent elsewhere.

Application Processing

The Division of Graduate Studies receives most application materials and sets up a file for each applicant. Once the application is submitted online, it will be available to the appropriate department for review and recommendation. Applicants are admitted by the graduate dean following recommendations by the departments. Applicants will be notified by e-mail whether or not they have been admitted for graduate study at UCSC after all reviews are complete. Under no circumstances will UCSC give out this information over the phone, in person, or by proxy. E-mail notifications are sent throughout the month of March. By a general agreement to which UC Santa Cruz and most graduate schools in the U.S. are signatories, applicants admitted to graduate schools have until April 15 to reply with their acceptance of fellowship offers. Any information about the completeness of the file can be found at apply.graddiv.ucsc.edu. Specific questions about the evaluation of the application should be directed to the graduate representative of the department.

Fees and Expenses

Fees and expenses for graduate students are shown below. *Tuition, fees, and other charges are subject to change without notice by the Regents of the University of California. For current fee information, check reg.ucsc.edu.*

Graduate Student Fees, 2008–09^a

	One Quarter	F-W-S Quarters
University Registration Fee	\$ 288.00	\$ 864.00
Educational Fee ^b	2,374.00	7,122.00
Santa Cruz campus fees	323.66	970.98
Health Insurance (waivable)	801.00	\$2403.00
Total for California Residents	\$3,786.66	\$11,359.98
Nonresident Tuition ^c	4,898.00	14,694.00
Educational Fee Differential ^b	104.00	312.00
Total for Nonresidents of California	\$8,788.66	\$26,365.98

^aThe 2009–10 Graduate Student Fees will be posted in the online catalog at reg.ucsc.edu in July 2009.

^bCalifornia residents pay an annual Educational Fee (EF) of \$7,122 (three quarters at \$2,374 per quarter). For nonresidents of California, the annual EF is \$7,434 (three quarters at \$2,478). Graduate students who have been approved to enroll in part-time study may be eligible for 50-percent EF reduction.

^cA limited number of Nonresident Tuition Fellowships are available. Please refer to the Financial Support section.

For information on fee refunds, see page 20.

Minimum annual expenses, including registration fees, for a single graduate student living on campus are estimated to be \$29,841 per academic year. Students should not plan to undertake graduate study without assured funding, since outside employment in the Santa Cruz community can be difficult to obtain. Here is an estimated sample student budget for the 2008–09 academic year. Non-California residents should add \$14,961 in nonresident tuition and fees to the total. Living expenses and fees are likely to increase for 2009–10.

Graduate Student Budget, 2008–09^a

Fees	\$ 11,360.00
Books and supplies	1,425.00
Room and board (on or off campus)	14,265.00
Transportation ^b	1,734.00
Personal	2,493.00
Total	\$31,277.00

^aThe 2009–10 Graduate Student Budget will be posted in the online catalog at reg.ucsc.edu in July 2009.

^bEstimated room and board for graduate students living with family is \$4,206.

^cExpenses of owning a car and parking on campus are not included here. For parking fees, see www2.ucsc.edu/taps/pdf/rates08-09.pdf.

Required Fees

Required fees are due and payable before the start of each quarter. At the beginning of each quarter, sufficient funds will be needed to cover housing charges and book costs. For many financial aid recipients, however, fees and on-campus housing charges are paid automatically from approved student aid funds. Financial aid recipients should note that fellowship, grant, and loan checks or bank deposits in excess of university charges are not available until after registration each quarter.

The University Registration Fee supports student services that provide a supportive and enriching learning environment and that are complementary to, but not part of, the instructional program. Programs include, but are not limited to, services related to the physical and psychological health and well-being of students, social and cultural activities and programs, services related to campus life, and educational and career support.

The Educational Fee helps support student financial aid and related programs; admissions; registration; administration; libraries; operation and maintenance of plant; the university's operating budget; and all costs related to instruction, including faculty salaries.

Santa Cruz campus fees help support a wide range of student services, including extracurricular programs, campus child care, community and public service projects, and free-fare use of the local transit systems.

In addition, all students, including foreign students, are assessed a mandatory fee for health insurance. The Cowell Student Health Center provides the primary care services for the plan while a contracted insurance company provides major medical and hospitalization insurance. There is an annual deductible, with most expenses covered at 75 or 95 percent of the customary and usual charge, depending on whether the preferred provider network is used. Coverage includes hospital stays, surgical services, physician visits, emergency treatment, outpatient care, and pregnancy. Dependent coverage is also available. For information, call the Student Health Center, (831) 459-2389.

Waivers from the mandatory insurance fee are available for students who can show that their outside plan provides coverage equal to or better than the student health insurance plan. Deadlines for applying for a waiver are listed in the *Schedule of Classes*—on the web at reg.ucsc.edu/soc—and the *Graduate Student Handbook* at graddiv.ucsc.edu/regulations/handbook.php.

Nonresident Tuition

A resident of a state other than California or of another country must pay nonresident tuition. General criteria for residency are in Appendix A.

Non-U.S. citizens note: Regardless of how long you live in California, only U.S. citizens and holders of immigrant visas may become qualified for resident classification.

Late Fees

Late fees may be assessed if a student fails to make university payments or enroll by the specified deadlines. *Late fees are assessed on a graduated basis for each month there is an unpaid balance on your university account,* and at \$50 each for a late registration payment and/or late enrollment and \$25 for a late housing payment. Deadlines are published online in the *Graduate Student Handbook* at graddiv.ucsc.edu/regulations/handbook.php and the *Schedule of Classes* at reg.ucsc.edu/soc, and they appear on the Statement of Account.

Deferred Payment Plan

See page 20.

Financial Support

The University of California, Santa Cruz, makes a strong effort to provide financial support to all graduate students who make normal progress in their program of studies. Certain kinds of support are awarded on the basis of academic merit, and others are granted on the basis of need. Students are encouraged to apply for both kinds of assistance by submitting the Free Application for Federal Student Aid (FAFSA). This form must be submitted after January 1 prior to the academic year for which you are requesting aid. The FAFSA may be filled out online and filed electronically at www.fafsa.gov. To receive need-based support for the fall quarter, the FAFSA should be submitted no later than three weeks prior to the end of spring quarter. Applications for student loans for each academic year will be accepted until April of that academic year. More detailed information about the application process and loans appears on pages 21–22. Students may also contact the Financial Aid Office, 201 Hahn Student Services Building, (831) 459-2963, e-mail fin_aid@ucsc.edu. Web: www2.ucsc.edu/fin-aid.

Fellowships, Assistantships, Grants

Cal Grant A and B Programs. Students who received one of these awards as undergraduates may request a one-year extension from the California Student Aid Commission to attend a teacher credential program. The Cal

Grant A program is expected to pay a maximum of \$7,440, and the Cal Grant B program is expected to pay a maximum of \$8,990 per year for study at the University of California in 2008–09. Renewal of these awards requires the student to submit the FAFSA by March 2.

Teaching Assistantships. For the 2008–09 academic year, half-time teaching assistantships provided a salary of \$5,463 per quarter.

Graduate Student Researchships. For the 2008–09 academic year, half-time researchships provided a salary ranging from \$1,351 to \$2,102 per month, depending on the student's academic level and department.

The application for fellowships, assistantships, and researchships is Part C of the admission application, which may be obtained from the Division of Graduate Studies. It should be filed by the program's deadline or by the February 1 preceding admission, **whichever is earlier.**

The division and the UCSC Career Center (see page 36) can provide information about external graduate fellowships and grants.

Student Loans

Graduate students may apply for student loans through the Financial Aid Office. Students who apply using the FAFSA are eligible for loans funded by the federal government. Students who demonstrate financial need qualify for the William D. Ford Federal Direct Subsidized Student Loan, and students who do not demonstrate need or who want an additional loan qualify for the William D. Ford Federal Direct Unsubsidized Student Loan. Subsidized loans are interest-free while the student is enrolled; interest accrues on unsubsidized loans during enrollment. Graduate students may also be eligible to borrow through the Federal Direct Graduate PLUS loan program. See page 22 for additional information.

Loan Forgiveness Programs

The federal government will forgive all or part of a student loan under certain circumstances. Examples of these include (1) performing volunteer work or military service and (2) practicing medicine in certain communities. For a summary of such exemptions, visit <http://www.finaid.org/loans/forgiveness.phtml>.

The Assumption Program of Loans for Education (APLE) is offered by the California Student Aid Commission. This program serves students who plan to become public schoolteachers.

Students must be nominated by the UCSC Education Department. Under the program, the commission may assume up to

\$11,000 in educational loan balances in return for service as a public schoolteacher in California, in either a designated subject-shortage area or at a school serving large populations of students from low-income families. In addition, participants who teach mathematics, science, or special education in the lowest-performing schools may have a total of \$19,000 in debt assumed. To receive full benefits, you must provide four consecutive years of teaching at a California public school. Additional eligibility criteria include California residence, U.S. citizenship or eligible noncitizenship, academic ability, and financial need. Contact the Education Department a (831) 459-3249 for more information. The funding status of the program for 2008–09 is subject to California budget deliberations. Call the California Student Aid Commission at (888) 224-7268 for an update.

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University Library

The handsome McHenry and Science & Engineering libraries house the increasingly impressive collection of UCSC's University Library. In more than four decades, the collection has grown from a few shelves of books and a substantial dependence on the libraries of UC Berkeley, to 1.5 million volumes, over 25,000 periodical titles (including online journals), over 725,000 microforms, and more than 400,000 nonprint items, including films, slides, and audio and video recordings.

As part of the statewide University of California library system, the University Library also serves as gateway to millions of other books and periodicals at other campuses throughout the state. The library's efficient Interlibrary Loan service is heavily used, especially the online request service of the California Digital Library. Faculty, staff, and graduate students may also use the Document Delivery Service for on-campus delivery of local materials.

The University Library collection is divided into two parts. Resources in the humanities, arts, and social sciences are contained in McHenry Library at the heart of the campus, while the engineering, mathematics, and natural sciences collections are housed in the beautiful Science & Engineering Library, conveniently located on "Science Hill."

Subject bibliographers manage the growth and development of UCSC's collection and provide in-depth research assistance.

Most of the holdings of the University Library are shelved in open stacks. Students and faculty are encouraged to help themselves, using information found via the local CRUZCAT online library catalog, the systemwide Melvyl® catalog, and the library home page. The library home page provides a convenient gateway to the CRUZCAT and Melvyl® catalogs, the California Digital Library, and a host of other electronic information resources, such as article databases and online journals. The library staff is also eager to offer its assistance at any of several service points.

At the reference desks in both libraries, reference librarians give individual guidance:

facing page: UCSC's McHenry Library has just added an 81,600-square-foot light-filled annex that includes a 60-station electronic research center; an instructional design center to help faculty make innovative use of technology in instruction and research; an Internet café providing social gathering space and online access; distance learning facilities; wireless networking throughout; and group study rooms to foster collaborative learning.

general orientation for the newcomer and specialized help for the researcher. Librarians assist in the use of a wide range of indexes—in print or online, and in more than 200 online article databases to which the library subscribes. Librarians also offer group instruction: orientation sessions at the beginning of each quarter, library research workshops, special web seminars for students and faculty, and upon request, specialized instruction to classes in all disciplines.

The Reserve desks lend copies of assigned class readings on a short-term basis, operate a web-based electronic reserve system, and provide protection for vulnerable circulating materials and heavily used periodicals. In addition, the Science & Engineering Library Reserve Unit provides access to recent newspapers.

Special Collections at McHenry Library contains rare, valuable, and often fragile materials that do not circulate. Holdings focus on local history and 20th-century literature and book arts. Special Collections also houses the official campus archives, as well as the archives of George Barati, Gregory Bateson, Thomas Carlyle, Lou Harrison, Kenneth Patchen, Edward Weston, the Grateful Dead, and the Shameless Hussy, Trianon, and Turtle Island presses.

Other important collections and services include the following:

- Government Publications, a selective depository for documents published by U.S., California, and Santa Cruz government agencies
- The Media and Electronic Resource Center (MERC), which provides access to CD-ROMs, computer files, and language-related audio and video recordings; electronic support for language study at UCSC; and printing support for the Electronic Reserve System (ERes)
- The Map Collection, with maps and aerial photographs of Santa Cruz and adjoining counties and topographic, nautical, and aeronautical maps from all over the world
- The Mary Lea Shane Archives of the Lick Observatory, a national resource for the history of astronomy
- The Film and Music Center, which houses music recordings and a growing collection of videos and DVDs
- The Regional History Project's documentation of Central California history
- The Visual Resource Collection, which emphasizes art history but also includes slides on science, history, and the UCSC campus and offers the web-based SlideCat slide catalog

For more information, see the library's home page, library.ucsc.edu.

Center for Teaching Excellence (CTE)

The CTE is a professional resource dedicated to promoting, sustaining, and recognizing teaching excellence at UCSC. Serving the faculty and graduate students, CTE programs and services support instructors in their efforts to develop as teachers, to enhance the quality of instruction, and to improve students' learning.

Regular programs and services include Instructional Improvement Grants, Excellence in Teaching Awards, Teaching Symposia, Mid-quarter Class Interviews, Electronic Mid-quarter Analysis of Teaching, UCSC Instructor Evaluation, and *Faculty Focus*, a quarterly newsletter featuring the voices of the UCSC community speaking out on teaching and learning.

CTE is located in 133 Kerr Hall. For more information, visit the web: ic.ucsc.edu/CTE.

Computing Facilities and Services

Information Technology Services (ITS)

ITS at UCSC provides a broad spectrum of IT-related resources and services that support instruction, learning, research and administrative operations by providing information technology to students, faculty, and staff in the areas of instructional computing; administrative computing; network, voice, and data services; information systems security; web services; media services; technical support; and training.

ITS operates the UCSC network, which interconnects the campus network, the student residential network, and the Internet. On-campus network resources include academic, library, and administrative computing, database, and information servers. Many instructors choose to provide course materials via the web or electronic mail, and the UCSC and UC-wide library catalogs are web accessible.

Purchasing a Computer?

If you are planning to buy a new computer, UCSC recommends purchasing a laptop with both wired and wireless network capability. Last year, 98 percent of students who came to campus had a personally owned computer in their residential housing rooms.

The campus community embraces both PCs and Macs, and in some circles, Unix-based Sun Solaris and Linux are popular. The Humanities Division and the Arts Division both are heavily Mac oriented. The Social Sciences Division and the Physical and Biological Sciences Division use both Macs and PCs. The School of Engineering uses primarily PC/Windows and PC/Linux (as well as Sun Solaris), and there is an emerging interest in Macs with the Unix-based OS-X environment.

All students at UCSC are eligible to receive discounts on the purchase of a computer at the Bay Tree Bookstore. For more information, please visit slugstore.ucsc.edu.

Disability Accommodations for Computing

If you have a disability and will require adaptive or assistive technology to use lab computers, library facilities, or other campus services, please contact the Disability Resource Center (DRC) right away so that they can coordinate services for you. Computing labs have common adaptive technologies, such as enlarged type for students with low vision and Dvorak keyboards for students with repetitive strain injuries. If you need accommodations, please call the DRC at (831) 459-2089 (voice), or 459-4806 (TTY).

Computing Labs

The 12 computing labs on campus are equipped for use as classrooms and can be reserved by instructors for teaching. When classes are not in session, labs are available to students on a drop-in basis to work on assignments, collaborate with peers, use University-owned software, print, etc.

Most labs are open from early in the morning until late at night with some labs open 24 hours. The 12 lab locations are geographically distributed across campus for easy access from wherever you are.

Labs with Macintosh, Windows, and Unix (Solaris) computers are available with an extensive software library already installed. Instructors can request the installation of additional software for course use.

Digital and analog video editing equipment is installed at some locations along with various other peripherals including scanners, slide scanners, zip drives, floppy drives, etc. CruzNet wireless access is available at most lab locations. For more information, please visit ic.ucsc.edu/services/computer_labs.

Every lab is open to every student, no matter what his or her major. Assistive technologies are provided to disabled students who request services via the Disability Resource Center.

If you need assistive technologies, please see www2.ucsc.edu/drc and make your request so ITS can provide services for you in a timely manner.

Academic Course Materials on the Web

The WebCT Learning Management System is an integrated set of web course tools that can be used to supplement a class taught mostly face-to-face or can be used to teach a course entirely at a distance (where students mostly “go to class” online using the web with few if any visits to campus).

WebCT can be used by instructors to easily create a class web presence without needing to know how to construct a web page. WebCT can be used to move some of a course’s learning activities online to free up in-class time for higher value collaborative interactions and to encourage student-to-student and student-instructor collaboration outside of class time.

ITS staff are available to help instructors use WebCT effectively and easily. Several WebCT workshops are available for faculty along with Instructional Design Support to help ensure pedagogical effectiveness of WebCT course materials. For more information, please visit ic.ucsc.edu/services/learning_management_system

Residential Network, Wireless Access, and E-Mail

ResNet, a high-speed data residential network, is available in nearly all residence halls and apartments. Students can connect to the ResNet and access campus resources and the Internet from their rooms at speeds significantly faster than provided by modems. The CruzNet wireless network is available campuswide at its.ucsc.edu/service_catalog/cruznet.

UCSC is connected to other UC campuses and the Internet via a high-speed connection to the UC network. UCSC is also part of the state and national initiatives for the next-generation Internet, joining the other UC campuses and select California universities in this project.

To access any of the central computing services, including e-mail, individuals must have a UCSC account called “CruzID.” Registered students are assigned an e-mail account and may set the initial password via the web at any of the computing labs or from their own computers at my.ucsc.edu. Faculty and campus units send e-mail about classes and student services to this account. Students may forward e-mail sent to their UCSC e-mail account to another address via a web form. For CruzID information, please visit cruzid.ucsc.edu.

Get Technical Help

ITS provides computer and technical support for its services to students, faculty, and staff. This support includes walk-in, phone, and online support. For support, please call (831) 459-4357 (459-HELP), e-mail help@ucsc.edu, or visit itrequest.ucsc.edu.

Research Programs and Facilities

Research at UC Santa Cruz is thriving. Facilities are excellent, and the amount of external funding received for research continues to grow. In addition to their individual research projects, faculty are involved in organized research on various scales, from small focused activities within academic divisions, to large research units, some with campus-wide scope and others with wider connections to the whole 10-campus University of California system.

Specialized research facilities in addition to those listed below are described in the programs and courses section, pages 109–442.

Arboretum

The Arboretum at UCSC is a research and teaching facility committed to plant conservation and serves both the campus and the public. Its rich and diverse collection, containing representatives of more than 300 plant families, provides beginning students with a broad survey of the plant kingdom. Facilities for growing plants offer students and research faculty opportunities to experiment with living plants. The Arboretum maintains collections of rare and threatened plants of unusual scientific interest. Particular specialties are world conifers, primitive angiosperms, and bulb-forming plant families. Large assemblages of plants from Australia, New Zealand, and South Africa, and California natives are displayed on the grounds. Many of the species in these collections are not otherwise available for study in American botanical gardens and arboreta.

Arboretum events educate and engage the public about plant diversity and conservation. Of service to the public and the nursery industry are the Arboretum’s activities in importing, selecting, and breeding choice ornamental plants, especially those that are drought tolerant and pest resistant. To date, the Arboretum is the original importer of more than 1,500 different selections of choice ornamentals. Many of these

have been and will continue to be the plants of future California gardens.

Norrie's, the Arboretum's volunteer-run gift shop, supports the Arboretum and is open every day, 10 A.M. to 4 P.M.

Arboretum: (831) 427-2998; Norrie's gift shop: (831) 423-4977; e-mail: arboretum@ucsc.edu; web: arboretum.ucsc.edu

Arts Instructional Computing (IC) Labs

IC has two labs that primarily serve the Arts Division: the IC Arts Mac Lab and the IC Music Lab. The IC Arts Mac Lab at Porter is equipped with Arts-specific software, including high-end video-editing, graphics, web-development and sound-editing software. The Music Lab includes hardware and software for music editing, notation and working with MIDI. See hardware and software details at ic.ucsc.edu/labs.

These Instructional Computing labs are open to all UCSC students. In addition, the Arts Division manages computer labs with specialized equipment and software for the exclusive use of students taking classes in the Art, Film and Digital Media, and Theater Arts Departments, and the Digital Arts and New Media M.F.A. program.

Arts Research Institute (ARI)

ARI funds and facilitates the research and creative work of individual arts faculty, as well as collaborative research, symposia and other creative activities and events. Grants and awards from the ARI have helped to support performances, exhibitions, software design, manuscript preparation, digital recordings, international field research, collaborative colloquia, on-site installations, operas, and electronic productions. These and other innovative projects in arts practice and theory are among the research areas and interests supported by the Institute. For complete details, see the ARI web site at arts.ucsc.edu/ARI or contact the ARI administrator, Christina Waters, Ph.D., at xtina@ucsc.edu or (831) 459-2256.

Baskin School of Engineering (BSOE) Facilities

The BSOE occupies principally the Baskin Engineering and Engineering 2 Buildings. Some laboratories and offices are also in the Physical and Biological Sciences Building and Sinsheimer Laboratory Building. BSOE maintains a strong presence at the UCSC Silicon Valley Center (SVC) located on the grounds



Open to the public, UCSC's Seymour Marine Discovery Center at Long Marine Laboratory houses an aquarium and exhibits that interpret the vast spectrum of research taking place within the Institute of Marine Sciences.

of NASA Ames Research Center in Mountain View, California. Many BSOE faculty members maintain offices and research labs and teach classes at the SVC and have joint research agreements with NASA and the University Affiliated Research Center (UARC). BSOE is working to develop additional locations off the main campus. Web: www.soe.ucsc.edu

Computing Infrastructure

BSOE operates a computing network of several hundred Unix, Windows and Macintosh computers and several computer laboratories. These labs support research and graduate instruction in applied mathematics and statistics, biomolecular engineering, computer engineering, computer science, and electrical engineering. Undergraduate computing is supported by a combination of BSOE Undergraduate Laboratories (BELS Labs) and the campus's Instructional Computing Laboratories (IC Labs). For graduate and research computing, the ITS/BSOE computing support team operates a high-speed 100/1000 megabit-per-second network with fiber-optic backbones and redundant core routers and paths. This service has multiple connections to the main campus's computing network via four separate Tier 1+ data centers, all with UPS and air-conditioning support. Two of the data centers have backup power generation and the other two use a cam-

pus cogeneration facility for backup power. For graduate and research computing, BSOE supports the following:

- Central file servers for core services such as mail, name service, file sharing, and backup
- Several general-access Unix systems
- Multiple compute servers
- Research computing clusters

BSOE maintains several general-use research computing clusters, in addition to the clusters used by individual research groups. These clusters are available to all faculty and graduate students for general-purpose computations:

- Several graduate student computer labs with a mix of Windows, Linux, and Solaris workstations and network printers
- A variety of software purchased in cooperation with UCSC central computing, BSOE computing, and individual faculty members
- A variety of computer-aided-design software, including Altera, Agilent Advanced Design System, AutoCAD, Cadence, Maple, Matlab, Mentor Graphics, National Instruments Labview, Qualnet, Synopsys and Xilinx

Baskin Engineering Wireless Networking.

BSOE has an installed wireless computer network that covers nearly all interior building spaces of the Baskin Engineering, Engineering 2, and portions of the Physical Sciences Buildings. This service (SOENET) is separate from the UCSC campus wireless network (CruzNet). SOENET allows for much greater flexibility in operations and for greater performance as required by SOE's faculty and researchers. To gain access to SOENET, BSOE faculty or staff member register their computers for use on SOENET. In addition to SOENET, the campus's wireless computing service, CruzNet, is also installed in parallel in several of the undergraduate laboratory spaces of the Baskin Engineering Building. Details of BSOE computing services can be found at www.soe.ucsc.edu/administration/computer.

Undergraduate Engineering Laboratories

(Baskin Engineering Lab Support–BELS). BSOE operates the following special instructional laboratories for the exclusive use of engineering students. These laboratories are typically open 24 hours a day, seven days a week, during instructional quarters. The instructional labs available in 2008 are listed below. Please check the web site for updates as new instructional laboratories are being added:

- Digital Logic Design Laboratory
- Controls, Signals, and Instrumentation Laboratory
- Analog Circuits Laboratory
- Electrical Engineering Senior Projects Laboratory
- Optics and Laser Laboratory
- Computer Engineering Projects Laboratory
- Electromagnetic and Radio Frequency Laboratory
- Physical Electronics Laboratory
- Computer Networking Laboratory
- Computer Game Design Laboratory
- Engineering Honor Society Hardware Laboratory

Detailed information about these labs can be found at the following web site: www.soe.ucsc.edu/bels.

UCSC Instructional Computing

Laboratories. In addition to the facilities provided by the Jack Baskin School of Engineering, students have access to the computing facilities of the UCSC Instructional Computing (IC) Labs. These include several labs located around the campus consisting of Unix, Mac, and Windows workstations. There are two large IC Labs located in the Baskin Engineering Building. Check the UCSC Instructional

Computing web site for details on these labs and hours of operation: ic.ucsc.edu.

Research Laboratories

BSOE operates and supports the following research laboratories. Current information about BSOE Research Labs can be found at www.soe.ucsc.edu/research/labs.

Applied and Nano-optics Group. The Applied and Nano-optics group covers a wide range of optical research with an emphasis on experimental nanoscale optics. New methods and devices are developed for optical studies of single particles such as molecules, photons, or nanomagnets. A variety of optical and nanoscale characterization techniques such as time-correlated single-photon counting, ultrafast laser spectroscopy, or scanning-probe microscopy are used and investigated. Applications include integrated biomedical sensors, high-density magnetic memory, single-photon light sources and detectors. Web: <http://photon.soe.ucsc.edu/>

Biomolecular Engineering Research Facilities

BSOE supports a broad range of biomolecular-engineering (BME) research activities through the use of more than seven state-of-the-art research labs in the department. Areas of research include systems biology, comparative genomics, HIV vaccine development, stem-cell research, nano-device fabrication and DNA-sequencing-device development. BME departmental laboratory facilities include a variety of equipment used for molecular biology, cell biology, protein chemistry, immunology, virology and computational biology. Specific equipment includes high- and low-speed centrifuges, PCR machines, CO₂ incubators, bacterial shakers, microtiter plate readers, microtiter plate washers, microscopes (inverted, upright, fluorescence), spectrophotometers, protein-chromatography equipment, a variety of gel electrophoresis equipment including power supplies, gel dryers, gel-imaging equipment, vacuum concentrators, and cryopreservation equipment. Recently acquired and planned equipment purchases to be shared with other investigators include a Fluorescence Activated Cell Sorter (FACS), and next-generation DNA sequencing devices. Shared equipment rooms contain a variety of common equipment including freezers, glass-washing equipment, autoclaves, and refrigerators. Most labs are supplied with basic utilities such as air, gas, vacuum and reverse-osmosis de-ionized (RODI) water. The BME research groups have several computer clusters, one with more than 1000 CPUs. There is additional access to BSOE laboratories and

facilities within other departments. Many of the BME research groups have cooperate closely with the Electrical Engineering Department, which operates a clean room, a scanning electron microscope and semiconductor fabrication facilities. Collaborative research with faculty from the Physical and Biological Sciences Division is frequent with routine access to a wide range of biology and chemistry laboratory facilities. Web: www.soe.ucsc.edu/research/labs/

Clean Room. The Electrical Engineering Department operates a shared Class 10,000 clean room for use by researchers in Electrical Engineering. This clean room is undergoing certification in 2008 to become a Class 1000 clean room. The Biomolecular Engineering Department also uses this facility. Web: www.soe.ucsc.edu/research/labs/

Computer Communication Research Group

(CCRG). This group is dedicated to basic and applied research in computer communication. CCRG research focuses on new algorithms, protocols, and architectures for wireless networks based on packet switching (packet-radio networks), Internetworking, multipoint communication, and the control of resources by multiple administrative authorities. Web: www.cse.ucsc.edu/labs/ccrg

Design and Verification Laboratory. This lab facilitates research in software and system design methods, embedded software design, software and system verification, game theory, formal methods. Web: dvlab.cse.ucsc.edu/

Geospatial Visualization Laboratory. This lab creates a consistent four-dimensional space-time visualization of geospatial data and intelligence associated with the environment. This task requires intelligent collection of data using various sensors, including a variety of cameras, LIDAR data, and multispectral imagery in all kinds of frequency bands. The spatiotemporal GIS (geographic information systems) visualization will bring together several layers of information including terrain data, street maps, buildings, environment data, aerial images, and mobile-objects data. Web: www.cse.ucsc.edu/odhagisviz/index2.html

Group Researching Advances in Software Engineering (GRASE).

This laboratory performs research in the areas of software evolution and reengineering, and software-configuration management. Current research includes identifying unstable areas of evolving software, automatic generation of software configuration-management repositories, and development

of web-based versioning and configuration-management infrastructure. Web: <http://www.soe.ucsc.edu/labs/grase>

High-Speed Network Laboratory. Members of this lab explore and expand the field of high-speed computer networking and communication. Current areas of research include high-speed switching, traffic-scheduling algorithms for providing quality-of-service (QoS) guarantees in packet networks, ATM congestion control, and optical networks. Projects are funded by NSF, ARPA, and private industry.

Image Processing and Multimedia Laboratory (IPMML). This lab is the central venue for ongoing research into topics in image processing and multimedia. Areas of interest include wireless digital video; virtual scene and panorama generation; natural and machine-generated image compression; video capture, processing, and editing techniques; color printing technology; image libraries; and combinations of the above.

Information Retrieval and Knowledge Management Lab (IRKM). This lab conducts basic and applied research in information retrieval and data mining. Projects include developing a proactive personalized information-retrieval system (funded by NSF), adaptive information filtering (funded by AFOSR), and collaborative personalized search, recommendation and advertising (with industry funding from Yahoo, Microsoft, Google, NEC, Nokia, Bosch).

Internetworking Research Group (i-NRG). This group conducts research in the design, experimental evaluation, and implementation of network protocols for both wired and wireless internetworks. Research activities include a number of areas in computer networks and distributed systems. Web: inrg.cse.ucsc.edu

Micro-Architecture at Santa Cruz (MASC). MASC's focus is on computer-architecture research, with emphasis on energy/performance trade-offs, thread-level speculation, simulation tools, FPGAs, and design complexity. Web: masc.soe.ucsc.edu

Multidimensional Signal Processing Research Group (MDSP). This group's interests are in the area of inverse problems in imaging, statistical detection and estimation, and associated numerical methods. Current projects include image-resolution enhancement and superresolution, computationally efficient

image-motion estimation, shape reconstruction from local and global geometric data, multiscale modeling and analysis of signals and images, radon transform-based algorithms for deformation analysis and dynamic imaging, image processing and inverse problems in remote sensing, and automatic target detection and recognition. The group is also associated with the Image Processing and Multimedia Lab. Web: www.cse.ucsc.edu/~milanfai/MDSP

Network Management and Operations Lab. BSOE, in partnership with Cisco Systems, has established this lab to serve as a "network-systems teaching hospital" where real-world problems and projects are addressed by students and faculty. Projects range from the routine (e.g., quality-assurance and release testing of new products) to the advanced (e.g., research into new architectures for network systems). Students employed as interns work with faculty researchers on these projects in BSOE facilities equipped for the specific needs of the projects. Web: soe.ucsc.edu/labs/nmolab

Quantum Electronics Group. This group's interests are in the mutual interaction of heat, light and electricity in nano- and microscale materials and devices. Studies and experiments are done in which this mutual interaction is used to improve device or circuit performance for communication, computing or energy-conversion applications. Examples include microrefrigerators on a chip that could be used to remove hot spots in microprocessor chips and internally cooled semiconductor lasers. The group has developed novel thermal-imaging techniques that can provide transient temperature maps of active devices with submicron spatial resolution. The group is also investigating optoelectronic and thermoelectric properties of quantum-wire and quantum-dot materials and the design of low chirp, narrow line-width and widely tunable passive microring-coupled lasers. The group maintains several electrooptics labs with femtosecond lasers, cryogenic and high-temperature setups, confocal and Raman microscopy and houses an on-site molecular beam epitaxy thin-film growth facility. Web: quantum.soe.ucsc.edu

Santa Cruz Laboratory for Visualization and Graphics. Recent research at this lab includes animal modeling and animation, environmental visualization, isosurfaces, d.v.r., hierarchies, irregular grids, massively parallel volume rendering through the net, uncertainty visualization, virtual reality in scientific visualization, nomadic collaborative visualization, tensor visu-

alization, and flow visualization. Web: www.cse.ucsc.edu/labs/slv

Storage Systems Research Center (SSRC) This center is composed of faculty from the Computer Science, Computer Engineering, and Electrical Engineering Departments and the Technology and Information Management Program, and is funded by the NSF, Department of Energy, and companies such as NetApp, Symantec, HP, LSI, Data Domain, and Agami. Current research topics include long-term archival storage, scalable indexing and metadata, petabyte-scale storage systems, and file systems for next-generation storage technologies such as non-volatile memories and probe-based storage. Issues of particular concern include performance and scalability, reliability, and security. The SSRC's resources include several computing clusters, the largest with more than 80 processor-disk nodes, as well as over 10 terabytes of dedicated storage. In addition, there are several hardware-software testbeds for projects such as self-managing archival storage and large-scale distributed file systems. The SSRC also maintains a PlanetLab site at UC Santa Cruz, allowing researchers to run experiments on the PlanetLab global-scale distributed testbed. Web: www.ssrc.ucsc.edu

UCSC Broadband Communications Research Group. The members of this group investigate the fundamental limits and performance analysis of protocols in wireless ad hoc networks, space-time signal processing, and development of signal processing and coding techniques for wireless communication systems. Web: <http://www.soe.ucsc.edu/%7Ehamid/ucbc/index2.html>

UCSC Scientific Visualization Laboratory. This lab provides the means for creating visualizations from scientific data. Projects include a simulation of an "extensive air shower" striking the Milagro detector at Los Alamos National Lab, representing a subsonic flow over a delta-wing aircraft, a demonstration of direct volume rendering on a multiple-gridded space-shuttle launch vehicle, an N-body simulation of large-scale structure in the universe, and a representation of a diving whale based on location data from a Monterey Bay tagging experiment. Web: vizwww.cse.ucsc.edu

UCSC Visual Computing Laboratory. This lab explores visual tracking, stereo and sparse IBR, facial modeling and analysis, and image and video processing. Web: soe.ucsc.edu/research/labs



At UCSC's Center for Agroecology & Sustainable Food Systems, researchers investigate the ecological basis for sustainable agriculture, with the goal of designing farming systems that conserve energy and water, recycle nutrients, and manage weeds and pests with minimal environmental and economic costs.

For additional information regarding BSOE, please check the web site: www.soe.ucsc.edu.

California Carlyle Edition

The splendid Norman and Charlotte Strouse Collection of Thomas Carlyle in Special Collections at McHenry Library is the focus of an exciting and innovative effort by an international group of scholars to publish an eight-volume critical edition of Carlyle's major works. Headquartered at UCSC, it is the first "scientific" edition of Carlyle, using computer technology to compare all the lifetime editions of each work in order to establish an accurate text, as well as providing explanatory notes for the modern reader. The edition promises to set the agenda for work on Carlyle and the Victorian era for the next generation. In addition to producing a much needed critical edition of the works of Carlyle, the project is using the campus's computer facilities to develop and demonstrate many state-of-the-art applications of data-processing technology in the humanities, from optical scanning of some editions and machine-assisted collation and proofreading, to desktop typesetting and the creation of an online Carlyle textual archive. The first volume, *On Heroes, Hero Worship, and the Heroic in History*, was published in 1993 by the University of California Press. The second volume, *Sartor*

Resartus, was published in 2000. *Historical Essays*, in 2003, and *Past and Present*, in 2006. *The French Revolution* is forthcoming. Web: www.nd.edu/~carlyle/strouse.html

California Institute for Quantitative Biosciences (QB3)

UCSC is one of three UC campuses sponsoring the QB3, a California Institute for Science and Innovation (CISI). This cooperative effort among three campuses of the University of California, Santa Cruz, Berkeley, and San Francisco, and private industry harnesses the quantitative sciences to integrate our understanding of biological systems at all levels of complexity—from atoms and protein molecules to cells, tissues, organs, and the entire organism. This long-sought integration allows scientists to attack problems that have been unapproachable before, setting the stage for fundamental new discoveries, new products, and new technologies for the benefit of human health.

The institute involves more than 180 scientists, including 44 from UCSC. It builds on strong biology programs at the three campuses as well as individual campus strengths in biomolecular and computer engineering and mathematical sciences at UC Santa Cruz, biomedical engineering and physical sciences

at UC Berkeley, and medical sciences at UC San Francisco. Harnessing these strengths, QB3 is developing effective new solutions to the world's most urgent biomedical problems through multidisciplinary research, innovative educational programs, and industrial and venture capital partnerships.

The institute facilitates access to state-of-the-art resources to enable scientists and engineers to develop devices, drugs, and therapies that save human lives, as well as technologies to prevent or mitigate environmental damage and improve energy production and use. Research areas include bioengineering and biotechnology, bioinformatics and computational biology, structural and chemical biology, experimental genomics, proteomics, and biochemistry. Through QB3, researchers in all of these fields come together to develop interdisciplinary collaborations.

In addition to the creation of fundamental new knowledge and potent new technologies, a major goal of the institute is to train a new generation of students able to fully integrate the quantitative sciences with biomedical research.

QB3 fosters industry and venture capital partnerships by identifying potential opportunities for research collaborations and support, and by assisting faculty with intellectual property and technology transfer issues.

QB3 is administered at UCSC through the Center for Biomolecular Science & Engineering and involves faculty from the Departments of Biomolecular Engineering; Molecular, Cell, and Developmental Biology; Chemistry and Biochemistry; Electrical Engineering; Applied Mathematics and Statistics; Computer Science; and Computer Engineering.

Find more information at www.qb3.org.

Center for Agroecology and Sustainable Food Systems (CASFS)

The CASFS is a research, education, and public service unit of the Division of Social Sciences, dedicated to increasing ecological sustainability and social justice in the food and agriculture system. CASFS researchers investigate the ecological basis for sustainable agriculture and the cultural, political, and economic aspects of developing sustainable food and agricultural systems. The work of CASFS is multifaceted, and includes research (theoretical and applied), education (practical and academic), and public service (with audiences ranging from local schoolchildren to international agencies). Much of the farming-systems research takes place on organic and conventional farms throughout the region, including a number of projects

in the Santa Cruz/Monterey area and the Elkhorn Slough watershed. CASFS social issues staff organize and participate in the Agrifood Working Group for UCSC faculty, researchers, and graduate students, which meets regularly to discuss topics related to food systems.

CASFS facilities and resources are available to all UC Santa Cruz undergraduate and graduate students. Students can take part in ongoing research and education efforts, or design their own projects and internships in collaboration with affiliated faculty and staff. Many undergraduate students participate in the CASFS as part of the environmental studies major (see page 261) and as participants in the Apprenticeship in Ecological Horticulture (see below). The graduate program in environmental studies includes a focus on agroecology and sustainable food systems (see page 262); graduate students have access to CASFS facilities and staff assistance for field based work. Students have also pursued undergraduate and graduate studies with the center by working through the Departments of Biology, Education, Anthropology, and Sociology.

In addition, about 35 people complete a six-month apprenticeship organized and taught by CASFS staff each year, earning a Certificate in Ecological Horticulture through UCSC Extension. Through workshops, lectures, and hands-on instruction, apprentices master basic organic farming and gardening techniques.

CASFS gives high priority to forging links with, and serving as a resource for, researchers on and off campus, government agencies at many levels, nongovernmental organizations, producers, consumers, students, gardeners, and other individuals interested in multiple aspects of sustainable agriculture and food systems. Staff coordinate major agricultural conferences, teach short courses, make presentations at agricultural and ecological events, and publish a newsletter twice yearly. In addition, CASFS hosts a growing number of international researchers interested in working with faculty and staff.

CASFS manages two facilities: the 25-acre Farm on a lower meadow of campus and the two-acre Alan Chadwick Garden on the upper part of campus. As the primary on-campus research facility, the CASFS Farm includes research plots, raised-bed gardens, row crops, and orchards, as well as staff offices, a laboratory, greenhouses, and a visitor center. The Chadwick Garden showcases small-scale intensive horticulture and supports a diverse collection of ornamentals, food crops, and native California plants.

The CASFS Farm & Chadwick Garden are open to the public daily from 8 A.M. to 6 P.M. In conjunction with the Friends of the UCSC Farm & Garden, the center sponsors a variety of public education events for the community. For further information, contact the center at (831) 459-3240; for directions to the Farm & Garden, call (831) 459-4140. Web: casfs.ucsc.edu

Center for Biomolecular Science and Engineering (CBSE)

The CBSE fosters interdisciplinary research and academic programs that address the scientific questions of the post-genomic era—the scientific opportunities arising from the completion of the Human Genome Project and the sequencing of other model organisms. As they further our understanding of biology, these scientific investigations have potential applications to medicine, agriculture, and ecology. The center serves as an umbrella organization at the University of California, Santa Cruz, spanning the Baskin School of Engineering and the Division of Physical and Biological Sciences in pursuit of the following goals:

- Promote interdisciplinary research in areas that encompass the study of genomic information and structural biology.
- Support the UCSC Genome Browser, a crucial resource for the international scientific community.
- Support core facilities, such as the computational cluster used for the UCSC Genome Browser and genome research, the microarray facility, the embryonic stem cell facility, and the transgenic mouse facility.
- Help meet the need for trained professionals in industry and academia by developing training programs in the areas of bioinformatics and biomolecular engineering.
- Attract research funding for the center, for affiliated faculty, and for students from federal, state, and private agencies.
- Cultivate and maintain mutually beneficial relationships with industry through research collaborations, internship opportunities, and gifting programs.

For more information about CBSE, visit the web site: www.cbse.ucsc.edu.

Center for Cultural Studies

The Center for Cultural Studies builds on UCSC's strong history of innovative scholarship in the humanities, and particularly on its

unusual strength in interdisciplinary and global cultural studies. The center sponsors conferences, lectures, film series, seminars, scholarly visits, workshops, and discussion groups. It also organizes and supports research clusters of faculty and graduate students working on a variety of topics, including cultural theory, critical regional studies (Asia-Pacific-America, Africa and African Diaspora, and Latin America have been recent foci), contemporary cultural production, minority discourse, and queer studies. The center is based in the Humanities Division, but it also sponsors collaborative work involving faculty and graduate students from the social sciences, the physical and biological sciences, and the arts. From 2003 to 2006, the center hosted several visiting scholars each year in conjunction with an ongoing project on "Other Globalizations," funded by the Rockefeller Foundation. It also sponsors an unfunded residency program for U.S. and international scholars in cultural studies. The center publishes a quarterly newsletter listing events and activities and maintains a web site with programs, schedules, and other material at humanities.ucsc.edu/CultStudies. The center can be reached at (831) 459-4899, by e-mail at cgirs@ucsc.edu, or by U.S. mail at Oakes College Academic Services.

Center for Global, International and Regional Studies (CGIRS)

The CGIRS was established within the Division of Social Sciences in 1996, bringing under one umbrella the Center for the Study of Global Transformations, the Institute on Global Conflict and Cooperation (IGCC)—UCSC Campus Program, the UC Pacific Rim Research Program, the Global Information Internship Program (see page 42), the Global Studies Honors Program initiative, and related research, teaching, conferences, workshops, and public-education activities. CGIRS is organized around the idea that human activities, although anchored in specific regions and nation-states, are increasingly integrated by social, economic, and cultural networks to states, regions, and communities in other parts of the world. Accordingly, globalization processes and responses to them are a major research focus of CGIRS. The center sponsors collaborative research groups under four rubrics: Innovation, Security, Identity and Sustainability (ISIS). CGIRS is funded by the Division of Social Sciences, the UC Institute on Global Conflict and Cooperation, multicampus research units, private donors, and foundation support. For fur-

ther information, e-mail global@ucsc.edu or visit the web site: cgirs.ucsc.edu.

Center for Informal Learning and Schools (CILS)

The CILS was created in 2002 through a Center for Learning and Teaching (CLT) grant from the National Science Foundation. The primary intent of this center is to strengthen K–12 science and mathematics education through deepening the understanding of informal learning and the alliances informal science environments can have with schools. CILS is a collaboration among UC Santa Cruz, the Exploratorium in San Francisco, and King's College London, England. All three institutions offer CILS graduate programs.

CILS programs at UC Santa Cruz offer doctoral and postdoctoral research support to study the nature of informal learning in diverse settings and in diverse communities traditionally underserved by schools. UC Santa Cruz CILS programs include the following:

Doctoral Fellowships

CILS doctoral students at UCSC receive support to pursue a Ph.D. through either the Science and Mathematics program in the Education Department or the Developmental Psychology program in the Psychology Department. CILS students complete the requirements in their department, as well as attend joint doctoral seminars.

Postdoctoral Fellowships

This two-year program is aimed at new Ph.D. recipients who want to develop their research in directions compatible with the goals of CILS. Postdoctoral researchers collaborate with one or more faculty members in developmental psychology, or science and mathematics education, on research of mutual interest.

CILS Science Fellows

This program offers three quarters of support for students at UC Santa Cruz who are working on their doctorates in the fields of natural or social sciences and who want to deepen their understanding about informal science learning and connections among diverse learning environments. CILS Science Fellows participate in a core course, colloquia, and a practicum in informal science education and informal learning with other CILS Ph.D. students.

For further information on CILS at UCSC, e-mail sallyd@ucsc.edu. For information on all CILS programs at all three institutions, visit the web site: www.exploratorium.edu/cils.

Center for Information Technology Research in the Interest of Society (CITRIS)

The CITRIS is one of four California Institutes for Science and Innovation created in 2000. Supported by state, federal, and private funds, the centers concentrate on areas of science and innovation that are of special importance to California's high-tech economy and to emerging renewable energy technologies.

CITRIS is seeking new ways to help realize information technology's potential for solving many of the complex problems facing society, including those in transportation, education, science, management, engineering, emergency response, health care, and the environment. At their core, such issues depend on widespread, reliable, and secure information systems that adapt to the varied needs of users and continue to perform even if part of the system is down, disabled, or threatened.

With participation from more than 200 engineers, scientists, and social scientists, the focus of the institute is to develop the technical foundations of such societal-scale information systems (SIS) to meet many of California's infrastructure needs. Initial work will provide distributed "smart classrooms" for enhanced education and training; "smart buildings" that adapt their environment to their inhabitants; an urban SIS for transportation management, disaster response, seismic planning, and environmental monitoring; and a medical alert network to monitor and treat patients.

CITRIS's lead campus is UC Berkeley. UC Santa Cruz, UC Davis, and UC Merced are partners in the institute. Web: www.citris-uc.org

Information Technologies Institute

The Information Technologies Institute (ITI) is a focused research activity (FRA) founded in 2001 and housed at the Baskin School of Engineering. ITI's objective is to provide an environment in which its members can attract large-scale projects that bridge technology research from concept to prototype and solve problems in social and commercial sectors nationally.

In ITI, advanced Internet applications provide the impetus and focus that bring together the components of research related to the rapidly expanding world of networks, distributed computing, "smart" sensors, and Internet appliances. As electronics and packaging developments lead to powerful low-cost sensors, resulting in a broad array of instruments, these become Internet devices, bringing a significant increase in the data captured, transmitted, stored, managed, and displayed.

Through its research centers, ITI focuses on interrelated areas in computer science, computer engineering, and electrical engineering as well as physics, chemistry, and applied mathematics. Areas of emphasis follow:

- Internet and information systems: architecture, performance, and applications
- Multimedia systems and applications in education, telecommuting, and distance learning
- Design and development of complex networked systems and software technologies
- Storage systems and databases
- Communications
- Optoelectronics (including nanotechnology devices)
- VLSI design, packaging, testing
- Sensors and Internet appliances
- Visualization and computer graphics

ITI manages the participation with other research partnerships of its faculty, including the activities of the Baskin School of Engineering in the Center for Information Technology Research in the Interest of Society (CITRIS), with UC Berkeley, UC Davis, and UC Merced; the High Dependability Computing Consortium (with NASA Ames, Carnegie Mellon, and other universities); the National Partnership for Advanced Computing Infrastructure (NPACI) and the San Diego Supercomputer Center; and local universities and organizations with mutual research interests, including the Naval Postgraduate School; San Jose State University; California State University, Monterey Bay; and the Monterey Bay Aquarium Research Institute (MBARI). Web: www.iti.ucsc.edu

Center for Integrated Water Research

The Center for Integrated Water Research at UC Santa Cruz undertakes research to help provide safe and reliable supplies of fresh water. Fresh water is critical to our health and quality of life, to providing ample food supplies, to maintaining a vibrant economy, and to supporting the environmental systems we depend on and enjoy. The center provides fresh water through ingenious combinations of natural and engineered systems, which require vast amounts of financial, human, and natural resources to develop and maintain. Billions of dollars and millions of skilled workers are employed in the water sector. Policies on freshwater management have profound impacts that can last for decades.

Influences on fresh water supply in the early 21st century include growing demand from all categories of water users, replacing and upgrad-

ing aging infrastructure, declining water quality, and changing climate and groundcover that affect water availability and quality.

To meet these challenges, society has developed an array of new water-treatment and supply technologies, as well as new approaches to managing when and how water is gathered and used. Many technologies are so innovative they do not fit in well with our existing laws, regulations, and division of responsibilities for water. The roles of water agencies are in flux as water treatment agencies take on water supply roles.

The center provides research expertise in policy, economics, management, and communication related to fresh water. Current projects include the treatment of impaired waters (desalination and water reclamation and reuse), communications between water agencies and the public, design of regional water supply and treatment strategies, and measuring the reliability of alternative water supplies.

The center builds research teams that bring other needed areas of expertise to our projects; collaborates with other universities, government agencies, national laboratories, nonprofit organizations, and the private sector; focuses on applied problems, building theory out of specific cases; and sponsors a Fellows Program that includes nationally and internationally respected scholars.

The center serves the UCSC campus by providing internship opportunities and supporting conference attendance by students, and it develops and maintains relations with individuals in the business, finance, and regulatory sectors, who often lecture at UCSC, thereby helping students learn the cutting-edge issues.

The center works to resolve major debates on water supply, quality, and reliability in the United States; strives to increase the quantity and quality of research on fresh-water policy, economics, and communications nationwide; and hopes to refine and develop concepts and methods of studying water that will help regions, states, and nations make good choices regarding water in the 21st century.

Further information is available on the web at <http://ciwr.ucsc.edu>, by e-mail at ciwr@ucsc.edu or kkoeppe@ucsc.edu, or by phone at (831) 459-3114.

Center for Justice, Tolerance, and Community (CJTC)

The CJTC was established in 2000 as part of the Division of Social Sciences. CJTC is an interdisciplinary applied research center tackling issues of social justice, diversity and tolerance, and the building of collaborative communities. Current research projects include

studies of educational equity, public attitudes toward social and economic policies, the digital divide, environmental justice, homelessness and the impact of welfare reform on low-income women and others. While the mix of work includes considerations of fundamental issues of discrimination, power, and domination, the center actively seeks to play a public role in providing research that can inform policy and programs to improve equity. To ensure a public presence, the center sponsors an annual lecture series as well as smaller events bringing together community leaders and academic researchers. The center draws researchers from various divisions and includes opportunities for postdoctoral and affiliated researchers. For more information, contact CJTC at cjtc@ucsc.edu or (831) 459-5743. Web: cjtc.ucsc.edu

Center for Molecular Biology of RNA

The center, established in 1992, brings together an interdisciplinary group of researchers, from the Departments of Molecular, Cell and Developmental Biology; Chemistry and Biochemistry; and Biomolecular Engineering, whose common interest is to understand the structure, function, and biological roles of DNA's intriguing cousin, RNA. The center promotes interaction between structural biologists, molecular geneticists, biochemists, and computational biologists. Major funding for the center has been provided by the Lucille P. Markey Charitable Trust, the W. M. Keck Foundation and individual research grants from the National Institutes of Health, the National Science Foundation, and other extramural sources. Creation of the center was prompted by exciting developments in the molecular biology of RNA in recent years. Unlike DNA, RNA has the ability to fold into complex and unusual three-dimensional structures that confer its biological functions. RNA, like protein, may possess enzymatic activity and can catalyze specific biochemical reactions. Therefore, RNA may have preceded both protein and DNA in the early molecular evolution of life. Studies on the human genome have shown that, while only a small fraction of the genome codes for protein, the majority of it is transcribed into RNA. Although several new classes of functional RNAs have been discovered recently, including those that regulate development of higher organisms, the roles of most noncoding RNAs are still unknown. New insights into the fundamental properties of RNA will benefit a wide range of medical research projects. For example, a rigorous molecular understanding of RNA viruses—such as HIV, SARS and avian influenza—has become a national priority; knowledge

of the molecular structure of the ribosome is leading to the development of new antibiotics. The center's facilities are located in Sinsheimer Laboratories, a state-of-the-art research center. Among the areas currently under investigation by members of the center are RNA splicing, protein synthesis, ribonucleoprotein assembly, RNA-protein recognition, the x-ray crystal structures of RNA and RNA-protein complexes (including the ribosome), the structure and mechanism of action of catalytic RNAs and micro-RNAs, in vitro evolution of novel catalytic and other functional RNAs, and RNA genomics, using diverse approaches including cryo-EM reconstruction, DNA microarrays and high-throughput sequencing. Members of the center participate in the research training of postdoctoral scientists and doctoral students in graduate programs offered by the Department of Molecular, Cell, and Developmental Biology, the Department of Chemistry and Biochemistry, and the Department of Biomolecular Engineering. Web: rna.ucsc.edu/rnacenter

Chicano/Latino Research Center (CLRC)

The CLRC is an internationally recognized, cutting-edge organization dedicated to fostering interdisciplinary, comparative, multilingual, and cross-border scholarship on the Americas. Research focuses on the politics, cultures, migrations, economics, histories, and societies of Latin America broadly conceived, including Chicana/o and Latina/o communities in the United States, the Caribbean, and wider global linkages to the Americas resulting from the influences of peoples, cultures, histories and economies. The CLRC supports a range of thematic and topical research clusters, sponsors conferences, workshops, colloquia, special events, and publications. Affiliated faculty, graduate students, and undergraduates make up a lively, active intellectual community. Programs include faculty research support, graduate student research grants, an undergraduate research apprenticeship program (URAP), and a working paper series. The center provides opportunities to critically engage and reflect on issues of contemporary importance such as globalization, immigration, and social justice as well as questions of identification including gender, sexuality, race, and nationality. For further information, e-mail clrc@ucsc.edu or visit the web page: <http://clrc.ucsc.edu>.

Dickens Project

Through a regular program of conferences, courses, and scholarly gatherings, the Dickens Project coordinates research and instruction in the work, times, influence, and achievement of Charles Dickens. Twice a year, faculty members and graduate students from the nine general campuses of the University of California, joined by colleagues from other universities, present their research findings to conference participants, interested undergraduate and graduate students, and members of the general public. They meet on the Santa Cruz campus each summer and at another university each winter. The featured novels for summer 2008 are *Hard Times* and *Mary Barton*. Each year, the conference is available as a regular Summer Session undergraduate course. The project also publishes its own newsletter and curricular materials, cosponsors international conferences, and sponsors a web site, humwww.ucsc.edu/dickens. Founded in 1981, the Dickens Project is a multicampus research group of the University of California.

Educational Partnership Center (EPC)

Established in 1999, the EPC coordinates UCSC's new and long-standing student academic preparation efforts with the goal of increasing access and opportunity to postsecondary education for students in the Monterey Bay and Silicon Valley/San Jose regions. EPC is a research- and data-driven umbrella organization for a variety of complementary, integrated academic preparation and educational partnership programs serving students, teachers, and families from kindergarten through college. To build a college-going culture, EPC partners with K–12 middle and high schools and districts and the 13 regional community colleges in San Benito, Santa Clara, Santa Cruz, San Mateo, and Monterey Counties to help students and families navigate the college-going pathway and achieve their higher-education goals.

The EPC's mission is to build college-bound communities that improve student learning and increase college-going rates among students from low-income and traditionally non-college-going families in collaboration with school, college, business, and community partners. An array of direct services and programs support students on the college-going pathway through tutoring, mentoring, academic planning and counseling, leadership training, test preparation, college awareness and enrichment, family involvement

initiatives, transfer-student support, and teacher professional development.

The EPC's key to success is providing an integrated facility that brings all of the student academic preparation programs together and creates synergy across programs that are each grounded in measurable goals and research-based best practices. Coordinating services across the middle school, high school, and community college programs has been essential to providing students and families with vital information on the various pathways to college. In addition, the Business Office; Partnerships, Policy, Research, and Evaluation Department; Student Employment Office; and Development and Communication Department provide essential support for the following direct services and programs:

California Reading and Literature Project (CRLP) is one of nine California subject-matter projects; it supports professional development opportunities for teachers of reading and literature in K–12 and university classrooms. Governed by the UC Office of the President, CRLP helps ensure that pre-K–12 students in the Monterey Bay region achieve the highest standards of academic performance through developing teachers' content knowledge and expanding their teaching strategies; focusing on academic English language development to prepare all students to meet or exceed academic content standards; creating a statewide pool of expert teacher leaders to train other teachers on sound classroom practices; and linking universities, schools, and districts together in collaborative partnerships to improve teaching and learning through teacher professional development.

California State Summer School for Mathematics and Science (COSMOS) is a four-week summer residential program at four UC campuses that provides students with an unparalleled opportunity to work side-by-side with outstanding researchers and university faculty, covering topics that extend beyond the typical high school curriculum. The academic experience includes nine clusters taught by UCSC faculty, special discovery lectures, academic field trips, and enrichment sessions. Students' residential life includes weekend events and fun-filled peer activities, and COSMOS alumni have opportunities to attend the California Nobel Laureate event, receive research awards and college scholarships, and participate in an industry internship program.

California Student Opportunity and Access Program (Cal-SOAP). The San Jose Cal-SOAP program supports and sustains a college-going culture by providing academic support and advising services and helping students explore and clarify career interests and make the connection between postsecondary education and future career aspirations. Cal-SOAP also provides transfer student support through "Transfer: Making it Happen" and helps students and parents access important financial-aid information through the annual Cash for College Campaign workshops and events. In addition, the San Jose Cal-SOAP Consortium convenes key stakeholders from higher education institutions, K–12 districts, county offices of education, City of San Jose, and community agencies and businesses to collaboratively develop and implement academic preparation activities to maximize resources and avoid duplication of efforts.

Developing Effective Engineering Pathways (DEEP). UCSC has joined with Foothill College, De Anza College, and the Collaborative for Higher Education to launch a multiyear effort to increase the number of community college students completing science, technology, engineering, and mathematics (STEM) courses and transferring to four-year degree programs. Funded by a National Science Foundation grant, DEEP identifies and supports community college students from underrepresented populations to enter the field of engineering and provides ongoing advising, academic support, and enrichment opportunities to help students create a successful educational plan leading to a career in engineering. DEEP is designed to address the changing needs of engineering students as they move through the community college system, transfer as juniors to UC Santa Cruz, and graduate from the UCSC Jack Baskin School of Engineering.

Early Academic Outreach Program (EAOP): The University of California's largest academic preparation program, EAOP works with students at underserved schools to prepare for postsecondary educational opportunities, complete all UC/CSU eligibility requirements, and apply for college and financial aid. EAOP partners with families, schools, and communities to make college dreams a reality and provides a variety of year-round services designed to increase the academic preparation, awareness, and motivation of middle and high school students toward higher education and to inform parents about available education opportunities.

Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) is a federally funded discretionary grant program designed to increase the number of low-income students who are prepared to enter and succeed in postsecondary education. Through the collaborative efforts of school and district partners along with additional business and community partners, GEAR UP provides critical academic preparation and support for students and families to help them navigate the college-going pathway. GEAR UP partnerships supplement existing school reform efforts and use research-proven practices to promote academic rigor and student achievement. The program brings much-needed resources to increase student academic performance and preparation for college, increase student and family college awareness, increase teachers' capacity to prepare students for college, and create a college-going culture within the broader community. EPC provides a variety of school-based academic services in its three GEAR UP partnerships in Watsonville/Pajaro Valley and north and south Monterey County.

Girls in Engineering. Inspiring students to envision themselves as future engineers and scientists, Girls in Engineering brings middle school girls with an interest in mathematics together for a unique, two-week introduction to engineering at the Jack Baskin School of Engineering during the summer. Designed to broaden the STEM pipeline, students participate in hands-on STEM projects, such as building and programming robots; exposure to STEM college and career pathways through guest speakers, industry panels, and special lectures from faculty; research lab tours and visits to engineering and manufacturing firms and museums; early college experiences through UCSC campus tours and college-prep presentations; and other academic enrichment opportunities.

Kids Around the University (KATU). The KATU curriculum, materials, and activities introduce elementary students to the idea of higher education to build it into their vision of the future. KATU publishes a colorful student-authored book that has been widely adopted by elementary teachers in the Monterey Bay region and provides teacher training and tours of the UC Santa Cruz campus. The goal is to start building college awareness and motivating students to dream big at the earliest grade levels.

Mathematics, Engineering, Science Achievement (MESA) Schools Program, a statewide program through the UC Office of the President, provides academic development for middle and high school students to prepare for baccalaureate degree programs in mathematics and science and careers in engineering and other mathematics-based scientific fields. The program's primary goal is to support students from underserved communities through fun-filled, hands-on projects and other college awareness activities to promote STEM college and career pathways. The UCSC MESA program provides academic support, enrichment opportunities, parent leadership, and college awareness to students, families, and partner schools in Santa Cruz and Monterey counties. The annual MESA Day Preliminary Competition brings hundreds of students to campus to compete against their peers in a variety of science, math, and engineering events.

Transfer Partnerships Program (TPP) identifies and supports prospective community college transfer students through academic planning and guidance services to strengthen the transfer process and help students make the successful transition to a four-year institution. Transfer outreach representatives visit the 13 community colleges in the immediate region around UCSC on an ongoing basis and meet with students and support their transfer goals. TPP helps students advance on the college-going pathway through academic planning and guidance; financial aid workshops and information about scholarships; transfer and UC application workshops; referrals to campuses of interest; course, major, and general articulation; UC Transfer Admission Guarantee referrals; transfer survival-skills workshops; UC campus tours; and invitations to UCSC-sponsored events.

University of California Summer Algebra Academy: Developed by the UC Office of the President, the Summer Algebra Academy initiative is a five-week program for rising ninth-grade students centered around a college awareness theme, focusing on increasing student academic performance in mathematics, introducing families to higher education, initiating systemic change within high school, and creating a college-going culture. Summer Algebra Academy is not a remedial summer school program; instead, the emphasis is on getting students ready for success in algebra in high school, a critical gatekeeping course in the A-G curriculum. The summer initiative also proactively addresses any potential barriers to going

to college and supports students' successful transition from middle to high school. Students receive about 100 hours of engaging, hands-on mathematics instruction to increase readiness for ninth-grade algebra as well as 40 hours of college awareness services, including tutoring, mentoring, intensive counseling, academic and college planning, and family college visits. The concurrent Parent Academy introduces families to higher education and empowers parents with knowledge to help their children succeed.

Three policy groups advise and inform EPC and its partnerships, programs, and services. **The Monterey Bay Educational Consortium (MBEC)** is a strategic alliance among the public educational institutions in the Monterey Bay area dedicated to increasing the levels of educational attainment of all students in the region by focusing on collaborative activities. MBEC convenes the top administrative officers of the three county offices of education, school districts, regional community colleges, and public higher education institutions on a quarterly basis. The MBEC Teacher Workforce Initiative addresses teacher recruitment, retention, and preparation issues in the region; its purpose is to develop an effective data-driven process that begins with the collection of accurate yearly information about the teacher workforce.

The Chancellor's Educational Partnership Advisory Council (CEPAC) engages deans, vice chancellors, and other key campus administrators from all UCSC divisions in discussions about educational partnerships and collaborations throughout the academic pipeline, from K-12 to postsecondary education. This leadership group leverages resources and expertise across the campus to address P-20 issues and advises the chancellor on education outreach and access programs and informs policy related to student academic preparation.

The UC Santa Cruz-Community College Regional Council brings together leaders of area educational institutions to develop, initiate, and maintain successful collaborative efforts to increase transfer rates from community colleges to the University of California. This group, comprising 13 community college presidents and the UCSC Chancellor, covers a broad geographical region that includes not only Monterey Bay and Silicon Valley but also the three community colleges in San Mateo County.

EPC is located at the University Town Center in downtown Santa Cruz at 1101 Pacific Avenue, Suite 210. For more information, call (831) 459-3500 or visit online at <http://epc.ucsc.edu>.

Focused Research Activity (FRA) in Visual and Performance Studies (VPS)

The FRA in VPS housed at Cowell College develops multidisciplinary and integrated approaches to performance, visual studies, and the arts. Faculty and graduate students come from three Divisions: Arts, Humanities, and Social Sciences. Major grants received: UCHRI conference grant, France-Berkeley Fund, ARI collaborative research grants, UC Presidential Chair funds. The FRA supports graduate RAships, Fulbright Fellows, and other visitors.

The FRA explores how working across the disciplinary boundaries of theater, dance, music, art, literary theory, anthropology, and history can uncover new methodological approaches to the study of performance and visual culture. VPS emphasizes both historical and socially aware approaches.

The intersections of new media, aesthetics and anthropology, of literature and performance, of dance and ethnography, and of all of these with the visual dimension of representation have become ever more intensive areas of interdisciplinary research since the 1980s. The “performativity” of viewing also contributes to our field of study. Today, performative and visual media interact and redefine our understanding of culture, causing critical approaches to be of paramount importance to the future. Our work generates new theories of interpretation and meanings through conferences, seminars, publications, and classes. The FRA sponsors a yearly seminar series and special events. Seminar series 2004–06: Visualities/Geographies; 2007–08: Visual Histories, Performance Histories. Open to all interested graduates students and faculty. For further information, e-mail cmsoussl@ucsc.edu or tsangrey@ucsc.edu.

Geographic Information Systems (GIS) Laboratory

GIS refers to a computerized information system that works with data referenced by spatial or geographic coordinates. GIS integrates procedures designed to support the capture, management, manipulation, analysis, modeling, and display of data for solving complex environmental planning and scientific problems. GIS allows researchers to work with vast amounts of information—ranging from local field data to satellite imagery to the U.S. Census. During the last several decades, GIS has become well established in environmental sciences, city and county planning departments, and resource management agencies, to map everything from vegetation and endangered habitat to transportation routes.



UCSC's Geographic Information Systems (GIS) Laboratory enables students and faculty to overlay various spatial data sets—ranging from local field data to satellite imagery to the U.S. Census. GIS technology provides scientists and policy makers with a new way to analyze, simulate, and visualize alternatives when formulating policy—especially policy related to environmental issues.

The laboratory is used for environmental and policy research and training, including teaching and self-instruction. Beyond serving the training and research needs of the campus, the lab serves as a regional resource through data and technology exchanges (e.g., with NOAA, the California Coastal Commission, U.S.G.S.). GIS brings technology to bear on critical science and policy issues and provides scientists and policy makers with a new way to analyze, simulate, and visualize alternatives.

Housed on the fourth floor of the Interdisciplinary Sciences Building, the laboratory consists of networked workstations and numerous peripherals including global positioning system (GPS) equipment. It is administered by the Environmental Studies Department, Division of Social Sciences, which offers Environmental Studies 115A (see page 265). Among the donors who have helped establish the lab are ESRI (ARC/INFO software), Sun Microsystems, ERDAS (imaging software), and the Instructional Improvement Grant Program. Interested students may contact the GIS coordinator at (831) 459-2890 (fulfrost@ucsc.edu). Web: gis.ucsc.edu

Institute for Advanced Feminist Research (IAFR)

The focus of the IAFR is feminism and the public sphere. IAFR sponsors projects that are historical, international, and interdisciplinary in their conception, and collaborative and experimental in their practice. Employing scholarly methodologies and activist strategies, participants address a range of intellectual and academic problems. They seek, above all, to engage current political debates, including those from which feminist critiques have been largely absent.

Centrally, the institute facilitates sustained conversations among individuals who do not ordinarily have the opportunity to brainstorm and act in concert: scholars, artists, activists, journalists, community people and public intellectuals; people of different generations from diverse geographical areas; those who define themselves as feminists and those who do not. These conversations create new conceptual spaces, theoretical formulations, and strategic interventions: written work of varying length—popular as well as academic—films and art shows, conferences and symposia, working groups and public policy collectives.

For information, e-mail iafr@ucsc.edu or call (831) 459-3882. Web: iafr.ucsc.edu

Institute for Humanities Research (IHR)

The IHR was established in the fall of 1999 with funding from the Campus Provost/ Executive Vice Chancellor's Office and the Humanities Dean's Office. The mission of the IHR is to enhance the environment for faculty and graduate-student humanities research on the UCSC campus. Recognizing that humanities research is an important component of a first-rate research university and is crucial to excellent teaching and scholarship, the IHR provides time, space, and support for the maintenance of a lively, active research community. The IHR includes research units in Critical European Studies, Cuba in Americas and Transatlantic Contexts, History and Philosophy of Science, Language and Linguistics, Living Writers, Mediterranean Studies, Modernist and Avant-Garde Studies, Pre- and Early-Modern Studies, and Psychoanalysis and Sexuality. It supports the Humanities Research Fellows Program, Faculty Research and Travel Grants, Graduate Dissertation Fellowships, Graduate Research and Travel Grants, and special events. In addition, the IHR sponsors Humanities in the Schools, an outreach initiative to middle and high schools in the region that includes the Graduate Students Speakers Bureau and the Teacher Scholar Seminars. Further information is available on the web: humanities.ucsc.edu/ihr. The IHR may be contacted by e-mail at ihrstaff@ucsc.edu, by campus mail at IHR, Cowell College, or by phone at (831) 459-4899.

Institute of Geophysics and Planetary Physics (IGPP)

UC's IGPP, a multicampus research unit, includes a branch at UCSC. The IGPP supports a wide range of basic research on the origin, structure, and evolution of Earth, the solar system, and the universe. One of the goals of this research is to predict future changes in global systems that may affect human life.

The UCSC branch of the institute addresses fundamental questions relating to Earth's environment, global change, and planetary sciences. The UCSC branch includes five interdisciplinary research centers: the Center for Origin, Dynamics, and Evolution of Planets (CODEP); the Center for Dynamics and Evolution of the Land-Sea Interface (CDELSI); the Center for the Study of Imaging and Dynamics of the Earth (CSIDE); the Center for Remote Sensing (CRS); and the Center for Adaptive Optics (CfAO). These interdisciplinary centers serve



The Ray Film and Study Collection preserves the films, drawings, and documents of Satyajit Ray, one of the greatest filmmakers of our time.

to create bridges between different departments and heighten the focus on collaborative research efforts. A Massive Computer Simulation Facility (MCSF) has been established with a large parallel supercomputer for conducting geophysical and astrophysical modeling.

CDELSI brings together faculty from six Departments: Ecology and Evolutionary Biology, Earth and Planetary Sciences, Ocean Sciences, Environmental Toxicology, Anthropology, and Environmental Studies. Researchers in these departments are at the forefront of efforts to understand the complex processes and interactions occurring at the continental margin. A primary concern is the impact of global and regional climate change on key processes in the coastal environment, such as atmospheric circulation, ocean temperature and currents, nutrient cycling, and the geological processes that shape the continental margin.

CODEP brings together faculty from the Departments of Astronomy and Astrophysics, Applied Mathematics and Statistics, Earth and Planetary Sciences, and Physics. The interests of CODEP researchers include Earth's internal dynamics, the formation of planets, how planetary systems evolve, and the discovery of new planets outside the solar system. This is a joint effort to understand as much as possible about planets in general, both in our own solar system and around other stars. The center encourages Earth scientists and astronomers to bring their different perspectives to bear on planetary issues.

CSIDE coordinates research in seismology, geodynamics, geomagnetism, hydrology, geomorphology, active tectonics, and mineral physics addressing structure and dynamics of the Earth's interior. Thermal, chemical, and dynamic processes are studied in six affiliated research laboratories. CSIDE hosts a major industrial consortium focused on development of new seismic-imaging technologies.

CRS coordinates research efforts of faculty in the Departments of Earth and Planetary Sciences, Ocean Sciences, Ecology and

Evolutionary Biology, Electrical Engineering, and Computer Engineering for the use of satellite and airborne remote sensing in studying processes occurring on the surfaces of Earth and other planets. Specific interests include astrogeology; plant ecology; coral reef health; volcanic, geothermal, and earthquake processes; climate change; submarine and coastal geology; ocean surface processes and marine habitats; and engineering development.

The Center for Adaptive Optics (CfAO) is a new UC multicampus center within the IGPP. Adaptive optics (AO) is an enabling technology that sharpens images by removing optical aberrations. This technology is transformative for ground-based astronomical telescopes, because it removes blurring due to turbulence in the Earth's atmosphere. An exciting spin-off application is the use of AO for imaging the living human retina. The mission of the IGPP's CfAO is to develop, apply, and disseminate adaptive optics science and technology in service to scientific research, health care, and industry. To accomplish these goals it will connect the different UC campus communities, foster research collaborations across campuses and disciplines, and develop the next generation of young leaders in this new field. The UC CfAO grew out of the successful NSF Science and Technology Center of the same name.

The IGPP was established in 1946 at UCLA. Other branches are located at UC San Diego, UC Riverside, UC Irvine, UC Berkeley, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory. A key objective of the IGPP is to encourage and support cooperative projects that bring together researchers from different disciplines, campuses, and institutions. The UCSC branch was established in 1999. Web: igpp.ucsc.edu

Institute of Marine Sciences (IMS)

With the dynamic combination of university marine scientists, state-of-the-art facilities and analytical equipment, collaborative research, and an overriding commitment to quality, UC Santa Cruz is on the forefront of marine sciences research, education, and outreach. Set in the biologically rich environment of Monterey Bay and the nation's largest national marine sanctuary, the campus provides students and scientists who seek to study the ocean and its life a unique opportunity to pursue their dreams.

Established in 1972, the IMS is composed of 42 affiliated faculty; 162 researchers, project scientists, specialists, postdoctoral researchers, and research associates; and 30 support staff. Marine scientists from the Departments of Ocean Sciences, Ecology and Evolutionary Biology,

Earth and Planetary Sciences, Environmental Toxicology, and Chemistry and Biochemistry conduct their research within the shared focus of the institute. The institute provides facilities and administrative and technical support for faculty, researchers, and graduate and undergraduate students involved in marine sciences. Faculty and researchers work independently and collaboratively within seven clusters:

- Coastal marine biology
- Marine vertebrate biology
- Ocean processes/oceanography
- Paleoceanography and climate change
- Marine and coastal geology/geophysics
- Environmental toxicology
- Fisheries and fisheries management

An undergraduate major leading to a B.S. in marine biology is described on page 139; a two-year graduate program leading to an M.S. in ocean sciences is described on page 375. Doctoral students pursue marine research through the Ph.D. programs in the Departments of Ecology and Evolutionary biology, Earth and Planetary Sciences, environmental Toxicology, or Ocean Sciences.

Facilities

The institute's on-campus complex includes the IMS administrative office; research laboratories; offices for researchers, postdocs, and visiting scientists; state-of-the-art analytical labs for marine chemistry, biology, and geology; a computer laboratory; culture rooms for invertebrates and algae; portable seagoing analytical labs; and support facilities for cruise staging.

The Joseph M. Long Marine Laboratory, an onshore site three miles from campus on the shoreline of the nation's largest national marine sanctuary, has running seawater capabilities that increase opportunities for research and instruction. Facilities include research laboratory buildings; outdoor tanks for research involving marine mammals (dolphins, seals, sea lions, and otters), seabirds, and fish; and teaching laboratories. Specialized laboratories and facilities for marine physiology, ecology, and marine mammal bioacoustics studies are available. Adjacent to the lab are 55 acres of land for which plans have been developed and approved for an expanded marine lab campus with space for future research and educational facilities. The marine sciences campus also has a protected lagoon, a sandy beach, and rocky intertidal platforms for field research. Because Long Marine Lab is close to the campus, work there is easily incorporated into daily campus activities. A campus-LML shuttle operates regularly.

Each year, over 55,000 people—including 10,000 schoolchildren—tour the Seymour Marine Discovery Center at Long Marine Lab. Trained volunteer docents welcome visitors, guide groups through the laboratory, and provide information on research in progress. The Seymour Center houses an aquarium, exhibits that interpret the research underway within the institute, two classrooms for school groups, and an auditorium. All are open to the public—including K–12 classes—for a modest fee. In addition, a Center for Ocean Health at Long Marine Lab houses offices and labs for marine sciences faculty and their research programs, as well as two nonprofits: the Nature Conservancy's Coastal Waters Program and Island Conservation.

IMS maintains a number of small vessels equipped for nearshore coastal research, several small craft for inshore work, and a scientific diving program. In addition, IMS-associated faculty, researchers, and students work around the world aboard larger oceanographic vessels.

IMS has scientific control over use of Año Nuevo Island, the largest elephant seal rookery on the Pacific coast (see page 70).

IMS maintains active cooperative research agreements with both the Biological Resources Division and the Coastal and Marine Group of the U.S. Geological Survey that have 50 agency scientists now housed adjacent to Long Marine Laboratory.

The institute maintains a cooperative agreement with the National Marine Fisheries Service (NMFS). In 2000, this agency completed a fisheries laboratory at Long Marine Lab, which houses 55 scientists and staff working on salmon, bottom fish, and fishery-management issues. NMFS scientists study causes of variability in abundance and health of fish populations and the economics of exploiting and protecting natural resources. The National Oceanic and Atmospheric Administration (NOAA) has also located sanctuary staff within this federal building. The California Department of Fish and Game operates a Marine Wildlife Research Center at Long Marine Lab, which provides interior lab space and outdoor pool space for research on sea otters and the effects of oil and other contaminants on marine mammals and seabirds.

Additional collaboration also takes place with scientists at the Monterey Bay Aquarium Research Institute, Moss Landing Marine Laboratories, Hopkins Marine Station, the Monterey Bay Aquarium, the Naval Postgraduate School, and the Monterey Bay National Marine Sanctuary.

IMS web sites: ims.ucsc.edu and www2.ucsc.edu/seymourcenter

Santa Cruz Predatory Bird Research Group

The Santa Cruz Predatory Bird Research Group (SCPBRG) was formed in 1975 to restore an endangered peregrine falcon population in California. SCPBRG researchers advise students on their senior theses, direct interns in individual studies, and hire biologists in entry-level field-biologist positions for wildlife management and field research on birds.

SCPBRG has become a resource to agency biologists, industry, and university researchers who require expertise with problem solving and management of avian species, especially raptors. Having accomplished most of its goals with peregrine falcon management, the group now applies its expertise to a wider range of species. Current studies involve international bald eagle satellite telemetry studies, helping restore the delicate ecology of California's Channel Islands, research to mitigate impacts to endangered birds by raptors, and research on solutions for avian electrocutions, wire strikes, and wind-farm fatalities along California's power transmissions network. SCPBRG is also expanding its activities to increase educational outreach through school assemblies and training for professionals. SCPBRG is located at the Long Marine Laboratory. For more information, review the web site at www.scpbrg.org.

Scientific Diving and Boating Safety

The university's Diving Safety Program (DSP) is housed within the Institute of Marine Sciences, with offices at Long Marine Lab. Scuba diving and small boats are tools used in science classes and by UCSC faculty, staff, and student researchers in Monterey Bay and at study sites worldwide. In order to ensure safe scuba diving and scientific boating practices, DSP provides training and oversight for all scuba diving (scientific and recreational) and scientific boating activities conducted under UCSC auspices. The diving safety officer teaches Biology 75, *Scientific Diving Certification* (see page 144

), which is a prerequisite for all UCSC courses and research using scuba diving as a tool. DSP maintains a fleet of boats and diving equipment for researchers to use. DSP assists faculty, staff, and student researchers in complying with federal OSHA standards for scientific scuba diving. Anyone who needs to use scuba diving or small boats for scientific purposes should contact the DSP Office at srclabue@ucsc.edu. Web: www2.ucsc.edu/sci-diving.

Recreational diving opportunities offered by the Office of Physical Education, Recreation, and Sports (OPERS) include numerous scuba

courses and the Scuba Club. The web address is www.ucsc.edu/opers/scuba.

Linguistics Research Center (LRC)

The LRC exists to facilitate research in theoretical linguistics by all members of the linguistics community at UCSC (faculty, students, and visiting scholars) and to disseminate the results of that research. To accomplish this mission, the LRC hosts visiting scholars, organizes workshops, engages in online publication, coordinates externally funded research projects and in general works to enhance the environment for linguistic research at UCSC. Founded in 1981 and currently housed in Stevenson College, the LRC is one of the research units of the Institute of Humanities Research (page 67), and sponsors joint enterprises involving linguistics and a variety of related disciplines in language and cognitive science (philosophy, psychology, computer science, language engineering, among others). Since 2005, there has been active and ongoing research collaboration with the speech technology group at UARC (page 74, NASA Ames Research Center). Besides supporting basic research, the LRC plays a vital organizational role in many projects and undertakings. Examples include the 1991 LSA Summer Linguistic Institute, the editing of the Squibs and Discussions section of *Linguistic Inquiry* (1993–1996), and the hosting of various conferences, such as SALT (Semantics and Linguistic Theory 1999), WCCFL (West Coast Conference on Formal Linguistics 2002), and CGSW (Comparative Germanic Syntax Workshop 2006). For further information on current research projects and the LRC visiting scholar program, see the web site at lrc.ucsc.edu or e-mail lrc@ling.ucsc.edu.

Monterey Bay Education, Science, and Technology (MBEST) Center

UCSC has played a leading role in the development of a multi-institutional center for science, technology, education, and policy—the MBEST Center—as a cornerstone of the Fort Ord defense conversion redevelopment plan. In 1994, about 1,100 acres at the former Fort Ord Military Reservation were conveyed to the University of California. Of that land, 479 acres are planned for development into the research and technology center, and 605 acres of adjacent natural habitat are now part of the UC Natural Reserve System. Investments in roadway and utilities infrastructure have been completed, making 55 acres of real estate

available for development. In addition, the UC MBEST Center headquarters and a high-technology business incubator were completed in 2001.

The mission of the MBEST Center is to promote collaborative interaction among private businesses, government research agencies, public and private education and research institutions, and policy makers in strategic alliances to address the environmental opportunities and challenges of the new millennium. MBEST Center activities will focus initially on environmental science and technology, biotechnology and bioresources, information science and technology, and multimedia. And, by leveraging the strengths of over 20 public and private research and training assets of the Monterey Bay Research Crescent, the UC MBEST Center is anticipated to be a key stimulus for sustainable economic development and job generation.

The first base reuse activity began in January 1995 at the MBEST Center when UCSC Extension started offering technical training classes there in environmental remediation. Since then, several tenants have occupied existing facilities at MBEST, including an office of the U.S. Geological Survey, an organic farming operation, a recycling plant, and an office of the Coastal Ocean Currents Monitoring Program (COCMP), a multi-institution inter-agency collaboration that is part of a nationwide effort to develop an Integrated Ocean Observing System.

Information about the center is available from the UC MBEST Center Office, 3239 Imjin Road, Marina, CA 93933, (831) 582-1020; via e-mail: info@ucmbest.org; web: www.ucmbest.org.

Natural Reserve System (NRS)

The purpose of the NRS is to establish and maintain for teaching and research a system of natural areas that encompass diverse and undisturbed examples of California's terrain, both aquatic and terrestrial. The reserves are open to all qualified individuals and institutions for scholarly work concerned with the natural environment. Such work usually deals with ecological topics or experimental studies in a natural setting.

The University of California administers 34 natural reserves throughout the state. Santa Cruz has responsibility for four—the Landels-Hill Big Creek Reserve, Fort Ord, Año Nuevo Island, and Younger Lagoon—in addition to the campus's own reserve. Information about the system's holdings and management is avail-

able from the director, NRS, University of California, 1111 Franklin Street, Oakland, CA 94607-5200, (510) 987-0150. Web: nrs.ucop.edu. You may also contact the UCSC natural reserve director, c/o Environmental Studies Department, 467 Natural Sciences 2 Building, (831) 459-4971, ghdayton@ucsc.edu. Web: ucreserve.ucsc.edu

Campus Natural Reserve

About 400 acres of campus wildlands were designated by the Regents in the 1988 *Long-Range Development Plan* as a Campus Natural Reserve. This reserve contains redwood forest, springs, a stream, vernal pools, secondary madrone/Douglas fir forest, chaparral, and many soil types and geological formations and structures. Supported by a modest field-studies center, the reserve is used for research and teaching and is operated by the UCSC natural reserve director, c/o Environmental Studies Department, 467 Natural Sciences 2 Building, (831) 459-4971, ghdayton@ucsc.edu. Web: ucreserve.ucsc.edu/. Students may join the volunteer program by contacting the steward: eahoward@ucsc.edu.

Landels-Hill Big Creek Reserve

This 4,000-acre reserve is located in the Santa Lucia Mountains on the Big Sur coast, about two hours by car from the campus. The reserve includes the lower portions of an undisturbed watershed containing numerous terrestrial and aquatic habitats and several geological formations and associated fault systems. The watershed is protected by the Ventana Wilderness of the Los Padres National Forest. The reserve's four miles of rocky coastline, located within the California Sea Otter Refuge area and the Monterey Bay National Marine Sanctuary, is now a California Department of Fish and Game Marine Protected Area and provides opportunities for marine research. There are campsites, a modest field-laboratory facility, a cabin for long-term researchers, and a small storage facility. The Big Creek Reserve is managed by the onsite reserve director. Access is controlled, and applications for use should be made to the resident reserve manager, Big Creek Reserve, Big Sur, CA 93920, (831) 667-2543, bigcreek@ucsc.edu. Web: www.redshif.com/~bigcreek

Fort Ord Natural Reserve

This 600-acre reserve was added to the system in 1996. It contains Monterey Bay maritime chaparral, an endemic plant community, and coast live oak woodland, grassland, and coastal scrub, including nine species of plants and animals that are listed as endangered, threatened,

or of special status. The reserve was part of the former Fort Ord army base and its habitats are relatively intact. The reserve specializes in studies of rare species management and habitat restoration. It is a 45-minute drive from campus. For information, contact the UCSC natural reserve director, c/o Environmental Studies Department, 467 Natural Sciences 2 Building, (831) 459-4971, ghdayton@ucsc.edu Web: ucreserve.ucsc.edu

Younger Lagoon Reserve

A 26-acre coastal lagoon and beach next to UCSC's Long Marine Laboratory is part of the NRS. Its waters are a haven for many species of migratory birds, and many small mammals, birds, reptiles, and invertebrates live in its marsh and bank vegetation. Younger Lagoon is managed by the UCSC natural reserve director, c/o Environmental Studies Department, 467 Natural Sciences 2 Building, (831) 459-4971, ghdayton@ucsc.edu. Web: ucreserve.ucsc.edu

Año Nuevo Island Reserve

This 25-acre island, part of the 4,000-acre Año Nuevo State Reserve 20 miles north of Santa Cruz, is a university research reserve of the NRS. Its rich variety of resident and migratory wildlife and proximity to campus make this an ideal location for research. Northern elephant seals, California sea lions, northern sea lions, and harbor seals breed and haul out at different seasons. The reserve's breeding colony of elephant seals has been the subject of a remarkable 40-year study by UCSC scientists. More than 300 species of land, shore, and sea birds reside in or migrate through the area, which also has a diversity of fish and intertidal organisms. Access to the island is restricted, and UCSC's research use is managed by the UCSC Institute of Marine Sciences (see page 67). An annual use agreement with California State Parks allows research and field work throughout Año Nuevo State Reserve. A small research facility is located on the island, and a day-use facility is available in the state reserve. For further information, call (831) 459-2883, e-mail pamorris@ucsc.edu, or visit the web: nrs.ucop.edu/ano-nuevo.htm.

New Teacher Center (NTC)

The NTC is a national resource focused on new teacher and new administrator development. The center works in the areas of teacher preparation, teacher induction, teacher leadership, and school administrator training and support, and conducts research addressing these topics. It is supported by the University of California, National Science Foundation,

California Postsecondary Education Commission, and contributions from 50 foundations, corporations, and individuals. Staff members consult with policy makers, colleges and universities, county offices of education, and school districts throughout California and in 41 other states. NTC is located at 725 Front Street, Suite 400, in downtown Santa Cruz; (831) 459-4323, e-mail ntc@ucsc.edu. Web: www.newteachercenter.org

Physical and Biological Sciences Division

Research Programs/Centers

Biomedical Research. The Division of Physical and Biological Sciences supports a broad range of biomedical research in the Departments of Chemistry and Biochemistry; Environmental Toxicology; and Molecular, Cell, and Developmental Biology. Structural biology, the molecular biology of RNA, genetics, bioinformatics, neurobiology, and developmental biology are areas of particular strength. Small faculty-led teams conduct their research in state-of-the-art laboratories, with additional access to shared facilities, equipment, and computational tools. Collaborative research is frequent, both among investigators within the division as well as with faculty in the Baskin School of Engineering, which is internationally recognized for its expertise in computational biology. These collaborative efforts are facilitated by the university's Center for Biomolecular Science and Engineering. There are excellent training opportunities for postdoctoral fellows and graduate and undergraduate degree programs in areas of biomedical research and the health sciences. Web: biomedical.ucsc.edu

Center for Tropical Research in Ecology, Agriculture, and Development (CenTREAD)

is a coalition of faculty and students spanning several departments and centers at UC Santa Cruz. The center fosters interdisciplinary research and training to understand tropical environmental issues and develop ecologically based, economically viable, culturally respectful, nonexploitative solutions that serve as a foundation for future generations. The center offers a variety of undergraduate and graduate courses at UCSC, and strives to provide educational opportunities to U.S. citizens who work in tropical countries and to students from tropical countries. Web: centread.ucsc.edu

Scientific Discovery through Advanced Computer (SciDAC) and the Supernova Science Center. The center consists of a part-

nership among UCSC, UC Berkeley, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, University of Arizona, Stanford University, State University of New York at Stony Brook, and Johns Hopkins University. This group strives for a full understanding, through numerical computation, of how supernovae of all types explode and how the elements have been created in nature. Web: www.supersci.org

Research Facilities

Chemical Screening Center (CSC). UCSC's CSC offers access to high-throughput screening technologies to speed the identification of small molecules that modulate biochemical or cellular processes and have the potential to alter disease states. The CSC maintains a suite of modern robotic instrumentation that permits high-throughput biochemical and cell-based screening of up to 30,000 compounds a day. In addition to targeted and known drug libraries purchased from commercial vendors, the CSC curates a growing collection of natural products. All libraries housed at UCSC are submitted to a panel of screens in diverse organisms, pairing each compound with a broad bioactivity profile. Active compounds are prioritized based on potency and phenotype, and target ID may be immediately pursued using affinity approaches. Through collaboration with UC investigators, the CSC aims to accelerate the path from new discoveries in biology to validated biological targets to provide novel small-molecule therapies for fighting diseases such as cancer, malaria, Parkinson's disease and cholera. Web: biomedical.ucsc.edu/ChemScreen.html

Climate Change and Impacts Laboratory (CCIL). The lab is a computational facility sponsored by the National Science Foundation, the California Energy Commission, and UCSC. The facilities include a 32-processor (quad core) Dell PowerEdge M1000e supercomputer, numerous high-performance workstations, and multi-terabyte data storage and backup facilities. The goals of CCIL are to calculate scenarios of likely future climate change and to investigate the possible impacts of climate change on the various dimensions of a given region, providing a multidisciplinary and multidimensional view of the possible effects of future climate change at regional scales. The current focus is concentrated on a region centered in California because of its complex topography, diverse microclimates and ecosystems, large

and growing population, and vulnerability to water. CCIL members are scientists from the departments of Earth and Planetary Sciences, Ecology and Evolutionary Biology, Environmental Studies, Environmental Toxicology, and Ocean Sciences, and represent a wide range of expertise on aspects of California's human and natural systems. Web: ccil.ucsc.edu

Confocal Microscopy Facility. The facility houses a Zeiss LSM5 Pascal Confocal Microscope System, providing outstanding optical resolution, as well as high-speed scanning. UCSC investigators currently use this system to study neuronal receptor cellular localization, neuronal targeting, *Vibrio cholerae* biofilm formation, and immune cell interactions during immunological tolerance. Web: biomedical.ucsc.edu/Confocal.html

Crustal Imaging Laboratory (CIL). The lab provides researchers with the sophisticated hardware and software resources necessary to perform high-resolution studies of the Earth's surface and outer layers. Although still under development, CIL facilities will consist of a state-of-the-art network of Sun and PC workstations, a variety of input/output and mass-storage devices, and both commercial and academic multichannel seismic-processing packages for seismic and surface imaging, and geodesy. Research is focused on remote sensing and GPS analysis, surface bathymetric and roughness mapping, and microscopic and submersible-mounted digital photo imaging. Web: www.es.ucsc.edu/research/crustal.html

Earth System Modeling Laboratory. The lab is home to the Paleoclimate and Climate Change Research Group, which is presently focused on past and future climatic and environmental change, and hosts several national and international visitors each year. This research takes many forms and involves the use of various kinds of models and observations, as well as a wealth of paleoclimate proxy data from many marine and terrestrial locations. The lab contains Sun Ultra10 and Ultra5 workstations, a Sun Enterprise 4-processor server, a Sun Ultra 80 4-processor server, a Sun Raid StorEdge device, SGI and Macintosh computers, and printers. The larger computers provide a cluster of parallel servers for intensive numerical modeling. The laboratory's computing resources are used for global and regional climate-modeling efforts and data analysis. Web: www.es.ucsc.edu/research/earthsys.html

Electron Microscopy and Digital Imaging Facility. This facility provides instruments and equipment for light and electron microscopy and digital imaging. Two transmission electron microscopes (TEM) are available. A JEOL 1200 EX TEM equipped with a 4pi x-ray analyzer and a Gatan Bioscan digital camera is used for general room-temperature applications. The lab also houses a state-of-the-art JEOL 1230 TEM equipped with a Gatan cryo-stage and transfer device, a Gatan Ultrascan digital camera, and a Gatan 626 video camera. Scanning electron microscopy is done using the lab's Hitachi S-2700 SEM, equipped with a 4pi x-ray analyzer and digital imaging system. Web: biomedical.ucsc.edu/EM.html

Electron Spin Resonance Facility. The facility is used to examine the structure and properties of metal-containing inorganic complexes, peptides, proteins, enzymes, nanoparticles, and biological membranes. The facility's Bruker ELEXSYS 580 X-band spectrometer operates in either continuous-wave or pulsed mode, with variable temperature control. A high-sensitivity Bruker EMX is especially useful for the limited sample sizes often encountered in biological studies. Web: biomedical.ucsc.edu/ESR.html

Geographic Information Systems (GIS) Laboratory. See page 66.

Greenhouses. The facility provides core support for plants used in the instructional and research programs of the Departments of Ecology and Evolutionary Biology; Molecular, Cell, and Developmental Biology; and Environmental Studies. Three separate growth areas are located on Science Hill to maximize exposure to sunlight as well as provide convenient access for the research and instructional labs housed in the buildings below. Web: greenhouse.ucsc.edu

Hydrogeology Facilities. These facilities include numerous dedicated and shared labs for field, laboratory, and computational research and for general student use. Two computer labs are used by both undergraduate and graduate student researchers for a variety of research projects and course work. In addition, there is storage and staging space used to hold instruments, equipment, and supplies and to prepare for short- and long-term field and lab experiments, and lab space dedicated to sediment analysis, including instruments for geotechnical and hydrologic testing of core samples. Outstanding analytical facilities are also available throughout the Earth and Planetary

Sciences and Ocean Sciences Departments, the Institute of Marine Sciences, and the Institute of Geophysics and Planetary Physics. Web: www.es.ucsc.edu/research/hydro.html

W. M. Keck Isotope Laboratory. The Laboratory comprises two mass spectrometers (a thermal ionization mass spectrometer and a ThermoFinnigan Neptune multiple collector inductively coupled plasma mass spectrometer) and wet chemical labs, all housed in a class 1000 suite of clean labs. The thermal ionization mass spectrometer is a fully automated, nine-Faraday collector VG Sector 54 equipped with a WARP filter and an ion counting Daly. Offering high-precision isotope measurements for almost all elements in the periodic table, the Neptune is equipped with nine Faraday collectors and four ion counters, one of which is located behind an RPQ filter to give high-abundance sensitivity. The facilities include separate rooms for cleaning, dissolution and acid preparation, Sr-Nd-Pb-Hf separations, and U-Th-Ra-Pa separations. Single zircon analysis may also be conducted using the mineral separation lab equipped with a Leica binocular microscope. Projects covering Earth sciences, marine sciences, environmental science and archaeology frequently use the W. M. Keck Isotope Laboratory facilities for high-precision isotope measurements. Web: keckisotope.ucsc.edu

W. M. Keck Seismological Laboratory. Researchers at the W. M. Keck Seismological Laboratory are investigating problems in earthquake seismology, plate tectonics, global Earth structure, seismic wave propagation and nuclear testing treaty monitoring. This research is conducted using a computing facility that consists of networked Solaris Workstations, a 23-node Linux cluster and networked Macs and PCs. Field equipment includes 11 portable broadband seismic stations, seven dual-frequency GPS receivers and antennae and a tripod-mounted LiDAR. Web: www.es.ucsc.edu/research/seis.html

Macromolecular X-ray Crystallography Facility. The facility houses a state-of-the-art rotating-anode/imaging-plate X-ray crystallography data collection suite, a cryosystem, and a collection of Apple, SGI and Linux computer workstations and software for crystallography data collection and computation, molecular visualization, and model building. UCSC scientists have used the facility to investigate the structure of the ribosome, catalytic RNA ("ribozymes"), and a variety of protein

structures, including systems that diffract to subatomic resolution. Users of the facility also collaborate with the Lawrence Berkeley National Laboratory's Advanced Light Source synchrotron radiation facility and the Stanford Synchrotron Light Source. Web: biomedical.ucsc.edu/Xray.html

Marine Analytical Laboratories. The Marine Analytical Labs are a part of the Institute of Marine Sciences at UC Santa Cruz. They consist of a general access analytical facility for the support of research in the marine sciences. Scientific instruments and other equipment to aid research in marine chemistry, biology, geology, and environmental toxicology are housed in a central lab complex within the Earth and Marine Sciences Building. Access is provided to all qualified users. Analytical instrumentation; instruction in use of the equipment; consultation in experimental design, sampling, analysis, and data interpretation; and general assistance in all aspects of analytical science are provided by the lab manager. Web: ims.ucsc.edu/mal

Mass Spectrometry Facility. Mass spectrometry is an analytical technique used to measure the mass-to-charge ratio of chemical ions. The facility currently houses two mass spectrometers: a Thermo Finnigan LC/MS/MS (LTQ) and an Ettan MALDI-TOF. This equipment is capable of determining the molecular weight of both small molecules and peptides, identifying proteins, and characterizing protein modifications. Web: biomedical.ucsc.edu/MassSpecFacility.htm

Microarray Facility. Used for genome-wide splicing and expression analyses of diverse organisms, from microbes to humans, the facility supports both spotted microscope slide and Affymetrix microarray research. Equipment includes an Affymetrix GeneChip system, a robotic microscope slide arrayer, an Axon slide scanner, and a 96-channel automated liquid handler. The staff offer wet-lab expertise to investigators, with bioinformatics specialists from the School of Engineering providing computational support. Web: biomedical.ucsc.edu/Microarray.html

Mineral Physics Laboratory. Experiments to determine the thermochemical and elastic properties of planetary materials at ultrahigh pressure (up to 150 GPa) and temperature (up to 6000 K) are conducted in this lab. High P-T conditions are generated using the diamond anvil cell coupled with laser heating. Presently, both Raman and infrared spectroscopic facilities

are available for characterization of the structural and bonding properties of minerals and fluids in situ at pressures and temperatures characteristic of planetary interiors. In addition, a high-intensity x-ray generator is used to determine the equations of state and phase equilibria of mineral assemblages relevant to the Earth's mantle and core. Finally, a transmission electron microscope is used to analyze crystal defects and for micro-phase identification. Web: www.emerald.ucsc.edu/research/mineral.html

Molecular Ecology and Evolutionary Genetics Facility. The MEEG facility provides molecular technologies for analyses of the structure and dynamics of genetic diversity found in animal, plant, and microbial populations. The facility includes two ABI 3100 Genetic Analyzers for analysis of DNA sequences and DNA fragments, a Packard Multiprobe II Automated Liquid Handling System to facilitate DNA preparation, and a Becton Dickinson FACScalibur Flow Cytometer, for immunophenotyping, analyses of cellular ploidy level, absolute cell counting, and cell sorting. The facility is capable of assessing hundreds of samples each week for differences in the DNA sequence of individual genes, specific genetic markers, and overall DNA content. Web: microbiology.ucsc.edu/meeg.html

Nanosecond Time-resolved Laser Spectroscopy. The Department of Chemistry and Biochemistry maintains several laser spectroscopy systems capable of measuring time-resolved spectra from the far UV to the near IR regions. Various systems are optimized to measure nanosecond-resolution time-resolved absorption spectra, linear dichroism spectra, circular dichroism spectra, magnetic circular dichroism spectra, optical rotatory dispersion, or magnetic optical rotatory dispersion. Software is available to collect and analyze data to obtain kinetics and spectra of reaction intermediates from nanosecond to second time scales. These facilities are used in a wide variety of research, including photochemical and photobiological studies, examination of functional and folding mechanisms of peptides and proteins, and investigation of fast electron and proton transfer in proteins involved in mitochondrial and bacterial respiration. Web: biomedical.ucsc.edu/Laser.html

Nuclear Magnetic Resonance/Mass Spectroscopy Facilities. The NMR facility brings together an interdisciplinary group of researchers from the departments of Chemistry and Biochemistry and Molecular, Cell, and

Developmental Biology. Ongoing research includes structural elucidation of anticancer natural product isolation from marine organisms, organic intermediates for drug synthesis, specially designed peptide intermediates, and oligonucleotide derivatives that remain attached to solid supports. At present, the facility manages four high-resolution NMR spectrometers: two 3-channel Varian Unity+ 500s with indirect and direct detection probes; a state-of-the-art multinuclear, 3-channel, waveform generator, PFG, automated Z-axis gradient shimming Varian INOVA 600 system with broadband inverse detection capabilities and a 600-MHz HCN 5mm cold probe system; and a Bruker AC250. Initial funding was from the Lucille P. Markey Charitable Trust and the W. M. Keck Foundation, as well as individual research grants from the National Institutes of Health, the National Science Foundation, and other sources available to UCSC. Web: chemistry.ucsc.edu/research/nmr.html

Paleomagnetism Laboratory. This lab is located in a remote building specially constructed with nonmagnetic materials and isolated from major sources of man-made magnetic noise. Inside this building, a magnetically shielded room houses a state-of-the-art superconducting magnetometer, a sensitive spinner magnetometer, thermal and alternating field demagnetizers, and paleointensity equipment. A second lab, devoted to the study of rock and mineral magnetic properties and housed in the Earth and Marine Sciences Building, contains another spinner magnetometer, devices for measuring Curie temperatures, magnetic susceptibility and its anisotropy, hysteresis loops, and computer facilities for data analysis and graphics. Web: www.es.ucsc.edu/~paleomag/facility.html

Proteomics Facility. Designed to perform large-scale comparisons in protein expression, such as in cancer progression, Parkinson's disease and manganese toxicity, the facility houses an Amersham Ettan Proteomics Lab with Differential Gel Electrophoresis (DIGE) technology. School of Engineering computer scientists will assist in processing the large amounts of protein data generated. Web: biomedical.ucsc.edu/Proteomics.html

Rock Preparation Facility. The facility is fully equipped to aid researchers in petrographic section making, rock crushing, sample sieving, and mineral separation. A full-time technical staff member oversees the facility. Web: www.es.ucsc.edu/research/rock.html

Stable Isotope Laboratory. This facility has two mass spectrometers used to determine elemental composition, a FISIONS Optima, and a FISIONS Prism. Both are equipped with automatic carbonate devices. In addition, the Prism is fitted with the VG “Multi-prep” autosampling system for carbonates and oxygen analyses of waters, and the OPTIMA is fitted with a Carlo-Erba CHN Analyzer for continuous flow measurement. Web: es.ucsc.edu/%7E-silab

Ray Film and Study Collection

The Satyajit Ray Film and Study Collection (Ray FASC) is a focused research activity concentrating on the films and other artistic works of Satyajit Ray, one of the world's greatest filmmakers. Ray FASC maintains, in addition to 35 mm films and videocassettes of Satyajit Ray's films, a collection of the Ray papers: books, articles, letters, screenplays, sketchbooks, costume designs, music tapes/recordings, posters, stills, illustrations, and other examples of Ray's multifaceted genius. Ray FASC has received the Lethbridge Collection of some 1,500 volumes/items of works on Ray and by Ray in some 10 world languages. The gift has come from Mr. and Mrs. Cuthbert Lethbridge of Melbourne, Australia. With a major grant from the Packard Humanities Institute, Ray FASC has prepared an inventory, catalog, and database of the materials in the archive. Ray FASC hosts lectures, film screenings, seminars, and exhibitions. It helped organize several recent Ray retrospectives nationally and internationally; plans for more are under way. Student internships and research projects in the archives are welcome. For further information, call (831) 459-4012, fax (831) 459-1925, e-mail rayfasc@scilibx.ucsc.edu, or check the web site: satyajitray.ucsc.edu.

Santa Cruz Center for International Economics (SCCIE)

The SCCIE is a group of UCSC and other scholars working in the field of international economics, broadly defined to cover international finance, open-economy macroeconomics, international trade, development economics (and linkages with environmental issues), and international political economy.

The objective of SCCIE is to broaden understanding of international economic issues by sponsoring research, conferences, graduate studies, and the exchange of scholars. The center also supports and participates in activities designed to bring greater public awareness and

understanding to policy issues involving international economics.

To this end, SCCIE supports public seminars, publication of working papers, and occasional public forums.

For more information, visit the SCCIE web site: <http://sccie.ucsc.edu>; call (831) 459-1553; fax (831) 459-5077; or e-mail: sccie.ucsc.edu.

Santa Cruz Institute for Particle Physics (SCIPP)

The SCIPP was established on the Santa Cruz campus by the Regents in 1980 to coordinate research and instruction in elementary particle physics and related areas. Its staff members, as well as visiting scientists, are engaged in theoretical and experimental particle physics and particle astrophysics projects that concern the fundamental interactions of matter. Additional work includes projects in neurobiology and radiobiology. They are also involved in graduate and undergraduate instruction as regular faculty or adjunct professors, usually with the Department of Physics.

Experimental work such as the design, testing, and construction of large-scale particle detectors, as well as associated electronics, takes place in the development laboratories on campus. Many of the experiments are ultimately performed at large facilities, national or international laboratories, or using space-based detectors.

The detector development at SCIPP is largely concerned with miniaturization of detectors. Design and testing of custom-integrated circuitry is a major facet of this effort. At present the institute's principal experimental projects include the following:

- Analysis of data from the BaBar detector, with an emphasis on matter-antimatter mixing for charmed particles, and rare “radiative penguin” decays in which a bottom particle decays into an array of light particles accompanied by the emission of a single high-energy gamma ray
- Studies of ultrahigh-energy cosmic-ray showers at facilities associated with Los Alamos National Laboratory and the VERITAS telescope array
- Scientific exploitation of the ATLAS detector at the Large Hadron Collider facility at the CERN Laboratory in Geneva, Switzerland, of which SCIPP played a major role in design and construction; research and development of the future upgrade to the ATLAS detector, including radiation-hardened electronics

and silicon sensors and high-speed data transmission, is a parallel activity

- Development of the ground station and flight components for the BARREL balloon program to study the loss of relativistic electrons from the Van Allen belts to Earth's atmosphere
- Development of the ADELE airborne gamma-ray detector to study particle acceleration associated with lightning
- Scientific exploitation of the GLAST orbiting gamma-ray telescope of which SCIPP played a key role in the design and fabrication

Both graduate and undergraduate students take part in these projects, which give them opportunities for thesis work, independent study, and part-time employment. Students have gained experience in electronics, computer-aided design (CAD) and use of scientific instrumentation as well as in actual experimentation and data analysis.

The institute's theorists have broad interests in high-energy physics, astrophysics, and cosmology—subjects that have become increasingly interrelated in recent years. Topics of their recent work have included the following:

- Phenomenological properties of Higgs bosons and formulation of search strategies for their discovery
- Development and analysis of other new theories of particle physics that can be tested at present and future accelerators, especially supersymmetric theories
- Investigations of gauge theories of strong and electroweak interactions, topics in quantum field theory and string theory
- Physics of the early universe including the origin of matter-antimatter asymmetry, inflation, and the nature of the dark matter and dark energy
- Theories of galaxy formation

The theory group collaborates with the SCIPP experimental group, the UCSC astrophysicists and astronomers associated with Lick and Keck Observatories, the large theoretical physics group at SLAC, and theorists at UC Berkeley, UC Davis, and the Institute for Theoretical Physics at UC Santa Barbara. The theory group supports the research and thesis work of graduate students and occasionally supervises undergraduate theses. Web: scipp.ucsc.edu

Social Sciences Division

Research Facilities

CineMedia Project (CMP). This is a noncirculating research archive dedicated to the study of Latin American and Latino film and video. CMP, located on the first floor of Casa Latina at Merrill College, is open to UCSC faculty, graduate students, and advanced undergraduates. Noncampus users of the facility are invited to become CMP Associates. Web: lals.ucsc.edu/research.html

Geographic Information Systems (GIS) Laboratory. See page 66.

Life Lab Science Program. Life Lab helps schools develop gardens where children can create “living laboratories” for the study of the natural world. Web: www.lifelab.org

Museum of Natural History Collections (MNHC). The MNHC is dedicated to cultivating an increased understanding and appreciation of the natural world by promoting the use of its natural science collections for teaching, research, and aesthetics. The museum, part of the Environmental Studies Department, is the main repository for natural science collections at UC Santa Cruz. Collections include specimens of plants, fungi, insects, fishes, amphibians, reptiles, birds, and mammals. Web: mnhc.ucsc.edu

Physical Anthropology and Archaeology Laboratories. These laboratories are dedicated to teaching and research in both physical (biological) anthropology and archaeology. Within the labs are spaces for the study of comparative anatomy, osteology, forensic anthropology, zooarchaeology, landscape archaeology ceramics, lithics, and Monterey Bay archaeology. The laboratories maintain collections of comparative vertebrate osteology and taphonomic specimens. Web: anthro.ucsc.edu/labs.shtml

Plant Growth Facility (Greenhouses). See page 71.

Social Sciences Media Laboratory. This lab is an academic resource center for media equipment and services within the Division of Social Sciences. The Media Lab provides technical consultation and support; equipment training; and equipment loans for faculty, students and staff in the Division of Social Sciences.

The Social Sciences Media Lab houses dark-room facilities, digital-photography workstations, audio workstations and video post-production suites. The lab's facilities are available for use by Social Sciences faculty, undergraduates and graduate students doing funded research, course work, independent studies and undergraduate or graduate thesis work.

The media lab offers production classes in video, audio, and photography. Students enrolled in lab classes learn the fundamentals of video field production, still photography, and audio production.

The lab may be contacted by phone at (831) 459-4010 or by e-mail at mlab@ucsc.edu. Web: http://socialsciences.ucsc.edu/administration/media_lab

UCSC Farm and the Alan Chadwick Garden. See page 61.

STEPS Institute for Innovation in Environmental Research

Founded to integrate science, technology, engineering, policy, and society, the STEPS Institute seeks workable solutions to critical environmental problems. The institute focuses on major global environmental issues through initiatives on climate change, biodiversity, and water resources that confront the biological and social effects of altered environments. The institute provides fellowships for interdisciplinary graduate research and research grants to faculty, graduate students and undergraduate students. It also works to increase dialogue among environmental researchers, policy makers, and resource managers through lectures, seminars, and workshops, leading to broader collaborations within California, nationally, and internationally.

Current research addresses a wide range of issues:

- How do we link science, policy, and management in coastal ecosystems?
- How do we translate the science and technology of climate modeling and data collection into effective planning tools for fisheries, agriculture, forestry, urban centers, and overall ecosystem management?
- How do we confront scientifically and socially the rapidly changing biodiversity of all ecosystems that is being driven by fragmentation of landscapes and the introduction of nonnative species of plants, animals, and microbes?

The STEPS Institute harnesses the expertise and resources of dozens of departments and research units campus-wide, drawing especially from researchers in the Division of Physical and Biological Sciences, Division of Social Sciences, and Jack Baskin School of Engineering. For more information, e-mail steps@ucsc.edu or call (831) 459-1310.

Web: www.steps.ucsc.edu

University Affiliated Research Center (UARC)

Under a 10-year, \$330 million research contract between NASA and the University of California, which began in September 2003, UC Santa Cruz is leading the UC-wide UARC at NASA Ames. Research, which takes place at the NASA Ames's Moffett Field facility, as well as at several UC campuses, focuses on multidisciplinary research in the following:

- Nanotechnology
- Information sciences
- Biotechnology and fundamental space biology
- Aerospace systems
- Astrobiology (space, life, and Earth sciences)

In addition to research, UARC offers an educational program via its Systems Teaching Institute, which provides opportunities for students to work alongside university and Ames researchers, enhancing their educational experiences while training them to become 21st-century world-class scientists, engineers, and educators.

To learn more about UARC and its programs, go to uarc.ucsc.edu.

University of California Observatories/Lick Observatory

Lick Observatory was established on Mt. Hamilton in the 1880s as a result of the gift of James Lick, a Pennsylvania piano maker who came to San Francisco in 1848 and amassed a fortune through investment in California real estate. The observatory has been part of the University of California since 1888, when the Lick Trustees conveyed the just completed original installation to the Regents.

UCO/Lick astronomers became a partner with California Institute of Technology astronomers to operate and provide instruments for the W. M. Keck Observatory, located at the summit of Mauna Kea in Hawaii. The two Keck 10-meter telescopes began operating in

1993 and 1996. These are the largest and most capable optical/IR telescopes in the world.

In 1988 the Regents established an organization to manage the university's ground-based optical and infrared observatories as a single unit. Known as the University of California Observatories (UCO), the organization includes Lick Observatory and UC's component of the Keck Observatory. UCO is headquartered at UCSC; the Lick director serves also as the director of UCO. UCO/Lick plays a large role in the Keck enterprise: both of the Keck telescopes' secondary mirrors were polished in the optical laboratory at Santa Cruz, and the high-resolution echelle spectrograph (HIRES), designed and constructed in the instrument-development laboratories here, was the first Keck instrument to become fully operational. The laboratories have also designed and constructed instruments for the second Keck telescope, including a powerful new optical instrument to aid in the search for dark matter (DEIMOS) and a new medium-resolution echelle spectrograph and imager (ESI). Web: www.ucolick.org.

As resident members of the Santa Cruz faculty, the UCO/Lick staff are members of UCSC's Department of Astronomy and Astrophysics, which offers the graduate program in astronomy and astrophysics and an undergraduate minor (see page 131). A B.S. degree in astrophysics is offered through the Physics Department (see page 388). The astronomy library and laboratories are located on campus, as are optical, electronics, engineering, programming, and detector and instrument-development groups. There are resources for measurement, analysis, and computation of data on campus as well.

The telescopes and accompanying facilities on the 3,762-acre reservation on Mt. Hamilton east of San Jose are operated as an observatory, with faculty, research, and student observers commuting to the facility. Telescopes include the Lick 36-inch refractor, the Carnegie 20-inch twin astrograph, and the CAT 24-inch, Crossley 36-inch, and Nickel 40-inch reflectors. The newest telescope is the Katzman 30-inch robotic reflector, dedicated to searching for supernovas. The largest and most powerful of the Lick instruments is the Shane 120-inch reflector, which was completed in 1959 and is one of the world's most effective telescopes. The observatory's equipment also includes a variety of auxiliary instruments used in connection with observations at the 120-inch telescope. Among the most recent is the Hamilton echelle spectrograph, judged to be one of the world's most efficient instruments for high-resolution analysis of the

light of stars and galaxies and the instrument by which astronomers have discovered new planets outside our solar system. Other instruments include the Kast double spectrograph, a pioneering example of UCO/Lick's innovative instrumentation capabilities; the multiple-object spectrograph, which gives astronomers the opportunity to look at the spectra of 100 objects simultaneously; and the prime-focus Wide Field Camera, capable of taking digital images of large areas of the sky. One of the most exciting technological innovations developed at Lick Observatory, in conjunction with Lawrence Livermore National Laboratory, is the use of an adaptive-optics system with an artificial laser-produced guide star to correct distortions to incoming light caused by the blurring effects of the atmosphere. The observatory is a systemwide facility used extensively by observers and students from other UC campuses and the national laboratories.

UCSC's courses in astronomy and astrophysics are taught on campus. Advanced students gain observing experience with the Mt. Hamilton telescopes and conduct research directed by the staff. Visiting astronomers use the equipment to investigate special problems.

UCO/Lick astronomers work on a wide variety of astrophysical problems, including solar system and star formation, stellar evolution, the origin and evolution of the Galaxy and external galaxies, abundances of the chemical elements, and the size, structure, and evolution of the universe. During the summer, UCO/Lick and the department host a conference on topics in astronomy and astrophysics, which brings international scholars and students to UCSC.

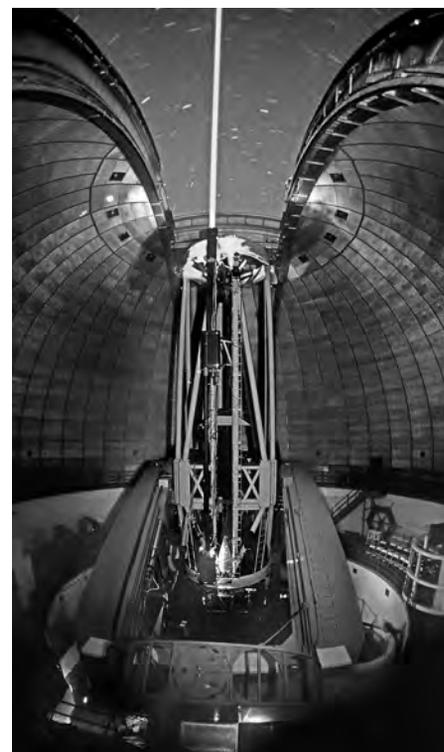
Since 2000, UCO has been a partner in a project to build a giant telescope (30-meter diameter primary mirror) and the adaptive optics systems and instruments that will make this the most powerful astronomical facility of the coming decades. This project—in a \$63 million design and development phase—is called the Thirty-Meter Telescope (TMT).

Center for Adaptive Optics (CfAO)

The CfAO is a Science and Technology Center funded by the National Science Foundation. As of January 2008, it is also a multicampus research center within UC's Institute of Geophysics and Planetary Physics. The CfAO's mission is to advance the technology of adaptive optics (AO) in service to science, health care, industry, and education. Its goal is to lead the revolution in AO by developing and demonstrating the technology, creating major improvements in AO systems, and catalyzing advances nationwide. The CfAO has implemented a highly successful education program

to teach our graduate students methods of inquiry-based science teaching, and to apply this knowledge in programs that attract and retain a new generation of scientists, particularly among women and underrepresented minorities. The NSF CfAO comprises 11 research universities, a dozen national laboratories and eye institutes, and a dozen industrial partners. Headquartered at UCSC where it is housed in its own building, the NSF CfAO was funded in 1999 for five years and in 2003 was renewed for a final five years. Center researchers are particularly interested in applications for large astronomical telescopes, searches for planets around nearby stars, and vision science. As an outgrowth of the center, a Laboratory for Adaptive Optics within UC Observatories was established through a \$9 million grant from the Gordon and Betty Moore Foundation. This state-of-the-art laboratory explores new AO techniques and develops and tests new components. E-mail: cfao@ucolick.org. Web: cfao.ucolick.org and lao.ucolick.org

Lick Observatory, near San Jose, California, is equipped with a state-of-the-art adaptive optics system that corrects distortion to incoming light caused by atmospheric blurring. Both Lick Observatory and the W. M. Keck Observatory in Hawaii are managed by the University of California Observatories/Lick Observatory (UCO/Lick), headquartered at UCSC.



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Under a 10-year, \$330 million agreement between NASA and the University of California, UC Santa Cruz is leading the UC-wide University Affiliated Research Center (UARC), which focuses on multidisciplinary research in nanotechnology, information sciences, biotechnology and fundamental space biology, aerospace systems, and astrobiology (space, life, and Earth sciences). In addition to research, UARC offers an educational program through its Systems Teaching Institute, which provides opportunities for students to work alongside university and Ames researchers while training to become 21st-century scientists, engineers and educators. All of this important work is being done at UCSC's Silicon Valley Center, located in the heart of Silicon Valley at NASA Ames's Moffet Field facility.



2

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The Colleges

The University of California, Santa Cruz, is a collegiate university. All undergraduate students and most faculty are affiliated with one of the colleges, their home within the larger university. All the colleges are committed to fostering a nurturing and academically thriving environment for students of all backgrounds. Each college strives to promote the attributes of a diverse and multicultural community in its own unique way. In order of founding, the colleges are Cowell, Stevenson, Crown, Merrill, Porter, Kresge, Oakes, College Eight, College Nine, and College Ten.

Self-contained and architecturally distinct, each college is a relatively small community of 30 to 110 faculty members and between 1,400 and 1,500 students, about half of whom live on campus. Each college has its own housing, academic, and recreational facilities, and each is an integral part of the larger campus. The colleges have their own academic emphases and cultural traditions, although each seeks faculty and students from a variety of disciplines to foster broad intellectual interests. The colleges play a primary role in academic advising and are the center of student life. Students graduate from their college. At the same time, *all university academic programs, resources, and student services are open to students of every college.*

The information students need to rank their college preferences can come from a variety of sources—personal acquaintance, a campus visit, literature available from the colleges, and the descriptions in this section of the catalog. Entering students are asked to list several colleges in order of preference; whenever possible, students are assigned to the college of their choice.

Similarities and Differences

Each college is residential and able to house close to half of its students. Most frosh choose to live on campus, as do a number of sophomores, juniors, and seniors. The particular style of housing varies among the colleges, ranging from fairly traditional residence halls, with a mix of single, double, and triple rooms, to apartment-style housing, where students live together in small groups and may do some of their own cooking. Faculty, staff, or graduate students, along with undergraduate resident assistants, reside in college housing units.

The faculty, or fellows, of each college come from a variety of academic disciplines. Some of

the colleges have faculty from nearly all the liberal arts and sciences, while the faculty in other colleges are more concentrated in particular disciplinary interests. Many faculty have their offices in the colleges.

Each college offers its own distinctive academic program for entering frosh. Taught in the college during the fall quarter, the required course provides a significant bridge between academic and residential life, since all frosh, regardless of major, will be in the course, and most will be in residence as well. Stevenson's core course extends over two quarters, while the other colleges offer one-quarter courses. College core course requirements for transfer students vary (see page 31). The colleges also offer selected courses in their area of interdisciplinary emphasis and host events and speakers that enhance this focus.

All the colleges provide academic advising and academic and general campus orientations to help you plan your academic program. In addition, each college has academic preceptors who can provide advice on academic matters. (See pages 36–39 for further information on academic advising.) Psychological and personal counseling is also available in each college, and many colleges have well-developed peer advising and tutoring.

The colleges differ in architecture; each was planned by a different architect, who was encouraged to convey the distinct personality of that college through the design of its buildings and their placement in the natural environment. Above all, the colleges differ in subtle ways having to do with their intellectual and social traditions, the different designs of their student governments, and the predominant interests of their students and faculty.

Changing Colleges

Most students, having affiliated with a particular college, develop friendships and intellectual attachments there, and they remain members of that college throughout their undergraduate years. Some students find that changing academic interests draw them to a different college. During the specified filing period, students may request a change of college with the approval of both college administrations.

Cowell College

Cowell College inaugurated the Santa Cruz campus when it opened with a pioneer class of 600 students in 1965. The founding faculty shaped an educational program that challenged and enriched students through wide-ranging inquiry and disciplined study. Today, Cowell has nearly 1,500 affiliated stu-

dents and 100 faculty fellows. Its motto—The Pursuit of Truth in the Company of Friends—expresses a continuing commitment to create a serious academic environment within a humane and broadly inclusive community. The college is named for the S. H. Cowell Foundation, which endowed the college at its founding.

Academic Emphases

The academic theme of the college encourages students to pursue their general and disciplinary study with attention to the values of liberal arts education: understanding one's individual perspective by exploration of its historical background and world context. Students affiliated with the college pursue majors from all departments on campus.

The faculty fellows affiliated with the college represent all academic divisions (arts, engineering, humanities, physical and biological sciences, and social sciences). The faculty fellows guide the college academic programs and serve as academic mentors to the students, supplementing the advising provided by the college academic advisers and departmental advising.

In satisfying their general education requirements, first-year Cowell students are required to take the Cowell Core Course in the fall term. The core course, Cowell 80, taught in small seminar sections, seeks to develop critical reading, analytical writing, and seminar discussion skills by reading a selection of classic and contemporary texts focused on the theme of justice.

The college academic buildings house humanities faculty, with notable concentrations in philosophy, classics (study of ancient Greek and Latin language and civilization), and modern foreign languages, especially Chinese, French, Italian, Russian, German, and Japanese. Interdisciplinary faculty groups in visual and performance studies and in pre- and early-modern studies are centered at Cowell College.

Students who develop ideas for research, creative projects, community service, or internship experiences may apply to the college provost for financial support. The college awards several annual scholarships, sponsors prizes for outstanding academic work, and acknowledges students who graduate with overall academic excellence in a breadth of study with College Honors.

The college enriches the intellectual and cultural life of the campus by sponsoring events of various kinds: lectures and presentations by local faculty and visiting scholars, theatrical and musical performances, and forums and debates on topics of current interest.

College Community and Facilities

Cowell's seven residence halls and three apartment buildings are arranged in three quadrangles on a hillside overlooking the city of Santa Cruz and Monterey Bay. About 650 students are housed in the college. Each residence hall houses from 40 to 60 students and is divided into two wings, with seven to 11 residents on each floor. Most floors are coed, with men and women sharing common lounges and other facilities, but single-gender floors are provided for those who prefer this arrangement. Apartments house 185 continuing students in six-person units. The residential staff members facilitate diverse educational, social, and recreational programming to enhance the living and learning environment.

Arranged around the college's central plaza are the dining hall, Page Smith Study Library, the fireside lounge, the coffee shop, and conference rooms and classrooms. Unique to Cowell College are the Eloise Pickard Smith Gallery, which regularly mounts exhibits, and the Cowell Press, where students can learn the fine technique of hand-operated letterpress printing.

Since the college's founding, regularly scheduled College Nights in the dining hall have offered students, staff, and faculty a special meal and a rich mix of after-dinner programs presented by students and professional artists. Community life is enlivened by many other scheduled and impromptu intellectual, cultural, and social events.

The Student Senate meets weekly to discuss campus issues and student government. The Senate advises the college on the allocation of funds for student activities and programs. Members of the Senate are selected each year by lot, but any student may become a voting member by steady attendance at meetings. The college's multicultural advisory board works with staff to create a supportive community for students of color affiliated with the college and to increase awareness of the many dimensions of diversity in the community.

For more information on the college, see www2.ucsc.edu/cowell or call (831) 459-2253.

Cowell Faculty and Staff

Provosts

TYRUS H. MILLER, *Literature*
DEANNA SHEMEK, *Italian Literature*

Fellows

KAREN BASSI, *Classics*
JAMES H. BIERMAN, *Theater Arts (Drama)*
HUNTER BIVENS, *Comparative and German Literature*
JOHN BOWIN, *Philosophy*

DONALD BRENNEIS, *Anthropology*
JEAN P. BRODIE, *Astronomy and Astrophysics*
MARGARET R. BROSE, *Italian and Comparative Literature*
GIULIA CENTINEO, *Italian Language*
SANDRA CHUNG, *Linguistics*
PHILIP CREWS, *Chemistry*
JONATHAN ELLIS, *Philosophy*
ANGELA ELSEY, *French Language*
MARK FRANKO, *Theater Arts*
CAROL M. FREEMAN, *Writing*
SAKAE FUJITA, *Japanese Language*
RAYMOND W. GIBBS JR., *Psychology*
WLAD GODZICH, *Literature*
DANIEL GUEVARA, *Philosophy*
GILDAS HAMEL, *French Language and Classical Studies*
ELLEN LOUISE HART, *Writing*
CHARLES W. HEDRICK JR., *History*
MARGO HENDRICKS, *Literature*
THEODORE HOLMAN, *Chemistry and Biochemistry*
THEO HONNEF, *Literature*
DAVID C. HOY, *Philosophy*
JOCELYN HOY, *Philosophy*
GRETA HUTCHISON, *French Language*
MICHAEL M. HUTCHISON, *Economics*
KIMBERLY JANNARONE, *Theater Arts*
KEVIN KARPLUS, *Computer Engineering*
DAVID KEENAN, *Chinese Language*
JACQUELINE KU, *Chinese Language*
WILLIAM A. LADUSAW, *Linguistics*
CAMPBELL LEAPER, *Psychology*
H. M. LEICESTER JR., *English Literature*
PATRICE L. MAGINNIS, *Music*
TYRUS MILLER, *Literature*
GLENN L. MILLHAUSER, *Chemistry and Biochemistry*
JEROME NEU, *Philosophy*
WILLIAM NICKELL, *Russian Literature*
MATTHEW O'HARA, *History*
CHARLES L. (LEO) ORTIZ, *Ecology and Evolutionary Biology*
RICHARD E. OTTE, *Philosophy*
MARIA (TONIA) PRENCIPE, *Italian Language*
S. RAVI RAJAN, *Environmental Studies*
FRANK A. RAMIREZ, *Spanish Language*
BETH REMAK-HONNEF, *Librarian*
PAUL ROTH, *Philosophy*
ZACK SCHLESINGER, *Physics*
SUSAN Y. SCHWARTZ, *Earth and Planetary Sciences*
DEANNA SHEMEK, *Italian and Comparative Literature*
CATHERINE M. SOUSSLOFF, *History of Art and Visual Culture*
ABRAHAM D. STONE, *Philosophy*
JOSHUA M. STUART, *Biomolecular Engineering*
NINA TREADWELL, *Music*
ANTHONY J. TROMBA, *Mathematics*
GEORGES VAN DEN ABEEL, *Literature*
THOMAS WALSH, *Literature*
PAUL WHITWORTH, *Theater Arts*
JAMES WILSON, *Writing, College Academic Preceptor*

Emeriti Fellows

W. EMMANUEL ABRAHAM, *Philosophy, Emeritus*
GEORGE T. AMIS, *English Literature, Emeritus*
HARRY BERGER JR., *English Literature and Art History, Emeritus*
RALPH J. BERGER, *Ecology and Evolutionary Biology, Emeritus*
GABRIEL BERNS, *Spanish Literature, Emeritus*
CHARLES W. DANIEL, *Molecular, Cell, and Developmental Biology, Emeritus*
JOHN DIZIKES, *American Studies, Emeritus*
ROBERT M. DURLING, *Italian and English Literature, Emeritus*
MIRIAM ELLIS, *French Language, Emerita*
MARY-KAY GAMEL, *Classics and Comparative Literature, Emerita*
ROBERT GOFF, *Philosophy, Emeritus*
VIRGINIA JANSEN, *History of Art and Visual Culture, Emerita*
S. PAUL KASHAP, *Philosophy, Emeritus*
BRUCE D. LARKIN, *Politics, Emeritus*
THOMAS A. LEHRER, *American Studies and Mathematics, Emeritus*
JOHN P. LYNCH, *Classics, Emeritus*
RICHARD MATHER, *History, Emeritus*
MELANIE J. MAYER, *Psychology, Emerita*
GARY B. MILES, *History, Emeritus*
ANDREW TODD NEWBERRY, *Ecology and Evolutionary Biology, Emeritus*
DAVID A. ORLANDO, *French Language, Emeritus*
RICHARD R. RANDOLPH, *Anthropology, Emeritus*
AUDREY E. STANLEY, *Theater Arts, Emerita*
THOMAS A. VOGLER, *English and American Literature, Emeritus*
MICHAEL J. WARREN, *English Literature, Emeritus*
HAYDEN WHITE, *History of Consciousness, Emeritus*
STANLEY M. WILLIAMSON, *Chemistry and Biochemistry, Emeritus*

College Administrative Officer

E. JAMES CARTER

Staff

DEBORAH ALEXANDER, *Dining Hall Manager*
SADEK CHAKIB, *Community Safety Officer, Zone Supervisor*
ELIZABETH COWAN, *Financial/Budget Specialist*
CLAIRE CRUM, *Groundskeeper*
DEBRA ELLIS, *Coordinator for Residential Education*
JOHN HADLEY, *Coffee Shop Manager*
KAREN HILKER, *Associate College Programs Coordinator*
ROBERT MANDELL, *Senior Building Maintenance Worker*
DAN MONKO, *Facilities Assistant Coordinator*
MARY JAN MURPHY, *Counseling Psychologist*
EMILIO NAVARRO, *Senior Building Maintenance Supervisor*
DANIELLE NILAND, *Academic Adviser*
LINDA POPE, *Gallery Curator*
GARY ROE, *Groundskeeper*
SARAH ROGERSON, *Senior Academic Preceptor*

CATHERINE SHENDER, *Advising and Records Coordinator*

S. JADEN SILVA-ESPINOZA, *Assistant to the Provost and the College Administrative Officer*

SHANNON SMIGO, *Coordinator for Residential Education*

KARA SNIDER, *College Programs Coordinator*

TONY SOOTTINANCHI, *College Assistant*

MANDIE STOUT, *Coordinator for Residential Education*

ADRIANNE WAITE, *Associate College Administrative Officer*

RYAN WATT, *Housing Coordinator*

LYNNE WOLCOTT, *Academic Preceptor*

Stevenson College

We are Stevensonians; we are free agents of history and masters of our own destinies. Every one of us is important, and we cherish our differences as much as we cherish our shared values of love, chivalry, honesty, hard work, and responsibility.

—Seung Kyun Joseph Mok,
Stevenson Alumnus/Regents Scholar

Stevenson College is named after former statesman and U.S. Ambassador to the United Nations Adlai E. Stevenson. Our faculty, students, and staff take pride in intellectual critical inquiry, academic and civic leadership, and respect for students' concerns about shared student governance, human rights, and social justice.

Stevenson College has a long-standing reputation for excellence in liberal education. The college strives to provide an academically, culturally, and socially supportive environment for all its members, fostering social responsibility and academic achievement. Stevenson has brought to the campus distinguished individuals such as Senator George McGovern, Congresswoman Bella Abzug, Nobel Laureate Elie Wiesel, Chief of the Miwok Tribe Greg Sarris, Producer Lourdes Portillo, and Associate Director-Counsel Theodore M. Shaw of the NAACP Legal Defense and Educational Fund.

The college's faculty and staff offer professional and personal service for the diverse needs of students. Faculty and staff assist students in all areas of their academic and social experience at Stevenson College, and are committed to instilling respect for the diverse backgrounds of Stevenson students.

Academic Emphases

- Faculty drawn from social sciences, humanities, natural sciences
- Two-quarter frosh core course
- Writing Assistants

• Junior Fellows Program

Stevenson distinguishes itself as the only college with a two-quarter core course intended to provide all first-year students with a common academic experience. The core course allows for more rigorous development of students' critical, writing, and analytical skills. It provides a unique learning environment and a supportive intellectual community for all Stevenson first-year students. Students admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college English composition course with a minimum grade of C (2.0) or better are able to take the core course to satisfy the C1 requirement. Stevenson alumni can be found in legal, political, educational, engineering, medical, computer and information sciences, business, and public administration careers, among others.

The faculty at Stevenson, drawn from a variety of disciplines in the social sciences, humanities, and physical and biological sciences, share a common concern for the study of social processes that shape modern society and determine the quality of our individual lives throughout various global regions and periods of world history. Linguistics, sociology, history, politics, psychology, biology, chemistry, and computer science are strongly represented in the college.

The Stevenson core course, *Self and Society* (see page 432), enables students to examine the nature of the self and the relationship of the individual to society. In addition, the course fosters an intellectual commitment to the general philosophy that has helped to define Stevenson College since its inception: preservation of human dignity, the social cultivation of individual creativity and citizenship, and a belief in ethical responsibility. The core course reflects the college's long-standing commitment to interdisciplinary and culturally diverse readings, while at the same time it affords students an opportunity to develop research interests, to acquire greater understanding of the role of research universities in contemporary societies, and to acquire the requisite skills to engage in increasingly more sophisticated intellectual work while at UCSC.

The Stevenson College Junior Fellows Program offers juniors and seniors an opportunity to serve as teaching and research assistants for *Self and Society*. Junior fellows, who must have completed outstanding work in *Self and Society* during their first year, undergo a rigorous application and selection process. Junior fellows (enrolled in Stevenson 120, *Teaching Practicum*) earn 5 course credits.

Stevenson provides writing assistance for all of its students. Stevenson Writing Assistantships are paid student positions open to juniors and seniors with excellent academic records.

College Community

- College Nights
- Stevenson Student Council
- Multicultural Advisory Committee
- Social and Multicultural Programs/Activities
- Rainbow Theater and Stevenson Theater Guild

Stevenson holds regular College Nights, where joining together for a special dinner presents an opportunity for Stevenson faculty, staff, and students to get together in a social context. College Nights—such as Cinco de Mayo, Chinese New Year, Vietnamese College Night—provide the opportunity to celebrate many different cultures. Dinner is followed by entertainment.

The Stevenson Student Council meets on Thursday evenings. This group of 16 elected representatives (eight resident students, eight living off campus) is responsible for allocating college membership fees to student activities. The council also serves as a forum for the discussion of college and campuswide issues and appoints student representatives to college and campuswide committees.

Facilities

- Eight small residence halls
- Three apartment buildings
- Theme floors in residence halls
- Multicultural and Social Justice House
- Outdoor Adventure House
- Coffee house
- Wagstaff Fireside Lounge
- Writers' Center
- Stevenson Library
- Stevenson Event Center
- Silverman Conference Room
- The Knoll
- Recreation room

Stevenson has a wide variety of facilities and activities to appeal to many tastes. The college, designed by San Francisco architect Joseph Esherick, has won many architectural awards. The buildings are situated amid redwood trees and sprawling lawns, and the main quad overlooks Monterey Bay. Stevenson is situated close to the campus bookstore, restaurants, McHenry Library, gym, and pool. There are eight small

residence houses at the college providing a choice of single-gender or coed floors; each house accommodates about 60 undergraduates. The apartments provide space for 132 continuing students. Nearby are a picnic area, playing fields, and a garden.

The Stevenson Coffee House, which has become *the* gathering place in the college, is a friendly and inviting spot to enjoy lunch or an espresso and pastry—indoors or out on the patio. It is the scene of lively conversation, occasional musical entertainment, and chess matches. Adjoining the coffee house is a recreational wing, with Ping-Pong, foosball, pool tables, and television. This area is also the site of much socializing and spontaneous group activity.

In contrast, the Stevenson Library is a striking building designed for quiet reading and study. The Wagstaff Fireside Lounge, a retreat for relaxed discussion, is also used for recitals, special lectures, meetings, and residence house activities. Art exhibits (both student and professional) are on display throughout the year in the lounge, library, and coffee house.

For more information, call (831) 459-4930 or visit the web site: stevenson.ucsc.edu.

Stevenson Faculty and Staff

Provost

ELLEN KAPPY SUCKIEL, *Philosophy*

Fellows

MARTIN ABADI, *Computer Science*

JUDITH AISSIN, *Linguistics*

PRANAV ANAND, *Linguistics*

DAVID ANTHONY, *History*

DANE ARCHER, *Sociology*

ELLIOT ARONSON, *Psychology, Emeritus*

JONATHAN F. BEECHER, *History*

ILAN BENJAMIN, *Chemistry and Biochemistry*

PETER H. BODENHEIMER, *Astronomy and*

Astrophysics

REBECCA BRASLAU, *Chemistry and Biochemistry*

FRANK G. BRIDGES, *Physics*

BRIAN CATLOS, *History*

MARK CIOC, *History*

CATHERINE R. COOPER, *Psychology and Education*

W. JACKSON DAVIS, *Ecology and Evolutionary Biology*

MICHAEL DINE, *Physics*

G. WILLIAM DOMHOFF, *Psychology, Emeritus*

DONKA FARKAS, *Linguistics*

HIROSHI FUKURAL, *Sociology*

ROBERT E. GARRISON, *Earth and Planetary*

Sciences, Emeritus

HERMAN GRAY, *Sociology*

MARVIN J. GREENBERG, *Mathematics, Emeritus*

ISEBILL V. GRUHN, *Politics, Emerita*

HOWARD E. HABER, *Physics*

CRAIG W. HANEY, *Psychology*

JORGE HANKAMER, *Linguistics*

DAVID M. HARRINGTON, *Psychology*

AIDA HURTADO, *Psychology*

JUNKO ITÔ, *Linguistics*

CATHERINE JONES, *History*

MICHAEL KAHN, *Psychology, Emeritus*

AL KELLEY, *Mathematics, Emeritus*

PETER KENEZ, *History*

KENNETH KLETZER, *Economics*

JOSEPH P. KONOPELSKI, *Chemistry and Biochemistry*

ROBERT P. KRAFT, *Astronomy and Astrophysics, Emeritus*

JEAN H. LANGENHEIM, *Ecology and Evolutionary Biology, Emerita*

ROBERT A. LEVINSON, *Computer Science*

RONNIE D. LIPSCHUTZ, *Politics*

MARC S. MANGEL, *Environmental Studies*

JAMES MCCLOSKEY, *Linguistics*

DENNIS C. MCEL RATH, *Sociology, Emeritus*

R. ARMIN MESTER, *Linguistics*

MARCIA MILLMAN, *Sociology*

CARLOS G. NOREÑA, *Philosophy, Emeritus*

JAYE PADGETT, *Linguistics*

THOMAS F. PETTIGREW, *Psychology, Emeritus*

IRA POHL, *Computer Science*

CYNTHIA POLECRITTI, *History*

ANTHONY R. PRATKANIS, *Psychology*

RALPH H. QUINN, *Psychology*

CRAIG REINARMAN, *Sociology*

FORREST ROBINSON, *American Studies*

DONALD T. SAPOSNEK, *Psychology*

PETER L. SCOTT, *Physics, Emeritus*

BUCHANAN SHARP, *History*

PRISCILLA W. SHAW, *English and Comparative Literature, Emerita*

WILLIAM F. SHIPLEY, *Linguistics, Emeritus*

GRETA SLOBIN, *Russian Literature, Emerita*

M. BREWSTER SMITH, *Psychology, Emeritus*

ELLEN SUCKIEL, *Philosophy*

MARSHALL SYLVAN, *Mathematics, Emeritus*

DANA TAKAGI, *Sociology*

HIROTAKA TAMANOI, *Mathematics*

KIP TÉLLEZ, *Education*

DAVID J. THOMAS, *Politics, Emeritus*

BRUCE THOMPSON, *History*

JOHN N. THOMPSON, *Ecology and Evolutionary Biology*

AVRIL THORNE, *Psychology*

MARK TRAU GOTT, *History*

MICHAEL E. URBAN, *Politics*

HOWARD H. WANG, *Molecular, Cell, and Developmental Biology, Emeritus*

MANFRED K. WARMUTH, *Computer Science*

RICHARD A. WASSERSTROM, *Philosophy, Emeritus*

CANDACE WEST, *Sociology*

MARILYN WESTERCAMP, *History*

HAROLD WIDOM, *Mathematics, Emeritus*

Honorary Fellows

JACK BASKIN

BORIS KEYSER

NORMAN LEZIN

ELEANOR MCGOVERN

CHARLES NEIDER

CHARLES H. PAGE

WILLIAM M. ROTH

ALMA SIFUENTES

F. M. GLENN WILLSON

Stevenson Fellows-in-Residence

GEORGE MCGOVERN (1982)

BELLA ABZUG (1983)

PAUL SARBANES (1983)

ARTHUR S. FLEMMING (1984)

CAROLE KING (1985)

CLARK KERR (1987)

PETER SHAFFER (1987)

DONALD MCHENRY (1988)

PAT CONROY (1990)

MOCTESUMA ESPARZA (1992)

LOURDES PORTILLO (1992)

GREG SARRIS (1997)

JESSE JACKSON (1998)

AMIRI BARAKA (1999)

RON DELLUMS (1999)

THEODORE M. SHAW (2002)

College Administrative Officer

E. JAMES CARTER

Staff

MARY ALVAREZ, *Academic Adviser*

ALISA BESCHERER, *College Programs Coordinator*

CAREN CAMBLIN, *Core Course Coordinator*

SADEK CHAKIB, *Community Safety Officer*

ELIZABETH COWAN, *Financial/Budget Specialist*

DARLENE DENNY, *Groundskeeper*

LAUREN DUN, *Assistant College Programs Coordinator*

ELIDA ERICKSON, *Coordinator for Residential Education*

CANDACE FREIWALD, *Academic Services Supervisor*

JOHN HADLEY, *Coffee House Manager*

LINDA HART, *Housing Coordinator*

WAYNE HENDRICKSON, *Community Safety Officer*

RACHEL JABLON, *Associate College Administrative Officer for Student Life*

MICHELLE KALUS, *Academic Programs Coordinator/ Academic Adviser*

GUSTAVO NOLAZCO, *College Assistant/Records Coordinator/Mail Services Supervisor*

STAN PRATHER, *Coordinator for Residential Education*

JAKE RENEW, *Maintenance Officer*

PAUL RICHTER, *Community Safety Officer*

AVA SNYDER, *Police Captain/Liaison*

GREGORY SPEED, *Community Safety Officer*

MICHAEL TASSIO, *Provost Assistant*

AMY WEAVER, *Writing Program Coordinator*

SARMA WILLIAMS, *Coordinator for Residential Education*

MARIE YOO, *Senior Academic Preceptor*

Crown College

Crown College faculty and students represent a wide variety of academic disciplines. The majority of the faculty are in the physical, biological and social sciences. Although Crown has more science and engineering students than any of the other colleges, the majority of Crown's students major in the social sciences, humanities, and arts. This diversity of interests and thinking enriches our intellectual environment.

An important goal of the college is to foster an appreciation for the contributions of diverse cultural groups and to provide an atmosphere in which issues of both diversity and common social purpose are integrated into a wide range of programs and discussions.

Crown is located on a hilltop surrounded by a redwood forest. The core buildings consist of an administration office, dining commons, lounge spaces, recreation facilities, study spaces, faculty offices, and classrooms built around a large patio and central fountain. The award-winning architecture with its white walls and high-pitched tiled roofs suggests a hillside Mediterranean village. The college's residential facilities are made up of eight traditional residence hall buildings and eight apartment buildings housing approximately 700 students. The facilities at Crown College were built through a partnership of public funds and a gift from the Crown Zellerbach Foundation.

Academic Emphases

From the time of its founding in 1967, issues pertaining to the role of science and technology in society have been a focus of special interest at Crown College. We approach these issues from an interdisciplinary perspective that recognizes the influence of social and cultural factors on the scientific enterprise, as well as the ways in which science and technology influence our society.

The Crown College core course, Crown 80, *Ethical Issues in Emerging Technologies: Participatory Evolution from Human to Posthuman*, is an interdisciplinary seminar concerning the effects of these world-changing technologies and encourages students to develop decision-making strategies to steer these technologies. The course examines the impacts of these technologies on society using a variety of disciplinary approaches that engage the perspectives of both humanists and scientists. The fall-quarter core course is required of all non-transfer students during their first quarter at UCSC. As with the core courses from our sister

colleges, the development of critical reading and writing skills is a major thrust of Crown 80. (See page 172 for the course description.)

The Crown-Merrill Science and Technology Learning Community is an innovative program to support first-year students who are interested in pursuing a major in the sciences. Students enrolled in this program live together, forming a supportive community that promotes collaborative learning and group problem solving. To facilitate this process, students are placed in a special section of Chemistry 1A or Math 3 and participate in a residentially based study group. The program is designed especially for students who have a strong interest in the sciences but feel slightly underprepared for university-level course work. It often acts as a bridge to the ACE Program in the physical and biological sciences and engineering (see page 38). Participation—limited to first-year students at Crown and Merrill Colleges—requires a commitment to succeed, a willingness to work hard, and a positive attitude.

The Crown *Undergraduate Seminar in Science, Technology, and Society* provides highly motivated students the opportunity to work closely with ladder-rank research faculty in a small seminar environment. Topics have included California Climate Change: Past, Present, and Future; Food Matters: Science, Technology, and Society; and an honors seminar on introductory computer architecture.

Juniors and seniors can participate in the college's new Undergraduate Research Fellowship Program, which awards \$800 fellowships to student-faculty teams and encourages their interaction through undergraduate research.

College Community and Facilities

Crown sponsors a wide variety of cocurricular events spanning cultural, educational, and social areas of interest. One popular series is the Science/Public Affairs Tables, informal dinners at the Provost's House that offer students an opportunity to socialize with a faculty member outside the classroom and hear about his or her research.

Students become involved in Crown life by both initiating and participating in a wide range of activities. Social activities vary each year according to the interests of students. At the monthly College Night in the dining commons, a special dinner is followed by entertainment, both often sharing a common cultural theme. Some major events have become traditional: for example, Karaoke College Night, the Crown Formal, and Regression Night. Crown activities and dances draw students from all over campus.

Outdoor activities organized by the student government, College Programs Office, or residential staff range from whale watching on the Monterey Bay to atomic bowling and from backpacking to stargazing.

The Crown Student Senate (CSS), the elected student government at Crown, holds open weekly meetings to recommend fund allocations for student activities and to discuss issues of concern to students and the college. CSS also sponsors events to enhance the college experience, including the very popular pelagic shark lecture and Casino Night.

Crown offers two types of residential facilities: residence halls and apartments. Eight traditional residence halls each house approximately 60 students in single, double, and triple rooms in a coed environment (single-gender bedrooms with unisex bathrooms) or on all-female floors. For students particularly interested in living with and learning about a special-interest environment, Crown provides transfer floors, Outdoor Pursuits and Academic Success Houses, and a Science and Technology Learning Community.

In addition, the college has apartments for approximately 230 students above the first-year level. Like the residence halls, the apartments are built on a small scale. Each three-story building has two or three apartments per floor that house four or five students in a combination of single, double, and triple rooms and include a kitchen, living room, dining room, bathroom, and outside deck.

Other facilities in the college include the Crown Library study space; a modern computer laboratory housing Sun workstations, which provides students with access to several kinds of systems and an array of applications and instructional software selected to support academic course work; the Fireside Lounge with widescreen television; the Music Practice Room; and the Crown-Merrill Community Room, which has a television, pool table, foosball, and ping-pong table, and provides an informal place to study, hold meetings, or just visit with friends. Dining facilities boast continuous dining, late-night dining, and Banana Joe's convenience store.

For general information, call the college assistant at (831) 459-2665 or visit the web site: www2.ucsc.edu/crown/. For residential or college programs information, call the Student Life Office manager at (831) 459-4656.

Crown Faculty and Staff

Provost

F. JOEL FERGUSON, *Computer Engineering*

Fellows

SCOTT BRANDT, *Computer Science*
 KENNETH W. BRULAND, *Ocean Sciences, Emeritus*
 JOSEPH F. BUNNETT, *Chemistry and Biochemistry, Emeritus*
 MAUREEN CALLANAN, *Psychology*
 KENNETH L. CAMERON, *Earth and Planetary Sciences, Emeritus*
 MANEL CAMPS, *Microbiology and Environmental Toxicology*
 SUE A. CARTER, *Physics*
 PAK CHAN, *Computer Engineering*
 NANCY N. CHEN, *Anthropology*
 YIN-WONG CHEUNG, *Economics*
 MARGARET L. DELANEY, *Ocean Sciences*
 NATHANIEL DOMINY, *Anthropology*
 CHONGYING DONG, *Mathematics*
 MICHAEL P. DOOLEY, *Economics*
 ÓLÓF EINARSDÓTTIR, *Chemistry and Biochemistry*
 GABRIEL ELKAIM, *Computer Engineering*
 SANDRA M. FABER, *Astronomy and Astrophysics*
 JOHN FAULKNER, *Astronomy and Astrophysics, Emeritus*
 TIMOTHY FITZMAURICE, *Writing*
 A. RUSSELL FLEGAL, *Environmental Toxicology*
 LAUREL R. FOX, *Ecology and Evolutionary Biology*
 MARIA CECILIA FREEMAN, *Writing*
 DANIEL FRIEDMAN, *Economics*
 KWOK-CHIU FUNG, *Economics*
 ALISON GALLOWAY, *Anthropology*
 J. J. GARCÍA-LUNA-ACEVES, *Computer Engineering*
 LYNDA GOFF, *Ecology and Evolutionary Biology*
 MATTHEW GUTHAUS, *Computer Engineering*
 JUDITH A. HABICHT-MAUCHE, *Anthropology*
 DAVID HAUSSLER, *Computer Science*
 RALPH T. HINEGARDNER, *Ecology and Evolutionary Biology, Emeritus*
 RICHARD P. HUGHEY, *Computer Engineering*
 GARTH D. ILLINGWORTH, *Astronomy and Astrophysics*
 DAVID E. KAUN, *Economics*
 ALAN H. KAWAMOTO, *Psychology*
 PAUL L. KOCH, *Earth and Planetary Sciences*
 JONATHAN M. KRUPP, *Biology; Coordinator, Microscopy and Imaging Laboratory*
 NANCY KRUSOE, *Writing Program*
 DEBRA LEWIS, *Mathematics*
 DOUGLAS N. C. LIN, *Astronomy and Astrophysics*
 DARRELL D. E. LONG, *Information Systems Management*
 ROBERT A. LUDWIG, *Molecular, Cell, and Developmental Biology*
 BRUCE MARGON, *Astronomy and Astrophysics*
 PHILLIP MCCALMAN, *Economics*
 ETHAN MILLER, *Computer Science*
 JOSEPH S. MILLER, *Astronomy and Astrophysics*
 RICHARD MONTGOMERY, *Mathematics*
 JUDIT N. MOSCHKOVICH, *Education*
 HARRY F. NOLLER, *Molecular, Cell, and Developmental Biology*
 LOISA NYGAARD, *German Literature*
 KAREN OTTEMANN, *Environmental Toxicology*
 TRILOKI N. PANDEY, *Anthropology*

GRANT H. POGSON, *Ecology and Evolutionary Biology*
 DONALD C. POTTS, *Ecology and Evolutionary Biology*
 JOEL R. PRIMACK, *Physics*
 JIE QING, *Mathematics*
 HARTMUT F.-W. SADROZINSKI, *Physics*
 THOMAS W. SCHLEICH, *Chemistry and Biochemistry*
 MARIA SCHONBEK, *Mathematics*
 JUDITH A. SCOTT, *Education*
 ABRAHAM SEIDEN, *Physics*
 ELI A. SILVER, *Earth and Planetary Sciences*
 NIRVIKAR SINGH, *Economics*
 LISA C. SLOAN, *Earth and Planetary Sciences*
 DONALD R. SMITH, *Environmental Toxicology*
 WILLIAM T. SULLIVAN, *Molecular, Cell, and Developmental Biology*
 EUGENE SWITKES, *Chemistry and Biochemistry*
 KIP TÉLLEZ, *Education*
 ROLAND G. THARP, *Education and Psychology, Emeritus*
 STEPHEN E. THORSETT, *Astronomy and Astrophysics*
 JOHN F. VESECKY, *Electrical Engineering*
 STEVEN S. VOGT, *Astronomy and Astrophysics*
 CARL E. WALSH, *Economics*
 MANFRED K. WARMUTH, *Computer Science*
 MARGARET L. WILSON, *Psychology*
 W. TODD WIPKE, *Chemistry and Biochemistry*
 STANFORD E. WOOSLEY, *Astronomy and Astrophysics*
 FITNAT YILDIZ, *Environmental Toxicology*
 A. PETER YOUNG, *Physics*
 JAMES ZACHOS, *Earth and Planetary Sciences*
 JIN Z. ZHANG, *Chemistry and Biochemistry*

College Administrative Officer

ALEX BELISARIO

Staff

MARIA ACOSTA-SMITH, *Senior Academic Preceptor*
 CINDY BLAKE, *Groundskeeper*
 ALLEN BUSHNELL, *Special Projects Coordinator*
 JEFF CAMERON, *Community Safety Officer Supervisor*
 SERENA DIONYSUS, *College Programs Coordinator*
 KEN EREZ, *Student Life Office Manager/Assistant*
 SAMARA FOSTER, *Coordinator for Residential Education*
 SALLY GAYNOR, *Academic Programs and Development Coordinator*
 JEANNE JOHNSON, *Academic Adviser*
 JERRY LEE, *Counseling Psychologist*
 DARLENE MIYAKAWA, *Housing Coordinator*
 ANDREW PARK, *College Assistant*
 NICOLE POTESTIVO, *Coordinator for Residential Education*
 IMANI RUPERT, *Coordinator for Residential Education*
 CHUCK SCHMIDT, *Senior Building Maintenance Worker*
 JILL SCHONTAG, *Academic Adviser*
 CURTIS SWAIN, *Community Safety Officer Supervisor*
 JOANIE WEBBER, *Assistant Budget Analyst*

SARAH WOODSIDE, *Associate College Administrative Officer for Student Life*

Merrill College

Merrill College seeks to expand its students' awareness of their own heritage and of the diversity of cultures around the world, past and present. Drawn largely from history as well as the social sciences, literature, and foreign languages, many Merrill faculty specialize in social theory, international affairs, and social change. The college makes a special effort to be a home for students from different cultural backgrounds and for international students; it presents unusual opportunities to those who value multicultural perspectives. Merrill is a center for Spanish language and Latin American and Latino studies and has been active in sponsoring American Indian cultural and academic activities.

Academic Emphases

Identities and Global Consciousness is the theme of Merrill College and in the homonymous Core Course, students read four books: Daoud Hari's *The Translator*; Le Ly Hayslip's *When Heaven and Earth Changed Places*; Fatima Mernissi's *Dreams of Trespass*; and Luis Rodriguez's *Always Running*. Additionally, students are introduced to a selection of secondary sources that supplement and enrich the aforementioned readings. All the Core Course readings are first-person narratives—memoirs or autobiographical works of fiction. They bear witness not only to conflict and crisis but also to individual strength and hope. They constitute material examples of how individuals and communities have dealt with various forms of crisis and conflict, and how people often turn to social activism as a form of healing the wounds left to communities and to individuals as a result of violence.

Through these astonishing personal narratives, the great movements of nationalism, imperialism, and globalization, and their attendant cultural clashes, religious conflicts, and social and gender inequalities are explored. Students are introduced to a myriad of opinions that will heighten their awareness of how differences and diversity relate to contemporary issues of global import. In addition, these secondary readings explore theories that seek to explain the persistent underdevelopment of many countries in the world, and the increasing poverty in the U.S.

Those admitted as transfer students are exempt from the Core Course requirement but may take it at their discretion.

Two thousand eight marks the 12th year of the Merrill Frosh Scholars Program. Roughly 22 students are selected by Merrill College to participate; it combines a more rigorous approach to academics as well as service learning, for a more comprehensive first-year experience. Participants take two 5-credit seminar courses—one in the fall (a designated section of the Core Course) and one in the spring quarter (a frosh seminar), do service work in a nearby elementary school throughout the academic year, and take part in extracurricular activities organized by the college provost during the winter quarter. Interested high school seniors apply by writing directly to the Merrill provost, after admission.

Two thousand eight also marks the fourth year of the Merrill College Distinguished Visiting Scholars Program, which hosts public and class presentations by national and international academics, artists, writers, and activists, representing a wide variety of perspectives.

Merrill also sponsors a variety of 2- and 5-credit courses on topics that change from year to year, recently ranging from the benefits of reevaluation counseling, to personal empowerment, to Caribbean migrations. Enrollment in these courses is kept to a size that facilitates discussion. In addition, students can participate in *Classroom Connection*, a service-learning course that provides students with the opportunity to volunteer in local elementary school classrooms.

Recognizing the increasingly rigorous requirements for science majors, Merrill—in collaboration with the Academic Excellence Program—coordinates the Science Learning Community to support students majoring in the sciences. Students participating in the program enroll in small discussion sections that encourage a collaborative learning approach.

In 2007–08, Merrill College began an Undergraduate Mentorship Program. The Merrill Mentorship Program aims to inspire and prepare undergraduate students to pursue graduate studies. It is designed to provide research experience and personal and professional development for Merrill students. Merrill faculty participants nominate a student whose work they are familiar with and whose interests are similar to their own area of research and expertise. Students who participate in the program (juniors and seniors) will be employed as research assistants by their faculty mentors, and receive up to \$1,000 for the school year.

Merrill serves as the administrative home for the Departments of Politics and Legal Studies, and Latin American and Latino Studies. Merrill is also the home of a Peace Corps satellite office,

which helps UCSC students who are interested in working overseas apply to the Peace Corps after graduation. It also houses the Chicano/Latino Research Center; the CineMedia Project; UCSC's Gay, Lesbian, Bi, Trans, Intersex Resource Center (a.k.a. the Lionel Cantú Center); the student-run Pottery Co-op, the only one of its kind at UCSC; and the Ming Ong Computer Center, a modern computer facility with more than 40 state-of-the-art personal computers.

College Community and Facilities

Located on a hilltop, Merrill's award-winning buildings thread upward through the edge of a redwood forest. The brick patios, gardens, outdoor café, and mission bell tower suggest California's Latino heritage, while the striking architecture of the residence halls is modern.

Merrill has four residence halls offering students both coed and single-gender floors. Two high-rise structures house 400 students, and two smaller buildings provide housing for about 100 students. In the residence halls, groups of about 14 students share common bathroom and lounge facilities. Residents eat their meals in the Crown–Merrill Dining Hall.

Apartments, which are located a short distance from the central part of the college, house 180 continuing Merrill students. Grouped amid winding pathways and redwood trees, these three-story buildings have three apartments per floor. Each apartment houses four to six students and comes fully equipped with kitchen and bath, large living area, and outside deck. Facilities at the apartment complex include common lounges, a large community room, and a laundry room.

With the help of the Merrill Coordinators for Residential Education, an enthusiastic residential staff plans recreational activities that include potluck dinners, intramural sports competitions, dances, musical events, film series, and a yearly outdoor mural-painting party. Many of these social and educational activities focus on building a multicultural community. Informal discussions, to which faculty are invited, take place throughout the year. In addition to the dining hall, the college has an attractive outdoor/indoor taqueria. A variety of college and campuswide events take place at the Merrill Cultural Center. Merrill is the only college that has a student-run pottery co-op. Students can throw, fire, and glaze their works in the workshop space, which is open to Merrill students on a first-come first-served basis.

The physical facilities of Merrill College were provided through a partnership of public funds and gifts from the Charles E. Merrill Trust and the family of Ming Ong. The Joel Frankel Fund,

a Merrill scholarship, supports students pursuing fieldwork in Latin America.

For more information, call (831)459-2144 or visit the web site: www2.ucsc.edu/merrill/.

Merrill Faculty and Staff

Provost

LOURDES MARTÍNEZ-ECHAZÁBAL, *Latin American Literature*

Fellows

JORGE ALADRO FONT, *Spanish Literature*
 MARK D. ANDERSON, *Anthropology*
 FRANK C. ANDREWS, *Chemistry and Biochemistry, Emeritus*
 GABRIELA ARREDONDO, *Latin American and Latino Studies*
 NORIKO ASO, *History*
 BRENDA BARCELÓ, *Spanish Language*
 DILIP K. BASU, *History*
 ROBERT F. BERKHOFER JR., *History, Emeritus*
 CLAUDE F. BERNASCONI, *Chemistry and Biochemistry*
 EVA BERTRAM, *Politics*
 JOHN G. BORREGO, *Latin American and Latino Studies*
 MICHAEL K. BROWN, *Politics*
 WAYNE B. BRUMBACH, *Physical Education, Emeritus*
 EDMUND BURKE III, *History*
 JULIANNE BURTON-CARVAJAL, *Literature*
 CARLOS CALIERNO, *Spanish Language*
 MAX CAMARILLO, *Counseling and Psychological Services*
 BENJAMIN CARSON, *Music*
 PEDRO G. CASTILLO, *History*
 ALAN S. CHRISTY, *History*
 ANNETTE CLEAR, *Politics*
 RENA V. COCHLIN, *Physical Education*
 GUILLERMO DELGADO-P., *Latin American and Latino Studies*
 JOSHUA M. DEUTSCH, *Physics*
 MARÍA ELENA DIAZ, *History*
 MAY N. DIAZ, *Anthropology, Emerita*
 JOEL DOMHOFF, *Core Course*
 KENT EATON, *Politics*
 BERNARD L. ELBAUM, *Economics*
 VERONICA FÉLIU, *Spanish*
 JONATHAN FOX, *Latin American and Latino Studies*
 DANA FRANK, *History*
 ROSA LINDA FREGOSO, *Latin American and Latino Studies*
 WILLIAM H. FRIEDLAND, *Community Studies and Sociology, Emeritus*
 HARDY T. FRYE, *Sociology, Emeritus*
 CAROLE GERSTER, *Core Course; Film and Digital Media*
 MARGARET (GRETA) A. GIBSON, *Education*
 DIANE P. GIFFORD-GONZÁLEZ, *Anthropology*
 SHANNON GLEESON, *Latin American and Latino Studies*
 WALTER L. GOLDFRANK, *Sociology*

MARÍA VICTORIA GONZÁLEZ-PAGANI, *Spanish Language*
 M. LISBETH HAAS, *History*
 JUDITH HARRIS-FRISK, *German Language and Core Course*
 GAIL B. HERSHATTER, *History*
 KARLTON E. HESTER, *Music*
 MINGHUI HU, *History*
 JOHN W. ISBISTER, *Economics, Emeritus*
 ROBERT P. JOHNSON, *Physics*
 SUSANNE JONAS, *Latin American and Latino Studies*
 NOEL Q. KING, *History and Comparative Religion, Emeritus*
 NORMA KLAHN, *Latin American Literature*
 LORI G. KLETZER, *Economics*
 FLORA LU, *Latin American and Latino Studies*
 PAUL M. LUBECK, *Sociology*
 PATRICK E. MANTEY, *Computer Engineering*
 JOHN MARCUM, *Politics, Emeritus*
 DEAN MATHIOWETZ, *Politics*
 MARIA EUGENIA MATUTE-BIANCHI, *Education, Emerita*
 BARRY McLAUGHLIN, *Psychology, Emeritus*
 MARTA MORELLO-FROSCH, *Literature, Emerita*
 MARIA MORRIS, *Spanish Language*
 OLGA NÁJERA-RAMÍREZ, *Anthropology*
 ELLEN NEWBERRY, *Writing*
 MATTHEW O'HARA, *History*
 ALEX T. PANG, *Computer Science*
 SARAH-HOPE PARMETER, *Writing*
 ELEONORA PASOTTI, *Politics*
 HECTOR PERLA, *Latin American and Latino Studies*
 JUAN POBLETE, *Literature*
 CLIFTON A. POODRY, *Molecular, Cell, and Developmental Biology, Emeritus*
 ALAN R. RICHARDS, *Environmental Studies*
 CELIA RIVAS, *Latin American and Latino Studies*
 PAMELA A. ROBY, *Sociology, Emerita*
 BARBARA ROGOFF, *Psychology*
 JOHN M. SCHECHTER, *Music*
 STUART A. SCHLEGEL, *Anthropology, Emeritus*
 ROGER SCHOENMAN, *Politics*
 ANA MARIA SEARA, *Portuguese Language*
 VANITA SETH, *Politics*
 BAKTHAN SINGARAM, *Chemistry and Biochemistry*
 GRAEME H. SMITH, *Astronomy and Astrophysics*
 DAVID G. SWEET, *History, Emeritus*
 MEGAN THOMAS, *Politics*
 LARRY TRUJILLO, *Community Studies*
 GEORGE E. VON DER MUHLL, *Politics, Emeritus*
 MARILYN J. WESTERKAMP, *History*
 DANIEL J. WIRLS, *Politics*
 DONALD A. WITTMAN, *Economics*
 ALICE YANG MURRAY, *History*
 PATRICIA ZAVELLA, *Latin American and Latino Studies*
 MARTHA C. ZÚÑIGA, *Molecular, Cell, and Developmental Biology*

Honorary Fellows

ZINA JACQUE
 CLARK KERR (deceased)
 JOHN LAIRD

ALICE LYTLE
 CHARLES E. MERRILL JR.
 JOHN VASCONCELLOS
 YORI WADA
 REV. CECIL WILLIAMS
 MARDI WORMHOUDT

Class Honorary Fellows

ROBERT TAYLOR, 1991, 1992, 1993
 LEILANI FARM, 1994
 MICHAEL PAUL WONG, 1995
 DAVID SILVERA, 1996
 ZIESEL SAUNDERS, 1997
 VICTOR HERNANDEZ, 1998
 MARÍA MATA, 1999
 WENDY BAXTER, 2000
 LARRY TRUJILLO, 2001
 GINA DIAZ, 2002
 MARÍA MATA, 2003, 2004

College Administrative Officer

ALEX BELISARIO

Staff

REBECCA AGUIRRE-GARCIA, *Coordinator for Residential Education*
 GABRIELA ALANIZ, *Coordinator for Residential Education*
 TIM BARBOUR, *Assistant College Programs Coordinator*
 ALLEN BUSHNELL, *Special Projects Coordinator*
 JEFF CAMERON, *Community Safety Officer Supervisor*
 VALERIE CHASE, *Associate College Administrative Officer*
 CONNIE CREEL, *Provost's Assistant/Academic Adviser*
 SETH HODGE, *College Programs Coordinator*
 MALIA LAWRENCE, *College Assistant*
 EDDIE LOMBOY, *Coordinator for Residential Education*
 MARÍA MATA, *Senior Academic Preceptor*
 MARILYN McGRATH, *Groundskeeper*
 WILLIAM MILLER, *Senior Building Maintenance Worker*
 BILL POOL, *Senior Building Maintenance Worker*
 MARIANNA SANTANA, *Faculty Services*
 KRISTEN WEAVER, *Housing Coordinator*
 JOANIE WEBBER, *Financial Analyst*
 ELIZABETH WELLIK, *Academic Adviser*

Porter College

The Porter College theme, Arts in a Multicultural Society, reflects the consensus among Porter College fellows that the creative process is an inseparable aspect of a broad-minded and rigorous education. The seminars, cocurricular activities, and cultural environment at Porter encourage creativity in all fields—from composition to community studies to computer programming.

Academic Emphases

Porter's faculty includes most of the campus's practicing artists and art scholars, though some of the college's faculty (and half of its students) specialize in the humanities or in the physical and biological or social sciences. The college is the administrative home of the Division of the Arts and the History of Art and Visual Culture Department. The Digital Arts and New Media Program also has offices here.

Porter 80, the core course (see page 402) focuses on writing across the arts, with concentration on literature and arts of California and the Pacific Rim. Those who are admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college English composition course with a minimum grade of C (2.0) or better are permitted to take the core course to satisfy the C1 requirement. Students meet with their faculty member in a seminar, attend regular lecture/performances, and participate in writing groups, advising, and other sessions that introduce some of the academic issues they will confront at the university. The course emphasizes critical reading, writing, and close intellectual contact with faculty and other students.

The college also offers 2-credit courses in a variety of areas connected to the arts. These are small classes in the practice or theory of the arts; they may include investigation of a particular style of music or dance, visits to Bay Area theaters and museums, working in the arts, or creation of a show in one of the college galleries. These diverse offerings allow Porter students to understand the significance of creativity in a university education.

The college provides fellowship funds each year to talented students pursuing original research and creative projects.

College Community and Facilities

The traditional residence halls and apartments play an important role in bringing the college community together. Students are encouraged to spend their beginning years in residence in the college, where housing is available for 845 students. The residence halls are divided into smaller units, with from 20 to 35 students sharing common lounges and other facilities. Theme halls include Performing Arts, Film and Digital Media, Gender Studies, Visual Arts, and Outdoors Experiences. Students also have a choice of quiet/intensive study, same gender, or

substance-free halls. The six-person apartments are reserved for upper-division students.

In addition to traditional classrooms, Porter has many specialized facilities such as a fireside lounge, galleries, a study center, and a dining hall that converts to a theater space. The Arts Instructional Computing Laboratories, located at Porter College, consist of two high-end labs oriented toward the arts.

Adjacent to the college are the campus's Theater Arts Center (see page 433), the Elena Baskin Visual Arts Center (see page 124), and the Music Center (see page 362).

Porter provides constructive opportunities for relaxation and recreation to balance the intellectual demands of a university education. The Porter Activities Office, in conjunction with the Porter Student Senate, organizes formal and informal events, including dances and recreational activities, which augment campuswide activities in these areas. For relaxation, Porter students and faculty gather at the college's coffeehouse—the Hungry Slug.

Many students and faculty perform or exhibit their work at Porter, and cultural events are a constant feature of life at the college. The dining commons has been the site of performances by artists such as El Teatro Campesino, lectures and readings by contemporary authors such as Amiri Baraka, and performances by artists such as Komar & Melamid and Nina Wise.

Porter College facilities were constructed through a partnership of public funds and a gift from the Porter-Sesson family of Santa Cruz. Part of the gift was used to establish an endowment for the college.

For more information, call (831) 459-2273 or visit the web site: www2.ucsc.edu/porter.

Porter Faculty and Staff

Provost

DAVID EVAN JONES, *Music*

Fellows

ELIZABETH S. ABRAMS, *Writing*

JUDITH AISSIN, *Linguistics*

KEN ALLEY, *Art*

ELLIOT W. ANDERSON, *Art*

ROGER W. ANDERSON, *Chemistry and Biochemistry*

LAWRENCE ANDREWS, *Film and Digital Media*

MANUEL ARES JR., *Molecular, Cell, and Developmental Biology*

DORIS B. ASH, *Education*

CHARLES ATKINSON, *Writing*

BRANDIN S. BARON, *Theater Arts*

AMY C. BEAL, *Music*

TANDY BEAL, *Theater Arts*

JONATHAN BEECHER, *History*

MARTIN BERGER, *History of Art and Visual Culture*

JAMES H. BIERMAN, *Theater Arts*

ROBERTO A. BOGOMOLNI, *Chemistry and Biochemistry*

BARRY BOWMAN, *Molecular, Cell, and Developmental Biology*

JOYCE BRODSKY, *Art, Emerita*

GEORGE S. BROWN, *Physics*

LINDA C. BURMAN-HALL, *Music*

ELISABETH CAMERON, *History of Art and Visual Culture*

BENJAMIN L. CARSON, *Music*

MARTIN M. CHEMERS, *Psychology*

ROBERT S. COE, *Earth and Planetary Sciences*

RAY T. COLLETT, *UCSC Arboretum, Emeritus*

DAVID H. COPE, *Music*

WILLIAM D. COULTER, *Music*

DONALD COYNE, *Physics*

DAVID CRANE, *Film and Digital Media*

E. G. CRICHTON, *Art*

DAVID CUTHBERT, *Theater Arts*

SHARON DANIEL, *Film and Digital Media*

CAROLYN S. DEAN, *History of Art and Visual Culture*

SHERWOOD DUDLEY, *Music, Emeritus*

KATE EDMUNDS, *Theater Arts*

PETER Q. ELSEA, *Music*

HARLAND W. EPPS, *Astronomy and Astrophysics*

SHELLY E. ERRINGTON, *Anthropology*

MARIA EVANGELATOU, *History of Art and Visual Culture*

MARIA V. EZEROVA, *Music*

M. KATHLEEN FOLEY, *Theater Arts*

DOYLE FOREMAN, *Art, Emeritus*

JEAN FOX TREE, *Psycholinguistics*

MARK FRANKO, *Theater Arts*

SUSAN FRIEDMAN, *Art*

GREGORY FRITSCH, *Theater Arts*

PATTY GALLAGHER, *Theater Arts*

FRANK GALUSZKA, *Art*

INGEBORG GERDES, *Art*

ROBERT GIGES, *Core Course*

JENNIFER A. GONZALEZ, *History of Art and Visual Culture*

IRENE GUSTAFSON, *Film and Digital Media*

MELISSA GWYN, *Art*

JAMES B. HALL, *Literature, Emeritus*

SUSAN HARDING, *Anthropology*

DAVID HARRINGTON, *Psychology*

AMELIE HASTIE, *Film and Digital Media*

JOHN HAY, *History of Art and Visual Culture*

IRENE HERRMANN, *Music*

KARLTON E. HESTER, *Music*

CLEMENS A. HEUSCH, *Physics, Emeritus*

DEE HIBBERT-JONES, *Arts*

ELI E. HOLLANDER, *Film and Digital Media*

EDWARD F. HOUGHTON, *Music*

DONNA HUNTER, *History of Art and Visual Culture*

KIMBERLY JANNARONE, *Theater Arts*

STACY KAMEHIRO, *History of Art and Visual Culture*

HI KYUNG KIM, *Music*

L. S. KIM, *Film and Digital Media*

THORNE LAY, *Earth and Planetary Sciences*

HERBERT LEE, *Applied Mathematics and Statistics*

JIMIN LEE, *Art*

ANATOLE LEIKIN, *Music*

FREDRIC LIEBERMAN, *Music*

PETER LIMBRICK, *Film and Digital Media*

NORMAN LOCKS, *Art*

CHARLES (CHIP) L. LORD, *Film and Digital Media*

PAVEL MACHOTKA, *Psychology, Emeritus*

ALMA R. MARTÍNEZ, *Theater Arts*

DOMINIC W. MASSARO, *Psychology*

WILLIAM G. MATHEWS, *Astronomy and Astrophysics*

JENNIE LIND MCDADE, *Art*

CHARLES E. MCDOWELL, *Computer Science*

TANYA MERCHANT, *Music*

LETA E. MILLER, *Music*

MARGARET MORSE, *Film and Digital Media*

PETER MOSTKOFF, *Theater Arts*

PAUL NAUERT, *Music*

DARD NEUMAN, *Music*

NICOLE A. PAIEMENT, *Music*

JENNIFER A. PARKER, *Art*

KENNETH PEDROTTI, *Electrical Engineering*

PAUL RANGELL, *Art*

ELAINE YOKOYAMA ROOS, *Theater Arts, Emerita*

NORVID J. ROOS, *Theater Arts, Emeritus*

BRUCE ROSENBLUM, *Physics, Emeritus*

WARREN SACK, *Film and Digital Media*

JOHN M. SCHECHTER, *Music*

DANNY SCHEIE, *Theater Arts*

CATHERINE M. SOUSSLOFF, *History of Art and Visual Culture*

SHELLEY STAMP, *Film and Digital Media*

AUDREY E. STANLEY, *Theater Arts, Emerita*

BRIAN J. STAUFENBIEL, *Music*

ELIZABETH STEPHENS, *Art*

UNDANG SUMARNA, *Music*

DAVID SWANGER, *Education and Creative Writing, Emeritus*

JOHN W. TAMKUN, *Molecular, Cell, and Developmental Biology*

OTHMAR T. TOBISCH, *Earth and Planetary Sciences, Emeritus*

JUDITH TODD, *Writing*

ANDREY TODOROV, *Mathematics*

NINA TREADWELL, *Music*

ALLEN VAN GELDER, *Computer Science*

GUSTAVO VAZQUEZ, *Film and Digital Media*

YIMAN WANG, *Film and Digital Media*

EDWARD WARBURTON, *Theater Arts*

LEWIS WATTS, *Art*

C. GORDON WELLS, *Education*

LINDA WERNER, *Computer Science*

JAMES WHITEHEAD, *Computer Science*

PAUL WHITWORTH, *Theater Arts*

QUENTIN C. WILLIAMS, *Earth and Planetary Sciences*

College Administrative Officer

MICHAEL YAMAUCHI-GLEASON

Staff

LUPE ALLEN, *Academic Preceptor*

JORGE ARROYO, *Coordinator for Residential Education*

SUSAN J. BEACH, *Assistant to the Provost*

JAMES BLAINE, *College Programs Coordinator*

JIMMIE BROWN, *Community Safety Officer Supervisor*

MARY CLARKE, *Counseling Psychologist*

KATHY COONEY, *Associate College Administrative Officer for Student Life*

JOE DEPAGE, *Housing Coordinator*

ROBERT GIGES, *Academic Preceptor*

MEGAN GNEKOW, *Coordinator for Residential Education*

EDDIE MACHADO, *Community Safety Officer*

SHERYL MCCARTNEY, *Senior Building Maintenance Worker*

KALIN MCGRAW, *Special Assistant to the CAO*

ERIC PETERSON, *Senior Building Maintenance Worker Supervisor*

SCOTT RANDLE, *Community Safety Officer*

SUE ROTH, *Assistant to the College Administrative Officer*

ANA SANCHEZ, *Assistant College Programs Coordinator*

MARY SIERRA, *Budget and Planning Specialist*

MARY SPAFFORD, *College Academic Adviser*

STEVE STRICKLEY, *Groundskeeper*

SARAH WIBE, *Coordinator for Residential Education*

Kresge College

Kresge is an experience that will allow you to learn a lot about yourself, be independent and learn to take responsibility for yourself.

—Yvette Keller, *Psychology and Modern Literature (double major)*

Academic Emphases

Kresge faculty are primarily from the humanities; they include anthropologists, artists, writers, dramatists, journalists, and political theorists. The college houses the Departments of Literature and Women's Studies, the Writing Program, the journalism minor, and the Dickens Project.

Kresge's core course 80, *Power and Representation* (see page 316), invites active participation in the creation of new social possibilities. The Kresge core course is an examination of key moments at the middle and end of the 20th century. The class focuses on Hiroshima and the dawn of the atomic age; and the social movements of the late 1950s, 1960s, and early 1970s, including civil rights, the Vietnam War, the women's movement, and the gay and lesbian movement. Each instructor has a special two-week period to examine topics the instructor is well versed in, and which reflect the overall focus of the core curriculum. The

last part of the course deals with the economic downturn of the 1990s. In addition to section meetings, on Tuesday nights all students come together to watch core-related films or performers or listen to lectures.

The core course seeks to open avenues to new ways of thinking and to various academic disciplines at the university, as it integrates the student's intellectual, social, and personal lives in a stimulating and supportive environment. The core course develops critical writing and thinking skills that prepare students for the rapidly changing multicultural world of the year 2006 and beyond. Special sections of the core course are designed specifically for transfer students, who can enroll in this course as an elective. These sections emphasize the same issues and skills development within a context that explores a transfer student's particular concerns on entering the university. Those who are admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college English composition course with a minimum grade of C (2.0) or better are permitted to take the core course to satisfy the C1 requirement.

In addition to the core course, Kresge offers a series of courses taught by faculty affiliated with the college. These courses give students a chance to study in small groups with faculty on topics close to faculty research interests and provide training in skills helpful to students as they begin their majors. A new array of classes is offered each year. Some of the courses in the past have been taught by senior faculty in mathematics, anthropology, history, literature, and journalism.

Residential Life

Kresge was the sixth college to be built on the UCSC campus. The college was founded on the principle of participatory democracy as a means of encouraging a strong sense of community. Architecturally renowned, Kresge has apartments rather than residence halls.

The Kresge apartments attract students with a strong sense of independence and community participation. Distinctively designed, the apartments are configured for five to eight people. Kitchen and living areas look out onto the street, with other rooms facing the surrounding redwood forest. At Kresge East, apartments are folded into the forest for greater quiet. These apartments with three single and four double bedrooms are typically reserved for continuing upper-division students. The Kresge three-to-four-person "in-fill" apartments are reserved for

continuing upper-division students. These two-bedroom apartments have an efficiency-style kitchen/living area.

The residential life staff at Kresge work to bring students of similar interests and diverse backgrounds together academically and socially by designing special programming based on student interest. The programs focus on celebrating the diversity of the residential community, on multicultural community-building, and on enhancing academic success, through film series, music events, career and graduate school advising, mural painting, food-centered events, field trips, and other creative programming ideas.

[Living at Kresge] takes a person who is confident with who they are . . . someone who is independent. You cook your own meals, live in a house environment with others who don't necessarily share the same view as you. It is a lot of work, but it has a big payoff. The people I lived with are still my best friends today.

—Samantha Vincent, *Psychology*

Community Life

There are a wide variety of events and activities at the college that shape community life: Lectures, workshops, trips, plays, dances, concerts, and films are a regular part of student life at the college. The nature and tenor of these events are a reflection of the interests and dedication of students and staff, who are committed to providing voice and opportunity for all community members.

Students actively shape the college community through participation in Kresge Parliament, an openly structured student organization responsible for voting the allocation of all college membership fees in support of activities and events. Parliament and Town Meetings also serve as a forum for the discussion of college and campus-wide issues with college staff and faculty.

Transfer Students

In recognition of the wealth of diversity that transfer students bring to the community—in terms of culture and experience—Kresge is the home of the Transfer Center for campuswide transfer students regardless of college affiliation. This is a staffed facility where students can gather to relax, socialize, hold meetings, and obtain campus information and resource support in a central location. The resource center offers workshops, social evenings, and special events that are tailored to meet the needs of transfer students.

Kresge has provided a place for me, as a transfer student, where my questions and concerns have been addressed. As a Peer Adviser, it has become my commitment to work with the Kresge community to provide students with an environment where they can experience the richness of university life.

—Julie Taylor, *Literature; Chancellor's Undergraduate Internship Program*

Kresge also offers special advising workshops and 2- and 3-credit courses designed to help transfers in the process of entering the university and moving forward in their careers from here.

Facilities

At the entrance to the college is the restful Piazzetta with its “un-fountain.” Spinning off from the Piazzetta are the Transfer Center, the Commuter Lounge, and a student lounge, equipped with television and VCR. In addition to the Transfer Center, as a unique facility on the campus, the Commuter Lounge is a place for off-campus students who want to use a kitchen, shower, or lockers while on campus. The Photo Lab Co-op is above the Piazzetta and offers 24-hour accessibility to darkroom equipment. Adjacent to the nearby meadow are a racquetball court and an outdoor basketball court. The college includes a study center with soaring ceilings and walls of glass overlooking the forest, a computer lab equipped with PCs for student use, and a student-run Food Co-op, where organic produce is sold and working memberships are available. At the top of the college are the Town Hall performance facility, the Music Co-op, and a restaurant.

If people are looking for an atmosphere that is accepting to different personalities and mind frames, and want the independence to work with other students, Kresge offers that. Kresge really strives to have a community of people, but leaves space to assert your independence.

—Diem Do, *Community Studies*

For more information, call (831) 459-2071 or visit the web site: www2.ucsc.edu/kresge.

Kresge Faculty and Staff

Provosts

MICAH PERKS, *Literature*

JUAN POBLETE, *Latin American Literature*

Members

RALPH H. ABRAHAM, *Mathematics, Emeritus*

ELIZABETH ABRAMS, *Writing*

BETTINA APTHEKER, *Feminist Studies and History*

ANJALI ARONDEKAR, *Feminist Studies*

KAREN BARAD, *Feminist Studies*

MURRAY BAUMGARTEN, *English and Comparative Literature*

RAOUL BIRNBAUM, *History of Art and Visual Culture*

GINA DENT, *Feminist Studies*

SHELLY E. ERRINGTON, *Anthropology*

J. PETER EUBEN, *Politics, Emeritus*

MARGE FRANTZ, *American Studies and Feminist Studies, Emerita*

CARLA FRECCERO, *Literature*

PASCAL GAITET, *French Literature and Language*

JODY GREENE, *English Literature*

CONN HALLINAN, *Journalism, Retired*

HENRY R. HILGARD, *Molecular, Cell, and Developmental Biology, Emeritus*

EMILY HONIG, *Feminist Studies and History*

AKASHA HULL, *Feminist Studies and Literature, Emerita*

EARL JACKSON JR., *Japanese Literature*

JOHN O. JORDAN, *English Literature*

ELISE KNITTLE, *Earth and Planetary Sciences*

DIANE K. LEWIS, *Anthropology, Emerita*

NATHANIEL E. MACKAY, *20th-Century Literature, Afro-American Literature, Creative Writing*

MARY KAY MARTIN, *Writing, Emerita*

ALMA R. MARTÍNEZ, *Theater Arts*

CAROLYN MARTIN SHAW, *Anthropology*

GEOFFREY MASON, *Mathematics*

KAREN C. McNALLY, *Earth and Planetary Sciences, Emerita*

ROBERT L. MEISTER, *Politics*

HELENE MOGLEN, *Literature and Feminist Studies, Emerita*

MADELINE MOORE, *English Literature, Emerita*

MARCIA OCHOA, *Community Studies*

LISA ROFEL, *Anthropology*

MATTHEW SANDS, *Physics, Emeritus*

JOHN H. SCHAAR, *Politics, Emeritus*

DANNY SCHEIE, *Theater Arts*

PAUL N. SKENAZY, *American Literature, Emeritus*

ROSWELL (ROZ) SPAFFORD, *Writing, Emerita*

RICHARD TERDIMAN, *Literature*

ANNA TSING, *Anthropology*

KAREN TEI YAMASHITA, *Literature*

College Administrative Officer

MICHAEL YAMAUCHI-GLEASON

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PAM ACKERMAN, *Maintenance Supervisor*

ELIZABETH ALSBERG, *Frontline Adviser/Advising Services Coordinator*

COLE COTTIN, *College Assistant*

KAWAMI CRAIG EVANS, *Coordinator for Residential Education*

HELEN MAYER, *Academic Preceptor*

KALIN MCGRAW, *Special Assistant to the College Administrative Officer*

URSULA OBERG, *Academic Preceptor*

MOLLY O'BRIEN, *College Programs Coordinator*

CLAUDIA PARRISH, *Transfer Center Coordinator*

CHARLES PERRY, *Coordinator for Residential Education*

DARIEN RICE, *Groundskeeper*

KAREN ROSEWOOD, *Associate College Administrative Officer*

PEG SHEMARIA, *Counseling Psychologist*

MARY SIERRA, *Financial Coordinator*

JOAO SIMAS, *Housing Coordinator*

DAVE SULSER, *Maintenance Assistant*

MINDY YANINEK, *Assistant to the Provost*

NICK YUKICH, *Community Safety Officer Supervisor*

Oakes College

Oakes was founded in 1972 to provide high-quality education to students from diverse cultural and social backgrounds. Students, staff, and faculty associated with the college believe that learning takes place not only in the classroom but also in residential settings. For that reason, they work hard to create a multicultural community whose members strive together toward certain universal goals—including equal access to educational opportunity and freedom from oppression—while simultaneously affirming and celebrating some of the distinctive aspects of the different backgrounds from which they come.

Academic Emphases

Oakes faculty members represent a variety of disciplines in the humanities, social sciences, and physical and biological sciences. Since its founding, Oakes has made a special effort to provide academic programs and experiences for underrepresented groups, including women. These programs and experiences are enriched by the presence of core faculty from disciplines housed in the college: American studies, American literature, writing, world literature, and history of consciousness. Oakes graduates have gone on to successful careers in fields such as medicine, law, education, medical research, and community service.

The Oakes core course 80, Values and Change in a Diverse Society, is required of all first-year students. The course is writing intensive and examines individual and collective responses to issues of culture, gender, sexuality, race, and class. (See page 372 for a description of the course.) Those who are admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college English composition course with a minimum grade of C (2.0) or

better are permitted to take the core course to satisfy the C1 requirement.

Students at Oakes are challenged in many ways. Not only do they have the opportunity to live and work with people from different backgrounds, but they are also expected to demonstrate academic excellence in their chosen fields of study. To enable all students to succeed academically a variety of services are available:

- The Learning Center at Oakes College serves as a location for study groups as well as tutoring and advising programs. Special assistance in writing and tutoring in a variety of subjects is offered to Oakes students and EOP students.
- The Oakes Computer Lab provides access to 20 PC computers for Oakes students.
- *Oakes 77: Exploring Opportunities for Social Justice Field Work* provides students with the opportunity to work with a variety of community service organizations. All Oakes students are encouraged to contribute service to public agencies, schools, and community organizations in the city of Santa Cruz and in economically deprived areas of Santa Cruz and Monterey Counties. Oakes students serve as tutors, teachers, mentors, and community builders. Academic credit is available through the Oakes 77 course.
- Student services at Oakes include academic advising and psychological counseling.

College Community and Facilities

Oakes College, located on the west side of the UCSC campus, commands a sweeping view of Monterey Bay. Students may choose between apartment and residence hall living. The residence halls have lounges on each floor, attractive courtyards, and views of the ocean and the city of Santa Cruz. Students can also share an apartment-style living space, which includes a common living area and small kitchen. All students participate in a University Meal Plan. Residence halls are coed and provide space for students in double and single rooms. Restroom facilities for each gender are located on each floor.

Full-time coordinators for residential education and neighborhood assistants help residents develop cooperative ways of living together. As one student put it, "Oakes is a community where people of many different colors, backgrounds, interests, and goals form a friendly neighborhood. We share our cultures and adapt to the different lifestyles of our neighbors." The residential program is designed to assist all students in integrating their academic and social

needs. The residential staff hosts activities such as brunches, study breaks, and block dinners, each with a different theme and often reflecting the various cultures represented by Oakes students. Other events include College Night programs in the dining hall, celebrations of cultural traditions such as Kwanzaa and Dia de los Muertos, an annual Harvest Dinner for the Oakes community, a Valentine's Day party, and a spring block party.

The college staff seeks to nurture and sustain a community in which mutual respect, understanding, and concern for others are the norm. Within that atmosphere of community expectations, students are also supported and encouraged to find room for their own creative personal expression.

The other physical facilities at Oakes further support the special programs of the college and provide recreational opportunities for the students. College facilities include the Learning Center; a multipurpose room for lectures, movies, and small theater productions; a college library; a dining facility shared with College Eight; TV lounges in the residences and adjacent to the Oaks Café; and a small basketball court, the "Underdome." Additional recreational facilities located close to the college include tennis courts, a large soccer field, and an indoor basketball court.

A grant from the San Francisco Foundation—from Roscoe and Margaret Oakes Foundation funds—was used in partnership with public funds for the construction of Oakes. Part of the grant was used to establish an endowed fund for the college.

For further information, call (831) 459-2558 or visit the web site: oakes.ucsc.edu.

Oakes Faculty and Staff

Provost

KIMBERLY J. LAU, *American Studies*

Fellows

ROGER W. ANDERSON, *Chemistry and Biochemistry*

LAWRENCE ANDREWS, *Film and Digital Media*

DAVID H. ANTHONY III, *History*

GOPAL BALAKRISHNAN, *History of Consciousness*

GEORGE R. BLUMENTHAL, *Astronomy and Astrophysics*

BARRY BOWMAN, *Molecular, Cell, and Developmental Biology*

VICTOR BURGIN, *History of Consciousness, Emeritus*

MAX CAMARILLO, *Counseling and Psychological Services*

LOUIS CHUDE-SOKEI, *Literature*

JAMES T. CLIFFORD, *History of Consciousness*

CHRISTOPHER CONNERY, *Chinese Literature*

VILASHINI COOPAN, *Literature*

MICHAEL H. COWAN, *Literature and American Studies*

ANGELA Y. DAVIS, *History of Consciousness, Emerita*

TERESA DE LAURETIS, *History of Consciousness, Emerita*

DAVID E. DORFAN, *Physics, Emeritus*

BARBARA L. EPSTEIN, *History of Consciousness*

JAMES B. GILL, *Earth and Planetary Sciences*

SUSAN GILLMAN, *American Literature*

KIRSTEN GRUESZ, *Literature*

DONNA J. HARAWAY, *History of Consciousness*

SHARON KINOSHITA, *Literature and Language Studies*

DAVID S. KLIGER, *Chemistry and Biochemistry*

ANN M. LANE, *American Studies, Emerita*

DIANE K. LEWIS, *Anthropology, Emerita*

AMY J. LONETREE, *American Studies*

DAVID S. MARRIOTT, *History of Consciousness*

PRADIP K. MASCHARAK, *Chemistry and Biochemistry*

ERIC PORTER, *American Studies*

CATHERINE RAMIREZ, *American Studies*

RENYA RAMIREZ, *American Studies*

A. CHRISTINA RAVELO, *Ocean Sciences*

DONALD L. ROTHMAN, *Writing, Emeritus*

DANIEL SELDEN, *Literature*

MARY W. SILVER, *Ocean Sciences*

FRANK J. TALAMANTES, *Molecular, Cell, and*

Developmental Biology, Emeritus

HAYDEN WHITE, *History of Consciousness, Emeritus*

ROB WILSON, *Literature*

JUDY YUNG, *American Studies, Emerita*

ADRIENNE L. ZIHLMAN, *Anthropology*

Honorary Associates

J. HERMAN BLAKE

BRUCE N. COOPERSTEIN

DAVID DODSON

ALLEN B. FIELDS

DOLORES HUERTA

ELBA R. SÁNCHEZ

College Administrative Officer

SUSAN WELTE

Staff

THOMAS AGUIRRE, *Coordinator for Residential Education*

ROBERT BARTEE, *Counseling Psychologist*

CHER BERGEO, *Academic Preceptor*

IRA BEYAH, *Relief/Proctor*

HOMAYUN ETEMADI, *Advising and Records Coordinator*

GABRIELLE FILIP-CRAWFORD, *Assistant to Provost and to College Administrative Officer*

JUAN GOVEA, *Senior Maintenance Assistant*

VALERIE GUERRERO, *College Programs Coordinator*

BILL HEINRICH, *Coordinator for Residential Education*

ELAINE KIHARA, *Academic Preceptor*

ADRIANA LOPEZ, *Coordinator for Residential Education*

SANDY LORD CRAIG, *Assistant Budget Analyst*

ALESHA MAGEE, *Student Life and Housing Assistant*

GWENDOLYN MATHIEU, *Housing Coordinator*

MARIE MORONES, *College Assistant*

MARI ORTIZ-MCGUIRE, *Associate College
Administrative Officer*

JOHN PALOCHAK, *Grounds*

SUSAN PARRISH, *Academic Services Assistant*

CURTIS SWAIN, *Community Safety Officer/
Supervisor*

College Eight

The theme of College Eight—Environment and Society—is concern for social, political, scientific, and ethical issues, recognizing the essential interconnections among human beings and between humans and all other forms of life. College Eight faculty are drawn primarily from the Environmental Studies and Sociology Departments, but also include faculty from other disciplines, such as Biology, Computer Engineering, Computer Science, Earth Sciences, Mathematics, Physics, and Psychology.

The students who come to College Eight bring with them a wide variety of life, work, and educational experiences. They represent all the disciplines in their choices of major. They also represent a rich diversity of cultural backgrounds. A large number of transfer students attend College Eight and tend to have a clear sense of their educational and professional objectives. For first-year students, the college fosters an exciting, interdisciplinary intellectual atmosphere in which to explore their academic interests and potential. This mix of ages and backgrounds creates a refreshingly easy fellowship among faculty, staff, and students.

Academic Emphases

The College Eight core course 80, *Environment and Society*, examines different perspectives on environment and community in the contemporary world. (See page 164 for the course description.) Through a series of lectures, films, readings, and small-group discussions, the course provides an opportunity for first-year students to study issues of vital importance and to share their diverse backgrounds, cultural heritage, and points of view. The course, which is required of all first-year students, features guidance and practice in the critical reading and writing skills necessary for successful study at the university level. Those who are admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college

English composition course with a minimum grade of C (2.0) or better are permitted to take the core course to satisfy the C1 requirement.

College Eight students and faculty are encouraged to develop courses, conferences, and field projects. Internships and field studies offer an opportunity to link classroom theory with action in the community.

College Community and Facilities

College Eight is located on a sunny, terraced hillside on the west side of the UCSC campus, a site that offers a spectacular view of Monterey Bay and the coastline. The college is designed to encourage interaction among resident and commuter students, faculty, and staff. Outdoor spaces allow for relaxing and informal opportunities to converse and socialize; they include small residence hall patios, grass quadrangles, and a large plaza—the heart of the college—where pedestrian traffic converges. Adjacent to the college are recreational facilities including the West Field House, tennis courts, basketball and sand volleyball courts, and playing fields. The Theater Arts and Music Centers, McHenry Library, and Porter and Oakes Colleges are a short distance from the college.

College Eight's facilities include an academic building that accommodates the college office, the Sociology Department and associated research centers, a computer lab with printers, classrooms, and faculty offices.

Approximately 450 students live in a community of two- and three-story residence halls with single, double, and triple rooms, and suites. The residence halls include designated study lounges, laundry facilities, and lobbies that serve as living rooms—favorite places where residents gather to relax, watch television, and catch up on the news of the day. Another 307 students are housed in College Eight's two-, three-, and four-bedroom apartments, which are generally reserved for students at the sophomore level and above.

The college's enthusiastic residential staff is composed of coordinators for residential education, who are full-time live-in professionals, along with undergraduate resident assistants. The residential staff plans a variety of educational and recreational events including community barbecues, outdoor movies, and a quarterly cultural festival celebrating the diversity of our community. More intimate gatherings include study breaks, coffee talks, brunches, and potlucks. The residential staff is available to ease the transition to college life, making the college a comfortable new home for our residents.

The Student Commons building contains the office of College Eight's college programs coordinator and a large meeting room for student use. The study center is located across the plaza. The lively College Eight Café features a pool table and a quiet, comfortable corner with couches. The café is a favorite haven and gathering place for students, faculty, staff, and other members of the campus community.

The College Eight Student Programs Office, in conjunction with the student government and student organizations, plans social, multicultural, and educational events for the college community. Weekly Café Nights—featuring open mikes, music, art shows, and guest speakers—accommodate the diverse spectra of cultural and artistic interests of the students. College Night, a monthly cultural event, provides an opportunity for students to learn about a variety of cultures through entertainment and delicious cuisine. In addition, the College Eight Student Programs Office works closely with the Student Environmental Center to bring programs that educate and build long-lasting networks, which aim to address the environmental issues affecting our world today.

Above all, College Eight seeks to create a community of inclusion, in which each person is encouraged to share and explore beliefs, worldviews, values, and ideas in an atmosphere of mutual support and trust.

For more information, contact the college at (831) 459-2361, e-mail 8housing@ucsc.edu or crmeusel@ucsc.edu, or visit the web site: eight.ucsc.edu.

College Eight Faculty and Staff

Provost

S. RAVI RAJAN, *Environmental Studies*

Fellows

JENNIFER K. ANDERSON, *Environmental Studies*

ERIC ASPHAUG, *Earth and Planetary Sciences*

DAVID P. BELANGER, *Physics*

JULIE BETTIE, *Sociology*

JOHN G. BORREGO, *Latin American and
Latino Studies*

BRUCE BRIDGEMAN, *Psychology*

DAVID T. BRUNDAGE, *Community Studies*

JEFFREY BURY, *Environmental Studies*

MELISSA L. CALDWELL, *Anthropology*

BRUCE N. COOPERSTEIN, *Mathematics*

DANIEL P. COSTA, *Ecology and Evolutionary Biology*

BEN CROW, *Sociology*

ROBERT R. CURRY, *Environmental Studies, Emeritus*

DANIEL F. DOAK, *Environmental Studies*

BRYAN H. FARRELL, *Environmental Studies, Emeritus*

F. JOEL FERGUSON, *Computer Engineering*

ANDREW FISHER, *Earth and Planetary Sciences*

MARGARET I. FITZSIMMONS, *Environmental Studies*

WILLIAM H. FRIEDLAND, *Community Studies and Sociology, Emeritus*
 HIROSHI FUKURAL, *Sociology*
 MARGARET H. FUSARI, *Environmental Studies; Natural Reserve Director*
 J. J. GARCÍA-LUNA-ACEVES, *Computer Engineering*
 GREGORY S. GILBERT, *Environmental Studies*
 VIKTOR GINZBURG, *Mathematics*
 STEPHEN R. GLIESSMAN, *Environmental Studies*
 WALTER L. GOLDFRANK, *Sociology*
 DAVID E. GOODMAN, *Environmental Studies*
 GARY B. GRIGGS, *Earth and Planetary Sciences; Director, Institute of Marine Sciences*
 BRENT HADDAD, *Environmental Studies*
 DAVID P. HELMBOLD, *Computer Science*
 KAREN D. HOLL, *Environmental Studies*
 MINGHUI HU, *History*
 SHELDON KAMIENIECKI, *Environmental Studies*
 PAUL L. KOCH, *Earth and Planetary Sciences*
 PHOKION G. KOLAITIS, *Computer Science*
 DAVID C. KOO, *Astronomy and Astrophysics*
 TRACY LARRABEE, *Computer Engineering*
 DEBORAH K. LETOURNEAU, *Environmental Studies*
 RONNIE D. LIPSCHUTZ, *Politics*
 SURESH K. LODHA, *Computer Science*
 PAUL M. LUBECK, *Sociology*
 PATRICK MCKERCHER, *Writing*
 ETHAN L. MILLER, *Computer Science*
 ONUTTOM NARAYAN, *Physics*
 PAUL NIEBANCK, *Environmental Planning, Emeritus*
 JAMES R. O'CONNOR, *Sociology, Emeritus*
 ART PEARL, *Education, Emeritus*
 JOHN S. PEARSE, *Ecology and Evolutionary Biology, Emeritus*
 JAMES E. PEPPER, *Environmental Planning, Emeritus*
 DANIEL M. PRESS, *Environmental Studies*
 MARY BETH PUDUP, *Community Studies*
 PETER T. RAIMONDI, *Ecology and Evolutionary Biology*
 DAVID M. RANK, *Astronomy and Astrophysics, Emeritus*
 JENNIFER REARDON, *Sociology*
 CRAIG REINARMAN, *Sociology*
 LISA B. ROFEL, *Anthropology*
 MICHAEL ROTKIN, *Community Studies*
 MARTINE D. F. SCHLAG, *Computer Engineering*
 DANIEL SCRIPTURE, *Writing*
 ALI SHAKOURI, *Electrical Engineering*
 MICHAEL SOULÉ, *Environmental Studies, Emeritus*
 ROSWELL (ROZ) SPAFFORD, *Writing, Emerita*
 NANCY STOLLER, *Community Studies*
 ANDREW SZASZ, *Sociology*
 ANNA L. TSING, *Anthropology*
 ANUJAN VARMA, *Computer Engineering*
 CANDACE WEST, *Sociology*
 TERRIE M. WILLIAMS, *Ecology and Evolutionary Biology*
 DEBORAH A. WOO, *Community Studies*
 ERIKA S. ZAVALA, *Environmental Studies*
 YI ZHANG, *Chemistry and Biochemistry*

Affiliate Fellows

WILLIAM JACKSON (JACK) DAVIS, *Ecology and Evolutionary Biology, Emeritus*
 SYLVIA JENKINS, *Music*
 BURNEY LE BOEUF, *Ecology and Evolutionary Biology, Emeritus*
 JOEL R. PRIMACK, *Physics*

College Administrative Officer

SUSAN WELTE

Staff

THERESA BEASLEY, *Housing Coordinator*
 PAUL BIANCHINI, *Asset Coordinator*
 JAN BURROUGHS, *Academic Preceptor*
 AUDREY CHING, *Coordinator for Residential Education*
 JODY CROCE, *Café Manager*
 TRAVIS DOUGLAS, *Coordinator for Residential Education*
 WENDY GITTINGS, *Café Assistant Manager*
 MIKE KITTRIDGE, *College Programs Coordinator*
 SANDRA LORD CRAIG, *Assistant Budget Analyst*
 MARY MCKINNON, *Associate College Administrative Officer*
 CHARLES MEUSEL, *College Assistant*
 A. PATRICE MONSOUR, *Counseling Psychologist*
 JOY PEHLKE, *Coordinator for Residential Education*
 LAUREN REED, *Academic Preceptor*
 CURTIS SWAIN, *Community Safety Officer/Supervisor*
 SARA WALSH, *Assistant to the Provost and Coordinator of Advising and Records*
 BALDO ZARAGOZA, *Facilities Supervisor*

College Nine

At College Nine, we introduce students to our increasingly interconnected world. Students can learn about the impact of economic globalization. We also expect them to come to appreciate the diversity of cultural traditions.

—Campbell Leaper,
 College Nine Founding Provost

Academic Emphases

College Nine's theme of International and Global Issues emphasizes the impact of our increasingly interconnected world. We consider how people around the world affect one another through global economies, education, mass media, jet travel, and computers. Some specific issues that our academic and cocurricular programs consider are economic and cultural globalization, immigration, ethnic conflicts, genocide, and human rights. Our programs seek to respect both diversity and unity in understanding individuals and societies. Students interested in these issues either as their major focus

or as part of their general education are invited to join the College Nine community.

Writing Seminar

In the first-quarter frosh course, *Introduction to University Discourse: International and Global Issues* (see page 164), students examine current issues pertinent to the college's intellectual theme. Topics address issues such as globalization, inequities in wealth and poverty across the world, human rights, and regional conflicts.

The seminar emphasizes the development of students' writing skills. Being able to write well is a valuable asset for success in college and in most careers. Students write several reflective and analytical papers during the quarter. Each paper undergoes at least one revision after the student receives constructive feedback from the instructor. Thus, the instructors work closely with each student throughout the quarter.

All students who enter as frosh are required to pass the college writing seminar with a grade of C or better. Those who are admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college English composition course with a minimum grade of C (2.0) or better are permitted to take the core course to satisfy the C1 requirement.

Global Action

In this workshop facilitated by peer instructors, students will learn about current international and global issues through interactive exercises, small group discussions and faculty presentations. Students will develop an "action plan" to raise awareness about one or more of these concerns and take practical steps to create positive change in the world.

Global Issues Colloquium Series

Through weekly presentations by leading experts, students learn about global challenges and also consider possible solutions. There is often an informal dinner following the presentation that allows for discussion with the speaker. Students have the option of taking this as a 1-credit class or of occasionally attending the presentations on a drop-in basis.

Special Academic Programs

Optional programs are available to involve College Nine students in academic and cocurricular activities beyond the first-quarter course. They are designed to promote students' ac-

democratic achievement and success by connecting them with faculty mentors and helping them pursue leadership experiences in particular contexts.

Service Learning

Students can extend their learning beyond the classroom by getting practical experience and course credit working as an intern for a community or business organization. This type of practical experience is known as service learning or field study. Examples include assisting in a classroom or at a homeless shelter. College Nine has its own service-learning program. The service-learning supervisor guides the student at the practicum site and helps the student develop a reading list and paper topic related to the placement.

Students as Teachers and Mentors

College Nine students have special opportunities to become course assistants, tutors, and student mentors for course credit. Students gain independent experience as teachers leading their own discussion sections of a College Nine course. They receive close supervision that emphasizes a collaborative approach to developing and enhancing teaching, communication, and leadership skills. The College Nine academic advisers can also direct students to other opportunities for student-teaching and peer-mentoring programs on campus. These are excellent opportunities to work closely with a faculty member and to develop one's own skills as a teacher and a leader.

Global Information Internship Program

The Global Information Internship Program (GIIP) places highly motivated students in internships with nongovernmental organizations and community groups. Students in GIIP help these organizations and groups in the use of Internet-based information and communications technologies. Interns acquire leadership and organizational skills through the "learning-by-doing" method. For more information, see page 42 and visit the web site at www2.ucsc.edu/giip.

Practical Activism: Lessons in Local and Global Change

This annual one-day conference focuses on international social justice concerns in the local context. Students gain valuable leadership skills in developing and implementing this exceptional program, which involves collaboration among faculty, staff, and the local community.

Education Abroad

The UC Education Abroad Program (see page 40) places students at a university in another country for one or more quarters. Studying

abroad can be a valuable way to expand one's understanding of the world. Given the international focus at College Nine, students are encouraged (but not required) to develop a second language or to study abroad.

Research Opportunities

The faculty at UC Santa Cruz are ranked high in their quality of research. College Nine students are encouraged to take advantage of the many excellent opportunities available to work closely with faculty as research apprentices. Students will find many internship, independent study, or senior thesis programs in the departments of most majors. The College Nine academic advisers will help link students with these programs.

College Nine Scholars Program

Eligible College Nine frosh may apply to the Scholars Program. This may include enrolling in an honors section of the frosh writing seminar in the fall quarter, the 2-credit workshop in the winter, and a special seminar with a social sciences faculty member in the spring.

College Nine Pathways to Distinction

Another feature of College Nine is that qualified students may graduate with College Nine Distinction. This recognition is intended to serve as an incentive for students to pursue activities that are especially apt to help them succeed in college and beyond. Two pathways are possible:

Research and scholarship. In this pathway, students pursue research with faculty by completing three quarters (15 credits) of work on a senior thesis or a research internship. Students may be recognized with College Nine Distinction if they do a thesis or a research internship in their major on a topic related to international or global issues.

Language and culture. Students who enroll in at least three quarters (15 credits) in either Education Abroad or a foreign language (or a combination) may qualify for College Nine Distinction.

College Community and Facilities

Founded in fall 2000, College Nine is one of the newest colleges at UCSC. Consistent with UCSC's founding vision, College Nine creates an integrated living and learning environment through engaging academic and extracurricular programs focusing on the theme of International and Global Perspectives. Students and staff collaborate to develop an array of programs exploring the many aspects of the college's theme. Some of the programs include

faculty presentations, guest speakers, debates, films, arts events, and interactive workshops. These programs bring together members of our community to learn, debate, and challenge ourselves about important issues facing us today in an atmosphere of mutual respect and engagement.

College Nights

Each month, the college community comes together to plan a College Night, which is a large-scale community celebration held in the dining commons and open to all College Nine students whether or not they live on campus. These events are planned by students and focus on particular regions of the world. College Nights include food, entertainment, and educational materials related to the theme. Some past College Nights have been Winter Holidays from Around the World, Carnival, and Asian Traditions.

International Living Center

The International Living Center (ILC) at College Nine offers a unique living environment fostering understanding, cooperation, and friendship among upper-division students from different nations, cultures, and backgrounds. Half of the residents are students from the United States, and the other half are students from various countries around the world. Students reside in the College Nine Apartments.

Cocurricular Programs and Opportunities

Getting involved in cocurricular activities is a predictor of college success. Not only do college activities help students make friends, they foster leadership and group cooperation skills. There are many opportunities at College Nine for student involvement. These include the following groups as well as many other programs, activities, and clubs.

Fall Leadership Institute

Student leadership and involvement are key to successfully building the new College Nine community. The Fall Leadership Institute offers students the opportunity to develop leadership skills and to develop efficacy as world citizens and leaders at College Nine. The institute meets weekly throughout fall quarter, providing a wide range of exercises, guest speakers, discussions, and debates.

Student Government

Student Government represents the students in the college. It appoints students to campus

and college committees, consults with college administration on policy development, and provides monetary support to student organizations.

CREATE

CREATE (Cultural Resources to Educate and to Empower) offers a community at College Nine for students of color to find support and empowerment through mentorship and friendship.

PHAT

PHAT (Programming House Activities Team) is a planning committee for the apartment residents who are interested in getting people out of their rooms and into their communities. Programs include the annual Haunted House and the Battle of the Buildings.

WATER

WATER (White Allies To End Racism) tackles issues of diversity and racism through the exploration of white racial identity. The group provides a safe and open space for dialogue and the opportunity to work with students of color groups on collaborative action projects.

Rainbow Club

The Rainbow Club provides opportunities for gay, lesbian, bisexual, transgender, intersex, queer, and questioning students and their allies to join together for self-awareness and social activities in a fun, relaxed atmosphere.

Alternative Spring Break

Students may apply to this program, in which participants spend part of their spring break in Mexico building a house and helping in the community.

Intercultural Communication Retreat

This two-day retreat provides international and American students from diverse backgrounds the opportunity to explore various components of intercultural communication. Through a series of structured exercises and small-group discussions, students share perspectives on issues such as multiculturalism, values orientation, and diversity. The goal of the workshop is to build community and friendship among international and American students as well as to increase students' understanding of the complexity of communicating across cultures. The Intercultural Communication Retreat is optional; students apply for this opportunity in the fall.

Physical Surroundings

College Nine is situated in a redwood grove next to the Social Sciences 1 and 2 Buildings near the heart of campus. One of the campus's Instructional Computing Labs is conveniently located in the Social Sciences 2 Building.

A nature preserve serves as College Nine's "backyard." College Nine students have immediate access to hiking, running, and mountain bike trails in the adjacent forest.

Residence halls with 400 single and double bedrooms opened in fall 2002. These fully furnished residence halls include student lounges, recreational spaces, and Internet connections. In addition, a state-of-the-art dining hall with an adjoining game room and student lounge for both Colleges Nine and Ten opened in fall 2002.

Colleges Nine and Ten also house approximately 300 upper-division students in apartments, with 190 students in single bedrooms and the balance in double and triple rooms. All apartments have full kitchens, living rooms, bathrooms, and Internet connections. Ground-floor apartments have decks, and most upper apartments have private balconies.

For more information about academic or general college programs, call (831) 459-5034, e-mail dslater@ucsc.edu, or visit the web site: collegenine.ucsc.edu.

College Nine Faculty and Staff

Provost

HELEN SHAPIRO,* *Division of Social Sciences; Sociology*

Fellows

Charter Fellows*

JOSHUA AIZENMAN,* *Economics*
 DILIP BASU,* *History*
 DONALD BRENNEIS,* *Anthropology*
 EDMUND BURKE III,* *History*
 MELISSA CALDWELL,* *Anthropology*
 NANCY CHEN,* *Anthropology*
 WEIXIN CHENG,* *Environmental Studies*
 MARK CIOC,* *History*
 ANNETTE CLEAR,* *Politics*
 BEN CROW,* *Sociology*
 BERNARD ELBAUM,* *Economics*
 JONATHAN A. FOX,* *Latin American and Latino Studies*
 LAUREL R. FOX,* *Ecology and Evolutionary Biology*
 K. C. FUNG,* *Economics*
 MARGARET A. GIBSON,* *Education and Anthropology*
 PER F. GJERDE,* *Psychology*
 STEPHEN R. GLIEMAN,* *Environmental Studies*
 WALTER L. GOLDFRANK,* *Sociology*
 JUNE A. GORDON,* *Education*

ISEBILL V. GRUHN,* *Politics, Emerita*
 JULIE GUTHMAN,* *Community Studies*
 MICHAEL M. HUTCHISON,* *Economics*
 DAVID E. KAUN,* *Economics*
 KENNETH KLETZER,* *Economics*
 CAMPBELL LEAPER,* *Founding College Provost; Psychology*
 HERBERT K. LEE III,* *Applied Mathematics and Statistics*
 DANIEL T. LINGER,* *Anthropology*
 RONNIE D. LIPSCHUTZ,* *Politics*
 SURESH K. LODHA,* *Computer Science*
 PAUL M. LUBECK,* *Sociology*
 STEVEN MCKAY,* *Sociology*
 JAYE PADGETT,* *Linguistics*
 INGRID PARKER,* *Ecology and Evolutionary Biology*
 JENNIFER POOLE,* *Economics*
 LISA ROFEL,* *Anthropology*
 JEROME SHAW,* *Education*
 NIRVIKAR SINGH,* *Economics*
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 LETICIA MALDONADO,* *College Programs Coordinator*
 KRISTINNE MICA,* *College Programs Coordinator*
 KAREN O'HANLON,* *College Assistant*
 ERIC PETERSON,* *Senior Building Maintenance Supervisor*
 ERIN RAMSDEN,* *Cocurricular Programs Coordinator*
 BILL REID,* *Groundskeeper*
 REGGIE SHAW JR.,* *Coordinator for Residential Education*

RACHEL STONE, *Housing Coordinator*
 ROD WATERS, *Associate College Administrative
 Officer for Residential Life and Housing*

College Ten

Our goal at College Ten is to foster students' concerns for social justice and their respect for diversity. This appreciation develops through both understanding and practice. Students can study the roots of social problems such as prejudice, ethnic hatreds, poverty, and political oppression. Another form of learning can occur through involvement in community organizations and other agencies. In these ways, we hope our students can contribute to the makings of a better world.

—Campbell Leaper,
 College Ten Founding Provost

Academic Emphases

College Ten's theme of Social Justice and Community addresses a range of social problems and their impact on all members of society. In particular, the academic and cocurricular programs consider the injustices that many people confront in their lives. Possible community and governmental policies for addressing social, political, and economic inequalities are also examined. In addition, the college provides students with opportunities to make their own positive contributions to social change through community involvement or scholarly research.

The college curriculum will explore the causes and consequences of social injustice in several ways. Students will examine the roots of prejudice, discrimination, and violence directed toward groups based on their ethnicity, skin color, gender, sexual orientation, religious beliefs, or political views. They will also consider the causes and consequences of poverty both within the United States and across the world.

Writing Seminar

In the first-quarter frosh course, *Introduction to University Discourse, Social Justice and Community* (see page 165), students examine current issues pertinent to the college's intellectual theme. Topics address issues such as poverty, discrimination, and economic injustice. Ways that communities, governments, and businesses can address inequities in society are also examined.

The seminar emphasizes the development of students' writing, reading, and speaking skills. Being able to write well is a valuable asset for

success in college and later in most careers. Students write several reflective and analytical papers during the quarter. Each paper undergoes at least one revision after the student receives constructive feedback from the instructor. Thus, the instructors work closely with each student throughout the quarter.

All students who enter as frosh are required to pass the college writing seminar with a grade of C or better. Those who are admitted as transfer students are exempt from the core course requirement but may take the core course at their option pending available space; lower-division transfer students who, prior to enrolling, have not completed at least one UC-transferable college English composition course with a minimum grade of C (2.0) or better are permitted to take the core course to satisfy the C1 requirement.

Special Academic Programs

Optional programs are available to involve College Ten students in academic and cocurricular activities beyond the first-quarter core course. They are designed to promote students' academic achievement and success by connecting them with faculty mentors and helping them pursue leadership experiences in particular contexts.

Social Justice Issues Workshop

College Ten students have the option of enrolling in the *Social Justice Issues Workshop* in winter quarter. This 2-credit course meets once per week and can be taken in addition to a regular 15-credit academic load. The workshop offers a small, dynamic learning community in which members explore important issues of personal and cultural identity; social, political, and environmental concerns; and community-mindedness. The class emphasizes small-group experiential learning through structured exercises and group activities, and also includes discussions, film presentations, and guest speakers. The course is offered to both first-year and upper-division students.

Service Learning

Students can extend their learning beyond the classroom by volunteering for a local nonprofit or school in the community for credit. This type of hands-on experience is known as service learning or field study. Examples include assisting in a classroom or at a homeless shelter. College Ten has its own service-learning program. The service-learning supervisor teaches a class, *Esprit de Corps*,

in which students meet weekly to reflect upon their experiences, discuss readings, and listen to speakers from the community. To culminate the service experience, students develop a final project related to civic engagement. Other service-learning opportunities include Praxis, a service-learning organization, and a service-learning trip to Mexico for alternative spring break.

Practical Activism: Lessons in Local and Global Change

This annual one-day conference focuses on international social justice concerns in the local context. Students gain valuable leadership skills in developing and implementing this exceptional program, which involves collaboration among faculty, staff, and the local community.

Students as Teachers and Mentors

College Ten students have special opportunities to become course assistants, tutors, and student mentors for course credit. Students gain independent experience as teachers leading their own discussion sections of a College Ten course. They receive close supervision that emphasizes a collaborative approach to developing and enhancing teaching, communication, and leadership skills. The College Ten academic advisers can also direct students to other opportunities for student-teaching and peer-mentoring programs on campus. These are excellent opportunities to work closely with a faculty member and to develop one's own skills as a teacher and a leader.

Research Opportunities

The UC Santa Cruz faculty are ranked high in their quality of research. College Ten students are encouraged to take advantage of the many excellent opportunities available to work closely with faculty as research apprentices. Students will find many internship, independent study, or senior thesis programs in the departments of most majors. The College Ten academic advisers will help link students with these programs.

College Ten Scholars Program

Eligible College Ten frosh may apply to the Scholars Program. This may include enrolling in an honors section of the frosh writing seminar in the fall, the 2-credit workshop in the winter, and a special seminar with a social sciences faculty member in the spring.

College Ten Pathways to Distinction

Another feature of College Ten is that qualified students may graduate with College Ten Distinction. This recognition is intended to serve as an incentive for students to pursue activities that are especially apt to help them succeed in college and beyond. Two pathways are possible:

Research and scholarship. In the first pathway, students are encouraged to pursue research opportunities with faculty by completing three quarters (15 credits) of work on a senior thesis or a research internship. Students may be recognized with College Ten Distinction if they do a thesis or a research internship in their major on a topic related to the theme of social justice and community.

Service and leadership. The second route to graduating with College Ten Distinction is through completing three quarters (15 credits) of service-learning internships, teaching, or other forms of community service.

College Community and Facilities

Founded in fall 2002, College Ten is the newest college at UCSC. Consistent with UCSC's founding vision, College Ten creates an integrated living-and-learning environment through engaging academic and extra-curricular programs focusing on the theme of Social Justice and Community. Students and staff collaborate to develop an array of programs exploring the many aspects of social justice. Some of the programs include faculty presentations, guest speakers, debates, films, arts events, and interactive workshops. These programs bring together members of our community to learn, debate, and challenge ourselves about important issues facing us today in an atmosphere of mutual respect and engagement.

College Nights

Every quarter, students and staff work together to plan College Nights, which are large-scale community celebrations held in the dining commons and open to all College Ten students whether or not they live on campus. College Nights include food, entertainment, and educational materials related to a theme.

Student Government

Student Government represents the students in the college. It appoints students to campus and college committees, consults with college administration on policy development, and provides monetary support to student organizations.

Cocurricular Programs and Opportunities

Getting involved in cocurricular activities is a predictor of college success. Not only do college activities help students make friends, they foster leadership and group cooperation skills. There are many opportunities at College Ten for student involvement. These include the following groups as well as many other programs, activities, and clubs.

CREATE

The purpose of CREATE (Cultural Resources to Educate and to Empower) is to facilitate the ongoing discussion of diversity issues at College Ten and in our living communities, learn about and promote multiculturalism, plan activities, and help students and staff have a resource for inclusiveness and training.

ENGAGE

ENGAGE (Explore New Growth and Gain Experience) offers students the opportunity to explore and develop their own beliefs, values, and feelings about current issues and social concerns through a wide range of exercises, guest speakers, discussions, and debates. Participants develop leadership skills and increase their efficacy as world citizens and leaders at College Ten. ENGAGE meets weekly throughout fall quarter.

PHAT

PHAT (Programming House Activities Team) is a planning committee for the apartment residents who are interested in getting people out of their rooms and into their communities. Programs include the annual Haunted House, the Battle of the Buildings, and Freestyle Fridays.

WATER

WATER (White Allies To End Racism) tackles issues of diversity and racism through the exploration of white racial identity. The group provides a safe and open space for dialogue and the opportunity to work with students of color groups on collaborative action projects.

Rainbow Club

The Rainbow Club provides opportunities for gay, lesbian, bisexual, transgender, intersex, queer, and questioning students and their allies to join together for self-awareness and social activities in a fun, relaxed atmosphere.

Alternative Spring Break

Students may apply to this program, in which participants spend part of their spring break in Mexico building a house and helping in the community.

Multicultural Community Weekend

This two-day retreat provides students from diverse backgrounds the opportunity to explore various components of multicultural communication. Through a series of structured exercises and small-group discussions, students share perspectives on issues such as multiculturalism, values orientation, and diversity. The goal of the workshop is to build community and friendship among students as well as to increase students' understanding of the complexity of communicating across diverse backgrounds. The Multicultural Community Weekend is optional; students apply for this opportunity in the fall.

Café Revolución

Located at College Ten, Café Revolución is a favorite gathering place. It is open nightly for social justice performances, music, and social interaction.

Physical Surroundings

College Ten is situated in a redwood grove next to the Social Sciences 1 and 2 Buildings near the heart of campus. One of the campus's Instructional Computing Labs is conveniently located in Social Sciences 2.

A nature preserve serves as College Ten's "backyard." College Ten students have immediate access to hiking, running, and mountain bike trails in the adjacent forest.

Residence halls with 400 single and double bedrooms opened in fall 2002. These fully furnished residence halls include student lounges, recreational spaces, and Internet connections. In addition, a state-of-the-art dining hall with an adjoining game room and student lounge for both Colleges Nine and Ten opened in fall 2002.

Colleges Ten and Nine also house approximately 300 upper-division students in apartments, with 190 students in single bedrooms and the balance in double and triple rooms. All apartments have full kitchens, living rooms, bathrooms, and Internet connections. Ground-floor apartments have decks, and most upper apartments have private balconies.

For more information about academic or general college programs, call (831) 459-5034, e-mail dslater@cats.ucsc.edu, or visit the College Ten web site: collegeten.ucsc.edu



College residents enjoying an outdoor study session

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Fellows

Charter Fellows*

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 JENNIFER ANDERSON, * *Environmental Studies*
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 MARGARITA AZMITIA, *Psychology*
 HEATHER BULLOCK, * *Psychology*
 GEORGE C. BUNCH, *Education*
 MAUREEN CALLANAN, *Psychology*
 MARTIN M. CHEMERS, * *Psychology*
 JOHN BROWN CHILDS, * *Sociology*
 FAYE CROSBY, * *Psychology*
 ROBERT FAIRLIE, * *Economics*
 PAUL FRYMER, * *Politics*
 RICARD GIL, *Economics*
 RONALD GLASS, *Education*
 MIRIAM GREENBERG, *Sociology*
 PHILLIP HAMMACK, *Psychology*
 SHELDON KAMIENIECKI, *Environmental Studies*
 LORI KLETZER, * *Economics*
 CAMPBELL LEAPER, * *Founding College Provost,
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 EDUARDO MOSQUEDA, *Education*
 RODNEY OGAWA, *Education*
 DANIEL PRESS, * *Environmental Studies*
 S. RAVI RAJAN, * *Environmental Studies*
 JENNIFER REARDON, *Sociology*
 CRAIG REINARMAN, * *Sociology*
 MICHAEL ROTKIN, * *Community Studies*
 GABRIELA SANDOVAL, *Sociology*
 ROGER SCHOENMAN, *Politics*
 TRAVIS SEYMOUR, *Psychology*
 DANA TAKAGI, * *Sociology*
 EILEEN ZURBRIGGEN, * *Psychology*

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 MAURÍCIO MAGDALENO, *Senior Building
Maintenance Worker*
 LETICIA MALDONADO, *College Programs
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 KRISTINNE MICA, *Assistant College Programs
Coordinator*
 RACHEL OGATA, *Cocurricular and College Programs*
 ERIC PETERSON, *Senior Building Maintenance
Supervisor*
 JOSÉ REYES-OLIVAS, *Cocurricular Programs
Coordinator*
 CHANTAL ROZAIRO, *Coordinator of Residential
Education*
 MICHELLE SASSE, *Groundskeeper*
 MATTHEW SERNAKER, *Events and Facilities
Coordinator*
 REGGIE SHAW JR., *Coordinator for Residential
Education*
 RACHEL STONE, *Housing Coordinator*

Student Life

Campus life is all about learning, discussion, and debate; meeting people from diverse backgrounds; making new and lasting friendships; attending cultural celebrations and artistic and musical performances; and getting involved with student organizations and clubs. UCSC provides a wealth of opportunity for personal growth within the context of a rich and meaningful academic experience. You will live, study, and socialize with other students in your college. You will also meet students from the other colleges—in your classes and at the many campuswide events that take place throughout the year. The colleges (described in the previous section) and the various campuswide units provide a wide range of student services to respond to individual needs, interests, and levels of personal development. In addition, students can take advantage of the campus's stunning natural setting, the friendly and engaging local community, and easy access to the Monterey and San Francisco Bay Areas.

Santa Cruz Community

Located on the northern tip of Monterey Bay, Santa Cruz is famous for its Mediterranean climate, forested state parks, and miles of scenic beaches. Recreational opportunities abound—hiking through redwood forests, bicycling along mountain roads, and surfing, sailing, and scuba diving. The Santa Cruz Mountains are minutes away; the majestic Sierra Nevada is a four-hour drive to the east.

The metropolitan centers of the San Francisco Bay Area are easily accessible. By car, Berkeley and San Francisco are less than two hours from campus. San Jose, Monterey, and Carmel are one hour away.

The city of Santa Cruz, with a population of about 56,000, was originally founded as a Spanish mission. Santa Cruz is a small community with cosmopolitan appeal and a strong awareness of environmental and political issues. Art exhibits, local theater companies, a symphony orchestra, fine restaurants, and a lively contemporary music scene combine to make Santa Cruz an interesting place to live.

Housing

College Residences

All undergraduate students, whether they live on campus or not, are affiliated with one of 10 residential colleges at UC Santa Cruz. Each college provides academic support, organizes student activities, and sponsors events that enhance the intellectual and social life of the

campus in addition to housing students in small-scale residential communities. About 45 percent of single undergraduate students live in university housing.

Freshmen and new transfer students entering in fall quarter are guaranteed university housing for their first two years at UCSC. Transfer students entering in fall quarter have a one-year guarantee. All deadlines must be met to qualify for guarantees.

You must be admitted as a full-time student before applying for housing. All new single students who state a preference for university housing as part of the admissions acceptance process and submit the required advance housing fee by the stated deadline will be sent housing information after college assignments are made. The housing packet will include additional information about your affiliated college and instructions for completing the online housing application/contract process.

The room and board rates for the 2008–09 academic year range from \$9,449 to \$13,464, depending upon the type of accommodation and meal plan (see pages 19–20 for more detailed information on rates).

The colleges at UC Santa Cruz offer two kinds of living accommodations—residence halls and apartments, both with access to common dining facilities. Nine of the colleges have both residence halls and apartments, while Kresge College has all apartments. Most frosh are housed in double, triple, or quad rooms, but some colleges occasionally house them in single rooms. Except for Kresge and Oakes, apartments are generally reserved for sophomores, juniors, and seniors. (See pages 79–97 for more detailed descriptions of college housing facilities.)

The residence hall floors, typically shared by 12 to 20 students, have common bathrooms and lounge areas. Students can request to live in a gender-neutral or single-gender area. Apartments, typically shared by four to seven students, have common living/dining rooms, kitchens and bathrooms, and a combination of shared and private bedrooms. Each community provides accessible housing for students with disabilities.

In addition to the room options, there are also a variety of theme-housing options for those who are interested. Based on academic pursuits, hobbies, individual backgrounds, and lifestyle preferences, these living/learning options serve to complement a student's experience in residence.

All housing contracts for residence halls and apartments at the colleges and at the University Inn include meal plans. Students with meal plans may use their student ID cards to access any of the five dining halls on campus, as well

as the University Inn dining hall in downtown Santa Cruz. Meal plans include Flexi Dollars (a dollar-for-dollar exchange for “food dollars” that can be used at college coffee shops, campus restaurants, and all dining halls). Additional Flexi Dollars may be added to any meal plan.

Each college's residential program is a team effort. Professional staff (coordinators of residential education) work with students trained as resident assistants. They help organize activities and events, provide referral information about academic or personal concerns, and assist with roommate problems.

For more information on the colleges, refer to the brochure titled *UC Santa Cruz, The Colleges: Communities of Learning*, or contact the Campus Housing Office.

The Village

Located in the Lower Quarry, the Village houses a mix of continuing undergraduates, transfer undergraduates, and graduate students. Each of the 17 houses has nine single bedrooms with Internet connections, three bathrooms, and a kitchenette. A meal plan is optional. A manager's apartment, office, laundry facility, community kitchen, and community lounge are located on site. The live-in manager and residential assistants are available to assist students. The Village housing fee for academic year 2008–09 is \$7,992. Call (831) 459-4388 or e-mail village@ucsc.edu for more information.

University Town Center

The University Town Center (UTC), located at the corner of Pacific and Cathcart in downtown Santa Cruz, provides housing for continuing and transfer students in two- and three-person studio apartments. A meal plan is optional. Contact the UTC Housing Office for more information, (831) 502-0031 or utc@ucsc.edu.

University Inn and Conference Center

The Inn, located on Ocean Street in downtown Santa Cruz, provides housing for continuing and transfer students during the academic year. Students living at the University Inn have a meal plan that may be used at any dining hall on campus, in addition to the Inn dining hall. Contact the University Inn Housing Office for more information, (831) 466-1181 or inn@ucsc.edu.

Family Student Housing

Family Student Housing, located on the west side of campus, has apartments for students and their families (see page 106 for information on child care and youth programs).

The apartments are unfurnished, and each has two bedrooms, a bathroom, a small study, a com-

bined living-dining area, and an electric kitchen. Several apartments are accessible to people with mobility impairments. For 2008–09 the monthly rent is \$1,210, not including utilities and phone. There is a \$500 refundable security deposit and a \$25 nonrefundable application fee.

If you are interested in an apartment, download an application form at housing.ucsc.edu/fsh and submit it with the application fee. Early application is advisable as these apartments are in great demand. Students with children are given priority. The waiting time for families with children is typically three to six months and for families without children it is typically six to nine months. For more information, contact the Family Student Housing Office, (831) 459-2549, or fsh@ucsc.edu.

Camper Park

A 42-space camper park on the north side of campus is available to students who own recreational vehicles. All have water and electrical hookups; eight also have sewer hookups. Rates for 2008-09 are \$428; or \$476 with sewer hookup. The community includes a small central facility with rest rooms, showers, a meeting room, and a laundry room. For more information about the park and the vehicle requirements, or to request an application, contact the Village Office, (831) 459-4388, rupark@ucsc.edu.

Graduate Student Housing

Four-bedroom apartments for single graduate students are located on the west side of campus, between Kresge College and the Baskin Engineering Building. See page 48 for a more detailed description. For more information, contact the Graduate Student Housing Office, (831) 459-5712, gradhsg@ucsc.edu.

Campus Housing Office

This office is responsible for the application and contract records for all single students living in college residence halls and apartments, the Village, University Town Center, University Inn, and Graduate Student Housing. Staff are available to advise students about room and board billing, payment plans, and contractual responsibilities. Students can purchase meal plans or Flexi Dollars online at studenthousing.ucsc.edu. Centrally located at 104 Hahn Student Services Building, Campus Housing is open 8 A.M. to 5 P.M. Monday through Friday, (831) 459-2394, e-mail: housing@ucsc.edu, Web: housing.ucsc.edu.

Community Rentals Office

The Community Rentals Office (CRO) maintains current rental listings accessible on the CRO web site. Students can post and search for potential housemates and register for auto-

matically matched rental listings to be sent to their e-mail accounts. Currently enrolled and new students access the listings for free. UCSC Extension and Summer Session students and alumni pay a small user fee to access listings. Verification of UCSC status by office staff is required.

Other services include online renters' workshop, rental forms and resource information, and basic advising about tenants' rights and responsibilities.

The Santa Cruz area offers a variety of housing options. Locating suitable housing can take from one to four weeks, depending upon specific requirements and restrictions. The cost of housing varies according to individual lifestyle and preferences. Price ranges are available at housing.ucsc.edu/cro/costs.html.

The Community Rentals Office, located at 104 Hahn Student Services (North Entrance), is open 8 A.M. to 5 P.M., Monday through Friday. For further information, call (831) 459-4435, e-mail communityrentals@ucsc.edu, or visit the web site: communityrentals.ucsc.edu.

Program In Community and Agroecology (PICA)

PICA is a unique collaboration that integrates classroom instruction and community-based experience for UCSC students. PICA seeks to engage students with critical issues in the development of sustainable food systems and sustainable communities. We provide ways of exploring the theory and practice of sustainability through an array of academic course work, community-based activities, and hands-on living and learning.

Academics. PICA offers classes and training in agroecology, horticulture, and organic agriculture through UCSC's Environmental Studies Department. PICA students and faculty work closely in both the classroom and in the field, addressing topics such as:

- Ecological design of farming, landscaping, and gardening practices
- The impact of consumer choice within a global food system
- Food equity for diverse urban communities
- Social justice and empowerment in agricultural communities
- Environmental education focused on sustainability

Many PICA classes incorporate on-farm experience as a vital component of the academic curriculum. The various campus gardens and the world-renowned farm at UCSC serve as outdoor classrooms for hands-on learning. Through PICA, students are finding unique ways to learn and participate in sustainable food systems and communities.

On-campus living at PICA. The PICA residential program offers students an alternative to standard dorm living. At the Village in the Lower Quarry, students from across academic disciplines come together to create a sustainable living environment on campus. PICA residents grow organic food at the nearby Foundational Roots Garden, come together to share in weekly community meals, implement ecological landscaping projects around their housing units, and direct a Village-wide composting program. This living/learning experience allows students a way to link healthy communities with healthy food systems.

Internships and Field Studies. Through internship and field studies programs, students participate in community partnerships and placements in agricultural communities that span geographic and cultural situations ranging from local to international. PICA continues to broaden its network of partnerships with nonprofit, government, community-based, and private agencies and farms working toward sustainability. These internship and field-studies opportunities are an important way of engaging students with issues facing food systems and farming communities around the world.

For further information, please contact Bee Vadakan at vvadakan@ucsc.edu.

Student-Run Cooperatives

Co-ops are an alternative form of organizing a group of people or a business. Here at UCSC, the co-ops are entirely student run and operated. Although memberships in the Bike and Kresge Food Co-ops are available, anyone, student or otherwise, is welcome to use them.

Kresge Food Co-op

Mission statement: "We are a group of students whose goal is to run a natural food store through consensus decision-making and group responsibility. We embrace cooperation as our tool for social change. We are not for profit; we are for collective power. As a cooperative business we seek to educate all members of the community, including ourselves. We use our buying power to reflect our ideals regarding ecological, social, and political issues. For this reason we carry healthy, locally based, cruelty-free, organic products. We focus on products that are good for the earth, the people who produce them, and the people who consume them. Open to all, we provide a space where good food and revolutionary action meet at the checkout line." Call (831) 426-1506 for more information.

Bike Co-op

The co-op is student owned and operated, run cooperatively, and nonprofit. Whether you need

to purchase a bike, repair a bike, or want to learn, the co-op can accommodate your needs. People are encouraged to attend meetings, learn more about cooperatives, and get involved. The Bike Co-op is located at the Student Union. For information, come by or call (831) 457-8281.

Housing Co-ops

The Santa Cruz Student Housing Cooperative is committed to providing affordable housing, a supportive community, and student empowerment. There are two democratically owned and operated houses where a diverse group of people come together, learn how to communicate, cooperate, and live well. The houses have communal dinners six nights a week, weekly meetings with agreements by consensus, and nice rooms in big Victorians—and they are near the university bus lines. Both houses provide housing for Summer Session students. Call (831) 457-2181 for the Cesar Chavez House, or (831) 471-9098 for Zami House.

Transportation and Parking Services

The UCSC campus strives for an academic environment disturbed as little as possible by automobile traffic. The university has chosen to reserve flatlands for future buildings, natural areas, and social and recreational spaces; as a result, parking is a limited resource on campus. UCSC requests that students not bring cars.

Comprehensive transportation systems have been developed to reduce traffic and eliminate the need for a car. Movement on the spacious campus is made easier by the care with which buildings have been located, a network of foot and bicycle paths, and an extensive intracampus shuttle system that links the colleges, central core facilities, and the two remote parking lots. Shuttle buses operate on 10- to 30-minute frequencies from 7:30 A.M. to 6 P.M. weekdays (except on academic holidays). During summer and quarter breaks, day shuttle service is provided at 12- to 15-minute intervals. In addition, a night shuttle service, operating at 10- to 30-minute intervals, runs seven nights a week between 6 P.M. and 12:30 A.M. during the academic year. The night shuttle provides curb-to-curb transportation to the colleges. Both day and night shuttles provide wheelchair-accessible services and are free of charge. Transportation and Parking Services (TAPS) also operates the Disability Van Service, which provides transportation to those with mobility impairments. Shuttle routes and schedules are available at the colleges and at campus Transportation Information Centers.

The Santa Cruz Metropolitan Transit District (Metro) provides regular and convenient bus transportation to campus and to outlying areas from Boulder Creek to Watsonville, as well as

to the Santa Cruz community. Metro provides service to UCSC every five to eight minutes on weekdays during academic sessions. Metro “Night Owl” buses provide late-night service to campus until 3 A.M. on Friday and Saturday nights. Sunday-through-Thursday-night service to campus operates until 2 A.M. This service is funded by a mandatory student fee. Students may ride any Metro bus without additional charge by showing their current UCSC identification card to the driver.

Bicycles are a popular means of transportation on campus and in Santa Cruz. UCSC offers bicycle programs including licensing, a bike trailer for commuters, and bike racks on the shuttles. Multigear bicycles are advisable because of the hilly terrain, and helmets are required.

Permits for on-campus parking are limited. Parking in the residential areas adjacent to the campus is restricted and strictly enforced. Due to lack of space, storage of vehicles for on-campus residents is limited, and the majority of remote-lot spaces are available to commuting students. Parking on campus for first- and second-year students living on campus is available by exception only. Parking regulations are strictly enforced; all students who bring a car to campus must purchase a permit in advance. UCSC requests that students not bring vehicles to campus if they are not eligible to purchase an on-campus parking permit.

UCSC offers a weekend shuttle between the campus and the Fremont BART Station. Use the shuttle to connect with BART, which offers rail service throughout the north bay, including stops in San Francisco, Berkeley, Pittsburg, Pleasanton, Concord, and Richmond. The UCSC Fremont BART Connector provides service on Fridays and Sundays during the academic year. Reservations are required and can be made weekdays 10 A.M. to 3 P.M. at (831) 459-3779.

Santa Cruz is served by commercial bus lines on a regularly scheduled basis. The nearest commercial airport is in San Jose, approximately 35 miles from Santa Cruz. The San Francisco Airport is about 70 miles from campus. Both airports are accessible by commercial van and limousine services.

For the occasional need of a car to travel off campus, go to the beach, go shopping, or even go home for the weekend, UC Santa Cruz has contracted with Zipcar to provide car sharing services to all eligible UCSC students 18 year of age and older. Zipcar is a membership-based car rental program providing self-service access to a variety of vehicles located on and off campus, 24/7. Reserve a car online by the hour or day, just “pay as you go”; low fees include rental costs, gas, mileage and insurance. Join Zipcar even before arriving campus at www.zipcar.com/ucsc.

Services can change, so it is recommended that you get up-to-date information from TAPS. Call (831) 459-2190, e-mail taps@ucsc.edu, or visit the web: www2.ucsc.edu/taps.

Student Health Services

Located on McLaughlin Drive across from Colleges Nine and Ten, the Student Health Center provides quality health care focused on the particular needs of students. All registered students have access to the Student Health Center regardless of their insurance plan, as services are partially supported by their university registration fee. Care is provided by board-certified physicians, nurse practitioners, and physician assistants. Students can be seen by appointment or, in cases of acute illness or injury, on the same day in Urgent Care. In case of emergencies, either during the day or after normal operating hours, please call 911.

In addition, the Student Health Center offers psychiatry services, nutritional counseling, health promotion, x-ray, and laboratory and pharmacy services on site. The center is open daily and Saturday mornings during the regular academic year. (For summer services and hours, see the Student Health Center’s web site.) For more information about the Health Center, call (831) 459-2780; e-mail healthcenter@ucsc.edu; web: www2.ucsc.edu/healthcenter.

Student Health Insurance

To ensure emergencies and other health care costs do not interfere with a student’s education, all University of California students are required to carry medical insurance. A comprehensive and inexpensive program specifically designed for students is available through the university via the Undergraduate Health Insurance Plan (USHIP). All students are automatically enrolled in USHIP and billed quarterly through their student account, unless they choose to waive this coverage by providing proof of comparable insurance by the specified deadline. For detailed information regarding insurance coverage and the waiver process, see the web at www2.ucsc.edu/healthcenter. You may also contact the insurance office at insure@ucsc.edu or (831) 459-2389.

Mandatory Hepatitis B Immunization

California state law mandates that all entering students under 19 years old must be immunized against Hepatitis B. These students are required to provide the Student Health Center with documentation proving their compliance with this law. Those not in compliance at the beginning of the quarter may be dropped from their classes. For more information, see the web at www2.ucsc.edu/healthcenter or call (831) 459-2211.

Student Health Outreach and Promotion

Student Health Outreach and Promotion (SHOP) provides opportunities for students to explore and enhance their health and wellness as they pursue their academic and personal goals. Our various programs and services offer UCSC students culturally sensitive, nonjudgmental information, education, resources, and support around issues related to alcohol and other drug use, sexuality and sexual health, holistic health, and other health concerns. Students can get involved with SHOP by becoming peer educators, HIV test counselors, Volunteers for the Condom Co-op, and/or CUIP Interns. For more information about these positions, visit SHOP at Kresge College in the Piazzetta (across from STARS), view the SHOP web site at www2.ucsc.edu/healthcenter/shop, e-mail us at shop@ucsc.edu, or call (831) 459-4679.

Alcohol and Other Drug Education.

SHOP coordinates alcohol and other drug (AOD) education, prevention, and early intervention efforts on campus. Staff members work collaboratively with students to help identify relevant information and facilitate informed decision making. Educators provide formal and informal sessions and workshops for students, college residential staff, and other campus groups. Staff also serve on the campuswide AOD Advisory Committee, which develops, implements, and assesses policies.

HIV and Other STI Prevention. Helping students explore their options around the sexual choices that they make, SHOP seeks to reduce students' risk of HIV, other sexually transmitted infections (STIs), and unplanned pregnancy. SHOP offers the following: free and anonymous HIV testing, run by highly trained student test counselors; the Condom Co-op, selling safer-sex supplies at a reduced cost; SLUG LOVE workshops and other presentations addressing STIs, safer sex, and values clarification and communication; and academic classes. SHOP also cosponsors special events such as the annual Santa Cruz AIDS Walk.

Student Health Advisory Committee. The Student Health Advisory Committee (SHAC) is composed of students interested in health care at UCSC. The group serves as a liaison between students and the Health Center staff; creates and supports campus health initiatives and other educational opportunities; and provides a fun, practical way for students to get involved and make connections with other students and health care practitioners.

Counseling and Psychological Services

Psychological counseling is available from professional staff at various locations on campus, including the colleges, Family Student Housing, and Kresge Annex B. Counseling psychologists come from a variety of backgrounds and are experienced in helping students clarify their sense of direction, set realistic goals, and better understand their personal problems.

You can meet with a counseling psychologist individually or join one of the many counseling groups offered throughout the year. Both individual and group counseling services are aimed at helping you gain greater personal effectiveness.

Information communicated to a counseling psychologist is confidential and cannot be released without a student's permission except in specific circumstances involving risk and safety. Counseling psychologists are available to consult with individuals, groups, committees, and campus departments and organizations in such areas as psychological problem solving, conflict resolution, ethnic and multicultural matters, and organizational development.

You may obtain further information regarding counseling services from the central Counseling and Psychological Services Office at Kresge Annex B, (831) 459-2628. Visit our web site www2.ucsc.edu/counsel.

(For information on academic and career advising, see pages 36–39.)

Rape Prevention Education Program

UCSC pioneered the establishment of Rape Prevention Education in 1979 to address issues of rape, especially acquaintance rape.

During their orientation to the campus, students are encouraged to attend educational presentations that use theater, video, and discussion to encourage respect, responsibility, and mutuality among students. Evening workshops are organized in the residence halls and apartments throughout the year. A wide variety of films and videos are shown campuswide to discuss the politics of gender and the causes and prevention of sexual assault. Resources are available for class papers. A peer education program is offered to both male and female students. Posters, pamphlets, newsletters, and resource booklets are distributed throughout the campus. Both male and female students take advantage of these educational resources. In addition, excellent self-defense classes for women are offered quarterly.

The coordinator of Rape Prevention Education is available for individual appointments and provides nonjudgmental support for those who have been raped as well as for their

friends and loved ones. The campus also has police officers available 24 hours a day, a network of emergency phones, guards at both campus entrances from 8 P.M. until 3 A.M., and frequent shuttles and buses.

Rape Prevention Education works with other campus units to try to ensure that the physical environment is as safe as possible. Fortunately, the external UCSC environment has been relatively safe and reported rapes or attempted rapes by strangers have been rare. UCSC is similar to other campuses in that over 90 percent of student rapes that occur on campus are committed by acquaintances and are vastly underreported. For more information, contact the Rape Prevention Education Office at Kresge College, (831) 459-2721; e-mail: g_g@ucsc.edu; web: www2.ucsc.edu/rape-prevention.

Resource Centers

African American

The African American Resource and Cultural Center (AARCC) develops and fosters cocurricular initiatives that promote academic success, leadership training, and student development. Since the center's inception in 1991, the program's primary mission has been to serve as a key resource to acclimate students to general campus life and academic culture. In addition, the program provides advocacy and support in helping to monitor students' academic progress and subsequent achievement of their educational goals. AARCC works closely with overall campus outreach to enhance the recruitment and retention of students of African descent.

AARCC welcomes volunteers and student interns to serve as members of TEAM AARCC Outreach Program or on our Advisory Council. Academic clubs include Black Science Network, Student National Medical Association, UCSC Gospel Choir, Honors and Scholars Club, and National Society of Black Engineers. Other organizations affiliated with the center include African/Black Student Alliance, African American Theater Arts Troupe, Black Sistas United, Black Men's Alliance, Alpha Kappa Alpha Sorority, Destination Higher Education, Rainbow Theatre, University Brothers/Sisters, MLK Youth Classic, and Delta Sigma Theta Sorority. AARCC works collaboratively with others on campus and in the surrounding community to enhance cultural and ethnic diversity initiatives on the UCSC campus. The center, located on the third floor of the Bay Tree Building in Quarry Plaza, is open Monday through Friday from 9 A.M. to 5 P.M. For more information, call (831) 459-3207, fax (831) 459-2469, e-mail african@ucsc.edu, or consult our web site at www2.ucsc.edu/aasl.

American Indian

The American Indian Resource Center (AIRC) works in collaboration with the Student Alliance of North American Indians (SANAI), the University of California American Indian Counselors/Recruiters Association, and native faculty and staff, as well as the indigenous tribal community leaders of the region to develop information, programs, and events that assist public understanding of native peoples. Invested in creating a campus climate that supports all students, the center provides mentoring and personal and academic advising. AIRC is located on the third floor of the Bay Tree Building in Quarry Plaza. For more information, call (831) 459-2881 or e-mail dtibbett@ucsc.edu or native@ucsc.edu.

Asian American/Pacific Islander

The Asian American/Pacific Islander Resource Center (AA/PIRC) provides and enhances opportunities for education and dialogue on issues affecting Asian Americans and Pacific Islanders, as well as opportunities for leadership development and community building. AA/PIRC aims to address students' multiple and diverse academic, social, cultural, and other cocurricular needs through programs and services. Programs include Asian American/Pacific Islander Heritage Month, Year-End Ceremony for graduating seniors, leadership skills workshops, graduate school panels, and community receptions. AA/PIRC events also highlight writers, performance artists, scholars, and community leaders. AA/PIRC sponsors academic and paid internships for students interested in gaining professional experience. Through AA/PIRC, students benefit from networking with individuals and resources such as alumni, faculty and staff, off-campus community-based organizations, and on-campus student organizations.

AA/PIRC is located on the third floor of the Bay Tree Building with the African American, American Indian, and Chicano Latino Resource Centers. Add your e-mail address to AA/PIRC's listserv to receive announcements on leadership, scholarship, internship opportunities, events, and community news. For more information, call (831) 459-5349; e-mail aapirc@ucsc.edu, or visit www2.ucsc.edu/aapirc.

Chicano Latino

The Chicano Latino Resource Center (El Centro) is a hub of organized activities and resources that support Chicano and Latino student transition, retention, and academic advancement at the university. Through collaborative efforts with campus partners, students can participate in a host of activities that encourage intellectual growth, leadership

development, preparation for graduate or professional school, and career options. El Centro encourages and supports student and community development through cultural and educational programming. Programs include the following: New Student Welcome Program; Chicana Latina Pipeline Project; César Chavez Convocation; dialogue on academic, social, cultural, and personal issues that affect the Chicano and Latino community; and a weekly online newsletter, *CHISME E-news*. El Centro offers student internships that support leadership-skills development while students help to organize events and activities. For more information or to schedule an appointment, call (831) 459-5449 or e-mail cab@ucsc.edu. Web: www2.ucsc.edu/vraza

Gay, Lesbian, Bisexual, Transgender, Intersex

The Lionel Cantú Gay, Lesbian, Bi, Trans, Intersex (GLBTI) Resource Center, located in a beautiful redwood building near Crown and Merrill Colleges, is a friendly, welcoming place to the entire community. The center's mission is to provide educational, social, and support services to students, staff, and faculty on GLBTI issues. The Lionel Cantú GLBTI Resource Center is home to several student organizations that meet weekly; a host of exciting programs; and a library offering books, magazines, and DVDs. Safer-sex information and supplies and other GLBTI-related materials are also on hand. Information and referral to campus and community GLBTI resources is available by phone or in person. Throughout the year, the Lionel Cantú GLBTI Resource Center coordinates student programming with a queer focus. Education of the non-GLBTI campus population is another function of the resource center; volunteers offer workshops for groups, classes, and dorms about unlearning heterosexism and transphobia. Everyone is welcome to use the center's cozy lounge, full kitchen, and study center to relax, study, socialize, and become involved in the campus's queer community. The center is open Monday–Friday; usual hours are 10 A.M. to 5 P.M. Stop by and meet the center's friendly staff and find out about internship and volunteer opportunities. You can reach the center at (831) 459-2468 or via e-mail at queer@ucsc.edu. The center's web site, queer.ucsc.edu features an extensive Queer Calendar. To get on the listserv for latest updates, e-mail the center with your name and e-mail address.

Women's Center

Located in Cardiff House, a historic farmhouse near the main entrance to campus, the Women's Center is devoted to helping students maximize their success at UCSC. Resource referrals and informal advising are always available from

center staff, and weekly events include films, readings, and talks. The center also sponsors student-oriented workshops on topics ranging from money management and car care to assertiveness and stress reduction.

The Women's Center is home base for a variety of student groups and student-run community-service efforts. Other opportunities for involvement include internships, independent study, and work-study jobs. Students can become involved in such Women's Center projects as the 51% Pipeline Project (leadership), That Takes Ovaries (theater), Inside Out Writing Project (Women in jail)—or create projects with the support and mentorship of staff.

The center's meeting rooms, kitchen, and garden are ideal places to study, relax, or connect with students, staff, faculty, and community members. Rotating art exhibits bring the center's walls to life, and students are encouraged to inquire about showing their work.

For more information, check the center's weekly calendar, visit the center's web site at www2.ucsc.edu/wmcenter, e-mail women@ucsc.edu, or call (831) 459-2072.

Physical Education, Recreation, Sports, and Wellness

The physical education, recreation, sports, and wellness programs provide a variety of interesting and challenging activities intended to attract you to becoming an *active* participant. The emphasis is on giving you an opportunity to develop knowledge, skills, and habits related to wellness to last through a lifetime of enjoyable physical and recreational activity.

Obtain further information about the programs described below from the Office of Physical Education, Recreation, and Sports, located at the East Field House, (831) 459-2531. The web address is <http://opers.ucsc.edu>.

Physical Education Courses

Regularly scheduled courses, which carry no academic credit but are recorded on your transcript, are available in a broad range of physical activities (see pages 384–386). Many classes are small, and all offer expert instruction and carefully designed practice periods so that you can accomplish much in sessions of two to three hours per week. Most activities have intermediate and advanced sections as well as courses for beginners. Subjects offered include swimming, scuba, sailing, rowing, basketball, racquetball, tennis, volleyball, ballet, folk dance, jazz dance, modern dance, fencing, soccer, aerobics, tai chi chuan, weight training, yoga, aikido, and taekwon do. Web: <http://opers.ucsc.edu/homepage/physicaleducation.html>.

Intramurals

The intramural sports program includes competitive leagues, tournaments, and special one-day events. Many of the activities are coeducational. The leagues feature basketball, flag football, floor hockey, indoor and outdoor soccer, softball, ultimate frisbee, and volleyball. Some of the leagues are divided into different skill levels. There are tournaments in basketball, racquetball, and tennis. Special events include a 5-k and 10-k run, and an annual triathlon. Prospective participants are encouraged to form their own teams. Individuals looking to be placed on a team are also welcome. Web: <http://www.ucsc.intramurals.com>.

Sports Clubs

The sports club program offers a variety of sports depending on student interest. Currently, active clubs include men's and women's rugby, lacrosse, and ultimate frisbee; men's soccer, baseball, cross-country, and track and field; and coed Special Olympics, cheerleading, dance, equestrian, triathlon, disc golf, cycling, sailing, water polo, badminton, and fencing. Web: <http://www.ucscsportsclubs.com/>.

Intercollegiate Teams

UC Santa Cruz offers the only National Collegiate Athletic Association (NCAA) Division III program in the UC system. As a Division III member, the program offers no scholarships or grants in aid that are based on athletic ability. Both men's and women's NCAA intercollegiate teams compete in the following sports: basketball, soccer, swimming and diving, tennis, and volleyball. Women's teams compete in golf and cross-country. For information on teams, rosters, schedules and Booster Club, go to www.goslugs.com.

Wellness Center

Located within the East Field House complex and overlooking Monterey Bay, the Wellness Center offers two floors of state-of-the-art cardiovascular and strength-training equipment. Classes, workshops, fitness testing, and personal training are available to assist everyone in reaching their fitness goals. Web: <http://www2.ucsc.edu/opers/wellness/index.html>

Recreation

The Recreation Program is designed to fulfill the diverse needs and interests of all members of the UCSC community. More than 100 activities, workshops, classes, off-campus outings, and special events are scheduled quarterly. In addition, the program offers a 10-day Wilderness Orientation (WO) prior to the start of school. WO is an invaluable experience for incoming college students, serving as an introduction to mountain travel and the "journey" of college

education. The beautiful settings of the Sierra Nevada provide students an opportunity to form new friendships and discuss their hopes and fears about entering college while learning outdoor skills. No previous backpacking experience is necessary.

The Outdoor Equipment Rental Center offers recreational equipment including surfboards, wetsuits, and high-quality backpacking and camping gear. If you are interested in planning your own outing, contact the Recreation Program Office for assistance. The office has extensive files, and staff members act as consultants, planning *with* people as well as *for* them. The office sells international student ID cards, provides bicycle licensing, and offers a free weekly drop-in bicycle maintenance program.

Open recreation hours are scheduled quarterly; you are strongly encouraged to use the facilities. Sports equipment may be borrowed without charge. There are also recreation clubs if you are primarily interested in organized recreation and individual performance. Clubs are coed and feature some combination of recreational participation, advanced instruction, and individual competition. For a list of currently active clubs, go to ucsc recreation.com.

Banana Slug Mascot

The Banana Slug, a bright yellow, slimy, shell-less mollusk found in the campus's redwood forest, was the unofficial mascot for UC Santa Cruz's coed teams since the university's early years. In 1981, when some campus teams wanted more organized participation in extramural competition, UCSC joined Division III of the NCAA. Since the application required an official team name, UCSC's then chancellor polled the student players, and out of this small group emerged a consensus for a new moniker—the sea lions. It was a choice that the chancellor considered more dignified and suitable to serious play than the Banana Slugs. But the new name did not find favor with the majority of students, who continued to root for the Slugs even after a sea lion was painted in the middle of the basketball floor. After five years of dealing with the two-mascot problem, an overwhelming pro-Slug straw vote by students in 1986 convinced the chancellor to make the lowly but beloved Banana Slug UCSC's official mascot.

Facilities

To make it convenient for you to utilize campus physical education, recreation, and sports facilities, field houses are located on the east and west sides of the campus. At both the East Field House and the West Field House, you will find the following: gymnasium, tennis courts, outdoor basketball and volleyball courts, and locker rooms. The East Field House also has a

dance studio, martial arts room, handball/racquetball courts, equipment center, fitness center, 50-meter swimming pool, half-mile jogging track, and sports fields. A strength-training and cardiovascular-fitness court is located near the east jogging track.

The UCSC Boating Center is located at the Santa Cruz Small Craft Harbor, about five miles from the campus. The boating program offers instruction and recreation using sailing and rowing vessels, such as Moore-24 sloops, Laser dinghies, C-15 dinghies, rowing dories, and sea kayaks. Web: <http://www2.ucsc.edu/opers/boating/index.html>

All facilities are open daily during academic terms and are available for individual recreation whenever they are not being used for classes or other scheduled activities.

Student Union

The Student Union is a student-governed facility located at the center of campus where students can take a break and lounge, play pool or ping pong, use computers, meet, or watch television. The Student Union is also home to registered student organizations, campuswide student government, the Student Union Governance Board, the Bike Co-op, and Engaging Education.

Located in Quarry Plaza across from the Bay Tree Bookstore, the Union complements college facilities by providing an alternative social, recreational, and educational gathering place for all students and members of the campus community. Student-support offices located at the Union include Student Union administration, Engaging Education, and Student Activities.

The Union is open Monday through Friday 9 A.M. to 10:30 P.M. and has limited weekend hours. The Union is closed holidays and quarter breaks. For up-to-date information, call (831) 459-3167.

Student Activities

Campuswide Student Organizations

Expand your horizons and your academic life by joining one of over 150 student organizations. Get involved in one or more cultural, ethnic, religious, Greek, political, service, or social organizations. Gain valuable life experience in leadership and develop rewarding and lifelong friendships.

Student organization membership is open to all UCSC students. Learn more about UCSC's campuswide groups or start your own at the Student Organization Advising and Resources (SOAR) office. Contact SOAR at (831) 459-2934, e-mail soar@ucsc.edu, or visit the web

site: www.soar.ucsc.edu. SOAR is located on the second floor of the Student Union.

Sports or recreation organizations can be contacted through the Office of Physical Education, Recreation, Sports, and Wellness (OPERS): sports clubs at (831) 459-4220; recreation clubs at (831) 459-2806. Broadcast or print media clubs can be reached at (831) 459-2840.

Community Service Opportunities

Community service is a vital part of the university's mission. It is possible for individual students, as well as campuswide student organizations, to develop service projects that link the university with the broader Santa Cruz County community. With the financial support of the campus's Community Service Project funding, students have aided local groups such as Students Toward Achievement in Writing Success, the Strange Queer Youth Conference, and renovation of the Siena House.

The Student Volunteer Connection in the main lobby of the Academic Resources Center connects interested students with the community to volunteer their time to tutor children, mentor youth, feed the homeless, and train people with developmental disabilities.

Service programs also exist through some colleges; check with your college office about opportunities. All the student resource centers (see pages 101–102) also coordinate volunteer efforts on and off campus.

For more information about service opportunities, contact the Student Volunteer Connection, (831) 459-3363 or 459-5707, or your college.

UCSC Student Voice

Santa Cruz offers you a unique variety of opportunities to participate in university governance at the college, campus, systemwide, and national levels. Regardless of what level you choose, participating in student government will provide you with a wonderful chance to practice leadership skills, meet others who share your interests, and learn a great deal about yourself and the university.

Advisory Committees

Serving on a campus advisory committee is a recognized channel for student involvement in the university's decision-making processes. Advisory committees, composed of faculty, staff, and student representatives, are established to develop and recommend policies on a wide range of subjects. Annually, the Student Committee on Committees (composed of one student appointed by each college and chaired by the Internal Vice-Chair of the Student Union Assembly) nominates more than 100 students to serve on over 50 administrative and Academic Senate committees.

For information about the selection process, contact Student Committee on Committees, (831) 459-5533, or the Student Union Assembly, (831) 459-4838.

College Student Governments

Each college has its own form of student government, enabling students to gain experience in planning, budgeting, executing, and evaluating a wide range of college programs and policies. Like the colleges themselves, each college governing body has its own character, structure, and meeting times and dates. For information, inquire in your college office or talk to our college programs coordinator.

Campuswide Student Government

The Student Union Assembly (SUA) is the undergraduate advocacy organization and the official student voice of UCSC. It comprises three representatives from each college government; six elected officers: chair, internal vice chair, external vice chair, organizing director, commissioner of academic affairs, and commissioner of diversity; and one appointed representative from each of the following student organizations that represent historically underrepresented people within the UC system: African/Black Student Alliance; Asian Pacific Islander Student Alliance; The Network (Gay, Lesbian, Bisexual, Transgender, and Intersex Students); Movimiento Estudiantil Chicano de Aztlan; Student Alliance of North American Indians; and Ethnic Student Organization Council. The SUA also provides paid part-time internship opportunities for students each year. These internships include but are not limited to field organizers, treasurers, outreach and publicity, and strategy and planning. The SUA conducts open meetings that are held every Tuesday at 6 P.M. in Bay Tree Conference Room Cervantez and Velazquez throughout the academic year. Students interested in advocacy, activism, and politics, as well as those concerned with their own and their friends' lives, are invited to get involved. The assembly operates via issue-specific campaigns and around general campus concerns. In the past, the SUA has formed campaigns around fighting fee-hikes, defending affirmative action, saving financial aid on a national and state level, striving for reasonable campus growth, and reforming UC Regents' procedures. Current issues have been fighting to make a UC education affordable, fighting to stop balancing budgets on the backs of students, fighting for the rights of UC workers, and working with community groups because UCSC students are also Santa Cruz residents. The SUA also works with the UC Student Association and the United States

Student Association on system, state, and national issues and will host the 2006 Statewide Womyn of Color Conference. For more information, contact the SUA at (831) 459-4838, or visit the SUA office on the second floor of the Student Union.

The Graduate Student Association (GSA) provides governance and representation for graduate students, and its Steering Committee coordinates student-life programs and activities for graduate students. For more information, contact the SGSA, (831) 459-3142, or visit the SUA office on the second floor of the Student Union.

Systemwide Student Government

The UC Student Association (UCSA) is the statewide association of graduate and undergraduate student governments from the 10 UC campuses. UCSA is the officially recognized voice of the students to the UC Board of Regents, various UC administrative offices, and the UC Office of the President. Issues covered by UCSA include UC fees and financial aid, comprehensive admissions policies, and academic policies, as well as broader issues of social responsibility such as environmental concerns and civil rights. UCSA coordinates the yearly selection of the UC Student Regent.

The SUA external office provides grassroots membership and support for the two main UCSA offices in Oakland and Sacramento. The campus office organizes students to run the grassroots campaigns that are adopted each summer during the UCSA Congress. At this session, delegates from the 10 UC campuses come together and choose the critical issues to be worked on for the next year. Issues in the past have included voter registration drives, letter-writing campaigns on particular UC issues, and increases in financial aid. UCSA provides a thorough introduction to UC politics and student representation. Students may also serve on systemwide committees through UCSA and gain a wide knowledge of the entire UC system through their service.

Two officers help to coordinate UCSA activities on our campus. The external vice-chair (EVC) is the official representative to the UCSA Board of Directors. This position has voting rights for UCSC, is the primary contact regarding all UCSA issues, and coordinates all lobbying of UCSA and local, state, and Federal governments on behalf of UCSC students. The organizing director (OD) coordinates with the EVC to effectively run the grassroots campaigns that are sponsored by UCSA every year. These positions are elected for one-year terms during spring quarter every year.

The Student Union Assembly officers in charge of UCSA activities can be reached at (831) 459-4838.

Student Media

UCSC Student Media comprises 25 print publications; KZSC 88.1, the campus radio station serving the campus as well as the tricity Monterey Bay Area; and campus Student Cable Television (SCTV Channel 28). Over 300 students enrich their cocurricular involvement through internships academic credit, as well as fellowship and employment opportunities.

With the greatest broadcasting power of the UC stations, KZSC broadcasts diverse music, news, and public affairs programming. KZSC is a student-governed station with more than 20 students serving in management and leadership positions.

The state and national award-winning student newspaper of record, the weekly *City on a Hill Press*, covers campus, local, national, and international news and offers reviews and commentary. *Fish Rap Live!* publishes twice monthly and provides an alternative forum for free expression of ideas, coverage of local and campus events, and personal journalism. Campus newsmagazines include *EyeCandy*, *TWANAS*, *Kresge Town Krier*, *Leviathan*, *Disorientation Guide*, and *The Project*.

Annual literary journals offer poetry, prose, photography, and art. Examples are *Chinquapin*, *Big Q*, *Red Wheelbarrow*, *La Revista*, *Alay*, *Las Girlfriends*, *Yellowt*, *Matchbox*, and the *Black African Voice*.

SCTV is a student-governed campus cable television station, which programs and broadcasts artistic, narrative, experimental, documentary, and public-service announcement submissions of video and film by 10 broadcasting organizations; these include Banana Slug News, Rainbow TV, Film Production Coalition, Moxie Production Group, Barn TV, SCTV Events, the Community Service Documentation Project, and others. Many of the students are affiliated with the film and digital media major; however, students from all disciplines are encouraged to participate.

If you are interested in contacting any of the Student Media print or broadcast organizations, call the Press Center at (831) 459-2840, KZSC at (831) 459-3811, or SCTV at (831) 459-3917. Visit the web site for links to print and broadcast organizations: studentmedia.ucsc.edu.

Campus Cultural Programs

Throughout the year, UCSC offers frequent and varied cultural opportunities. Students, faculty, and staff have the opportunity to participate as audience members, performers, or behind-the-scenes support crew.

The considerable range of offerings includes art exhibits, lectures, films, concerts, recitals, and dance and drama presentations; programs

vary from single performances to weeklong cultural celebrations. The colleges host a number of events, and the departments frequently engage speakers of particular academic interest to address the campus community or present lecture-demonstrations.

Arts & Lectures (A&L), a series of public performances and residencies by artists of international stature, is presented by University Relations during the year. Past appearances have included the vocalist Bobby McFerrin, the Ailey II dance company, performance artist Laurie Anderson, musician Bonnie Raitt, and the Guarneri String Quartet. Lecturers have included documentary filmmaker Michael Moore, NPR's David Sedaris, the late political columnist Molly Ivins, and environmental advocate Robert F. Kennedy Jr. A&L collaborates with the colleges and academic units in the development of workshops, lecture-demonstrations, and seminars offered by visiting artists, with the common goal of broadening cultural perspectives through the arts. The Arts & Lectures phone number is (831) 459-3861.

The Arts Division maintains a high profile in the community with performances by faculty, student, and guest artists: music recitals are offered regularly, and several major theater, dance, and music presentations are mounted each quarter in conjunction with the academic program.

Full-scale productions by the Theater Arts Department have included the Sondheim musical *Merrily We Roll Along*, *The Good Person of Sezuan* by Bertolt Brecht, and a new translation of Victor Hugo's *Ruy Blas*, *The Princess and the Pea* (coproduced with Shakespeare Santa Cruz). Recent student productions have included classic and contemporary plays such as *Equus* by Peter Shaffer, *In the Blood* by Suzan-Lori Parks, *Bent* by Martin Sherman, and *Language of Angels* by Naomi Iizuku, as well as the annual showcase of student choreography, *Random with a Purpose*.

The Music Department sponsors a variety of concerts by the University Orchestra, Wind Ensemble, Chamber Singers, and Concert Choir, as well as fully staged operas and periodic faculty recitals. Recent performances have featured works such as Mozart's *Requiem*, Rossini's *Petite Messe Solennelle*, and the operas *Don Giovanni* and *The Magic Flute*, Lou Harrison's *Mass for St. Cecilia's Day*, Leonard Bernstein's *Chichester Psalms*, and Morten Lauridsen's *Lux Aeterna*. The department also sponsors concerts by the Jazz Ensembles and Big Band, Percussion Ensemble, and Electronic Music Studios, and ethnomusicology groups such as the West Javanese Gamelan Ensemble and Latin American Ensembles. In addition, the department sponsors a growing number of performances of Indian classical music, with recent

appearances by sarod master Rajeev Taranath and sitar player Pandit Habib Khan, as well as the Pacific Rim Festival of Music in alternate years. Student recitals, class open rehearsals, and informal "Friday at Four" showings round out the calendar.

All students, not just majors, are encouraged to audition for Theater Arts Department and Music Department productions and ensembles. For information about how to get involved, call the Theater Arts Department at (831) 459-2974 and/or the Music Department at (831) 459-2292.

The Music Center, including the 396-seat Recital Hall and Indonesian gamelan and electronic music studios, houses all Music Department programs, as well as performances by visiting artists.

The Theater Arts Center is the setting for a year-round program of drama, dance, and special events. The 528-seat Theater Arts Mainstage, 215-seat Second Stage, 400-seat Media Theater, and modular Experimental Theater, as well as supporting studios and shops provide professional facilities for campus and visiting artists and productions. Other on-campus performance venues include the 153-seat Barn Theater, the Kresge Town Hall, the outdoor Upper Quarry Amphitheater, and the colleges' dining commons. Ticket information is available from the UCSC Ticket Office, located at the Theater Arts Center, (831) 459-2159 (voice or TDD). For additional information about performing arts events, contact the Arts Division Events Office, (831) 459-2787. Online calendar: events.ucsc.edu/calendar.

Shakespeare Santa Cruz

Shakespeare Santa Cruz (SSC), recognized by *USA Today* as one of the 10 "most influential" Shakespeare festivals nationally, is a professional theater company in residence at UCSC, which unites scholarship with academic endeavor. Every July and August, SSC produces a summer season that includes two plays by William Shakespeare as well as non-Shakespeare productions carefully chosen by the artistic director to complement the season. In late November and early December, SSC stages a holiday production, providing high-quality family entertainment. UCSC students are an integral part of this collaboration between SSC and the Theater Arts Department. Students act, build sets, hang lights, work as assistant directors, and run the show under the guidance of SSC's professional artistic team.

SSC offers courses through the university Summer Session; sponsors conferences for scholars, teachers, and passionate theatergoers; and provides opportunities for the community to get involved in the intellectual and theatrical components of Shakespeare. The summer acting

company is composed of professional Equity actors and top nonunion talent from throughout the United States, local professionals, and college-age interns. Production crews are made up of regional and local professionals and also include university students and interns.

Every spring, SSC sends out a touring group of 10 student actors and a stage manager to local schools in Santa Cruz, Monterey, and San Benito Counties. This program, Shakespeare to Go, performs a 50-minute version of one of the plays to be produced in the summer.

For further information, contact the Shakespeare Santa Cruz Office in the Theater Arts Center, (831) 459-2121, or visit the web site: shakespearesantacruz.org.

Bay Tree Bookstore

UCSC's Bay Tree Bookstore is located in the Quarry Plaza complex in the center of campus, at the intersection of Hagar Drive and Steinhart Way. The bookstore serves as the campus resource for UCSC course materials, including new and used course books and customized faculty publications, general reading and reference books, a wide variety of school and personal supplies (including computers and computer supplies), and many other items such as backpacks, emblematic apparel, art supplies, posters, gifts, greeting cards, and academic regalia. Services include online reservations for course materials, student debit accounts, special ordering of books, book buyback services, fax services, and limited check cashing. The bookstore also houses the campus's convenience store (the Express Store), Student ID Card Services, and UCSC's Digital Copy Services (Express It!). For more information, call (831) 459-4544 or visit the web: slugstore.ucsc.edu.

Child Care and Early Education Services

Child Care and Early Education Services offers programs for children of students, faculty, and staff. Enrollment is limited and early application is encouraged since most programs have waiting lists. Free or reduced rates are available to low-income students who qualify.

All programs offer nurturing, homelike environments that are safe and developmentally appropriate. The programs stress the importance of meeting children's needs in all areas of development: social, emotional, physical, cognitive, and creative. The curriculum emphasizes play as a learning process and provides environments that are rich and challenging.

Programs are open to all children without regard to religion, color, ethnicity, gender, and

physical or mental ability. Full- and half-day schedules are offered. The majority of spaces are reserved for students who meet low-income requirements; these spaces are free or have a sliding-scale fee, depending on income. A few spaces with flat monthly fees are reserved for faculty and staff families. Fee-for-service spaces at a reduced rate may be available to student parents whose income exceeds state-subsidy requirements.

Information on all programs, fees, and applications is available from the Child Care and Early Education Services Office in the Community Building at Family Student Housing, (831) 459-2967, or e-mail childcareservices@ucsc.edu. Web: housing.ucsc.edu/childcare

Infant Toddler Center

Located in Family Student Housing, the Infant Toddler Center cares for children from 3 to 36 months. Small groups, low child-to-adult ratios, and primary caregivers ensure consistent and individualized care and nurturing. The Infant Toddler Center operates year-round, with closures for administrative holidays, academic breaks, and staff development.

Granary Child Development Center

Located near the main entrance to campus, the Granary Child Development Center provides care and education for preschool children ages 2–4 years. The Granary operates year-round, with closures for administrative holidays, academic breaks, and staff development.

Children's Center

Located in Family Student Housing, the Children's Center provides care for prekindergarten children ages 4 to 6 and after-school care for children in kindergarten. The Children's Center program provides a rich curriculum that prepares children for kindergarten and school. The Children's Center operates year-round with closure for administrative holidays, academic breaks, and staff development.

School Age Center

Located in Family Student Housing, the School Age Center is an after-school recreation program for children in kindergarten through sixth grade during the academic year. The program provides developmentally appropriate arts and crafts, life-skills and sports activities, occasional community outings, and quiet time for homework. Extended service hours are available on a preregistration basis for elementary school holidays or in-service days. An all-day Summer Recreation Program is also offered for children of UCSC students, faculty, and staff.

UCSC Alumni Association

UCSC's graduates—more than 70,000 of them—can maintain a lifelong connection to the campus through the UCSC Alumni Association. Through the dues they pay, Association members contribute to the living-learning environments at each college and the enrichment of the entire campus. Thirty percent of annual membership dues directly support student programs, special activities, and other projects at the colleges and campuswide.

The association promotes excellence at UCSC by making three annual awards. It supports students by offering two types of awards (college service and financial need), and enriches campus and college intellectual life through its Distinguished Visiting Professor program and endowment.

Hundreds of alumni return to campus during the annual Reunion Weekend to enjoy receptions, tours, panel discussions, and other programs through which they reconnect with old friends, faculty, and students. Thousands more reconnect through the association's Online Community (alumni.ucsc.edu), which offers an online alumni directory, association event information and RSVP services, and much more.

Alumni are keenly interested in career issues. More than 1,000 of them act as career mentors online through the Online Community and Career Services' Career Advice Network, and in person at the annual Multicultural Career Conference and similar events. The Alumni Association, in partnership with other UC Alumni Associations, brings politically minded graduates to Sacramento for an annual legislative conference aimed at increasing support for UC.

Alumni reconnect at events offered by regional groups across the nation and by six affinity groups.

Members of the Alumni Association enjoy a range of benefits. These include use of the campus pool and recreation facilities, an alumni affinity e-mail account, insurance coverage, use of a UC vacation center, UC Extension discounts statewide, library privileges across the entire UC system, the online Digital Library, invitations to alumni events, and more.

News of alumni is featured in the campus's magazine, the *UCSC Review*, in the association's exclusive membership newsletter, the *Banana Slug Bulletin*, and its e-mail newsletter, the *eSlug Bulletin*.

Information about the Alumni Association is available at its campus headquarters in the Carriage House, locally at (831) 459-2530, toll-free at (800) 933-SLUG, via e-mail at alumni@ucsc.edu, and on the web: alumni.ucsc.edu.

Programs and Courses

Programs are listed alphabetically.



Programs and Courses

The academic programs offered at UC Santa Cruz are described in detail in this section. Curricula, courses, and degrees listed in this catalog are subject to change through normal academic channels. New proposals and changes are initiated by the relevant departments, divisions, or colleges and approved by the appropriate academic dean and by the Committee on Educational Policy or the Graduate Council. The designations F (fall), W (winter), S (spring), or Sum (summer) that appear at the end of each course indicate the intentions of the academic units; however, on occasion, the actual scheduling of classes may change.

For changes and additions to courses listed in this catalog, consult the *Schedule of Classes*, published each quarter and available on the web at reg.ucsc.edu/soc/. Students may also view the university catalog on the web at reg.ucsc.edu/catalog/. Course syllabi, when provided by faculty, can be accessed via Advance Course Information (ACI) at reg.ucsc.edu/soc/acil/. The Office of the Registrar also provides detailed information on its pages at reg.ucsc.edu.

Course Credit

Unless otherwise specified in the course description, each course earns 5 quarter credits. Therefore, regardless of course format or scheduling, each course makes approximately equal demands on enrolled students. Five (5)-credit courses usually meet for four to five hours per week.

All physical education courses are noncredit. Other noncredit courses include certain graduate seminars. Laboratory courses, music courses involving individual lessons or ensemble participation, as well as some special-interest seminars and individual studies courses carry fewer than 5 credits and are designed accordingly.

The normal UCSC undergraduate program of study is three 5-credit courses per quarter or equivalent. In 12 quarters at UC Santa Cruz, most students complete 180 credits. With a college's approval, a student may be allowed to vary the course load. See also Part-Time Program, page 39.

Course Numbering

Undergraduate courses are classified as lower division or upper division. Lower-division courses (numbered 1–99) are designed for first-year and sophomore students but may be taken by more advanced students. Upper-division courses (numbered 100–199) are designed for junior and senior students but are open to first-year and sophomore students who have sufficient background and the consent of the instructor in charge.

Graduate courses (numbered 200–299) are either restricted to graduate students or open only to students who can show the instructor that they have completed sufficient upper-division course work basic to the subject matter of the course.

Footnotes

Courses marked with an asterisk (*) will not be offered in the 2008–09 academic year. Courses

marked with a dagger (†) will be offered, with the quarter as yet to be determined.

General Education Codes

The general education codes that appear in some course descriptions are explained in the section on general education requirements, page 26.

Course Format

Most courses at UC Santa Cruz are taught as lectures or, when the class is small enough for considerable discussion, as seminars. A large number of courses require enrollment in a secondary discussion section scheduled at a different time from the primary course. Sometimes there is laboratory or fieldwork associated with a course.

Occasionally, a student may wish to do an individual project as part of the work for a course. UC Santa Cruz instructors are usually quite willing to consider and evaluate such work, time permitting. The campus system of evaluation of student performance makes such individual work a natural option, even in larger classes.

Prerequisite Policy

When applicable, prerequisites are listed in this catalog within the course description for each course. There are many courses that meet general education requirements and do not require a prerequisite.

Prerequisites come in many forms—for example, specific courses, placement examinations, or “satisfaction of the Entry-Level Writing Requirement” for writing courses. Some course descriptions also specify that students must be declared majors or seniors in order to enroll. Other course descriptions recommend the appropriate background for a course—for example, “ability to use algebra and solve problems.”

Questions concerning prerequisites should be directed to the instructor of the course or the respective department office. Students who have not met all prerequisites may be excluded from a course. Alternatively, the instructor or a department adviser may waive the prerequisite based on demonstrated competence or equivalent academic experience.

Class Size

A student's class level plays a large part in how many small classes are available. Introductory classes tend to be large, although they are usually accompanied by required small sections or labs. Many small classes have prerequisite courses that enroll large numbers of students. Also, certain large classes fulfill campuswide general education requirements. First-year students experience at least one small seminar in conjunction with the college core course, and they are likely to experience an increasing proportion of small classes as they progress to senior status.

Individual Study

Especially in the upper division, students may arrange special courses to pursue independently, under the guidance of faculty members. A study plan should be devised with a faculty member in the general subject area of interest. The faculty member will ultimately be responsible for evaluating the work done. Students submit individual study petitions to the course sponsoring agency for approval.

Field Study

Independent, off-campus field study is available through many departments. It is handled in much the same way as individual study. In addition, there are several established field programs that offer a variety of full- or part-time off-campus field placements as part of the regular program of academic study. For more information on these programs, see page 40.

Apprentice Teaching

An upper-division or graduate student may apply for approval to teach an undergraduate seminar of his or her own design. The seminar is supervised by a faculty member and carries normal academic credit for the students and the apprentice teacher. Interested students should initiate a proposal with a faculty member in the appropriate subject area.

Credit by Petition

Regularly enrolled students may obtain full academic credit for a course by challenging the course. Challenging the course entails passing an examination or completing an appropriate body of work supervised by a regular instructor for the course. The petition for such credit must be approved by the instructor of the course, the chair of the department offering the course (or provost, if it is a course offered by a college), and the provost of the student's college. Some courses are not considered appropriate for credit by petition.

For foreign language students, credit by petition may not be used by students whose language ability greatly exceeds the course level proposed for challenge. Petitions for credit for levels 4 and 5 cannot be filed in the same quarter. Contact the Language Program, 239 Cowell, 459-2054, for more information.

Auditing of Classes

Instructors may permit nonenrolled students to attend their classes when space is available after all students who wish to enroll officially have done so. An instructor is not obligated to devote time to the work of students who are not officially enrolled in the class.

Additional Courses of Interest

Sometimes, in addition to the program description, departments include related courses offered by other academic units under the heading Additional Courses of Interest. Some of these courses may be accepted in partial satisfaction of the major requirements. Students should consult with the chair of the program offering the major about the availability of major credit for enrollment in related courses. The full descriptions of the related courses should also be checked for prerequisites.

American Literature

Students wishing to pursue a course of study in American literature should consult the English-language literatures concentration in national/transnational literatures under Literature, page 337.

American Studies

209 Humanities 1
(831) 459-4658
<http://amst.usc.edu>

Faculty and Professional Interests

MICHAEL H. COWAN, Professor, American Studies
American cultural theory and history, history of American studies, symbolic expression in American life, urban cultural studies, American literary studies, studies in the institutional culture of higher education

JOHN DIZIKES, Professor Emeritus, American Studies

ANN M. LANE, Emerita, American Studies

KIMBERLY J. LAU, Associate Professor; Provost, Oakes College

Feminism, discourse, and power; feminist theory; discourse, analysis, and ethnographic methods; folklore and narrative; globalization

AMY LONETREE, Assistant Professor, American Studies

Indigenous history, museum studies, memory and American history, Native American cultural production, public history, and Ho-Chunk tribal history

ERIC C. PORTER, Associate Professor, American Studies

Black cultural and intellectual history; U.S. cultural history and cultural studies; comparative ethnic studies; popular music and jazz studies; race, science, and technology

CATHERINE S. RAMIREZ, Associate Professor, American Studies

Chicana and U.S. Latino literature, culture, and history; gender studies and feminist theory; visual culture and style politics; cultural studies; popular and urban youth cultures; speculative fiction, Afrofuturism, and Chicanofuturism; science, technology, race, and gender; theories and methods of American studies

RENYA K. RAMIREZ, Associate Professor, American Studies

Native American studies, Indian identity, Native Americans and anthropology, urban Indians, Native American women, cultural citizenship, expressive culture, and anti-racist education

FORREST G. ROBINSON, Professor, American Studies

Nineteenth- and 20th-century American literature, including Mark Twain, the American West, and popular culture; biography and American culture theory

JUDITH YUNG, Professor Emerita, American Studies



DAVID H. ANTHONY, Associate Professor, History
African and African American history, art, music, literature, and cinema; eastern and southern Africa; African languages; Indian Ocean world; African and African American linkages; Islamic civilization; African diaspora studies; world history

ROBERT F. BERKHOFFER, Professor Emeritus, History

MICHAEL K. BROWN, Professor, Politics
Inequality, race and African American politics, political economy, political development of welfare states, theories and methods of historical social science

DAVID T. BRUNDAGE, Associate Professor, Community Studies
American working-class and immigration history, history of U.S. social movements, Irish history and politics

PEDRO G. CASTILLO, Associate Professor, History
Chicano/a history and culture; American social and urban history; race, class, and gender in California history, immigration history, Latin@s in the U.S.

JOHN B. CHILDS, Professor, Sociology
Ethnic conflict and transcommunal cooperation; sociology of knowledge; African American, Native American, Latino interactions

ANGELA Y. DAVIS, Emerita, History of Consciousness

BARBARA L. EPSTEIN, Professor, History of Consciousness
Social movements and theories of social movements, 20th-century U.S. politics and culture, Marxism and related theories of social change

SUSAN GILLMAN, Professor, American Literature
Nineteenth-century American literature and culture; theories of culture, race, and gender; world literature and cultural studies

HERMAN S. GRAY, Professor, Sociology
Cultural studies, media and television studies, black cultural politics, social theory

KIRSTEN S. GRUESZ, Professor, Literature
Transnational Americas studies; Chicano/Latino literatures and cultures; 19th-century U.S. and Latin American literature; poetry; history of the book; reading and literacy; bilingualism

LISBETH HAAS, Associate Professor, History
U.S.-Mexico borderlands, Chicano and Native American history; visual culture in the colonial Americas; the U.S. West and California; historical memory, theory, and historical methodology

JUDITH A. HABICHT MAUCHE, Professor, Anthropology
Precontact and early contact North American cross-cultural interaction and trade; ceramic technology; archaeology of gender, power, and identity; Southwest and Southern Plains

SUSAN F. HARDING, Professor, Anthropology
Culture, politics, narrative, gender, local/global studies, ethnographic writing, fundamentalism, Christianity, state-making, aging, America, and Spain

NATHANIEL E. MACKAY, Professor, Literature
Twentieth-century American literature, Afro-American literature, creative writing

OLGA NÁJERA RAMÍREZ, Professor, Anthropology
Folklore theory, ritual, festival, dance, greater Mexican culture, history and folklore, transnationalism, identity; expressive culture, ethnomusicology, bilingual communication, gender, history, and culture of Latin America, the U.S., and Mexico

TRILOKI N. PANDEY, Professor, Anthropology
Native peoples of North America, cultures of India, political anthropology, anthropological theories and comparisons

MARY B. PUDUP, Associate Professor, Community Studies
Regional studies, economic justice, public policy, historical geography of the U.S.

PAUL N. SKENAZY, Emeritus

NANCY E. STOLLER, Emerita, Community Studies

DANA TAKAGI, Professor, Sociology
Social inequality and identity, research methods, race relations, nationalism and social movements

MARILYN J. WESTERKAMP, Professor, History
British colonial and revolutionary America, early modern cultural and religious history, U.S. religious history, women's history, gender

DANIEL J. WIRLS, Professor, Politics
American politics, including national political institutions (Congress) and the President; public policy (military and foreign policy) and political history

DEBORAH WOO, Emerita, Community Studies

ALICE S. YANG-MURRAY, Associate Professor, History
Historical memory, Asian American history, gender history, race and ethnicity, 20th-century U.S., oral history

PATRICIA J. ZAVELLA, Professor, Latin American and Latino Studies
Chicano/Latino studies, women's work and domestic labor, poverty, family, sexuality and social networks, feminist studies, ethnographic research methods, and transnational migration of Mexican/worker and U.S. capital

Program Description

The American studies program is committed to a self-critical and historically grounded examination of the United States and its diverse people, viewed within a local and global context. The major is designed to be comparative along a number of axes. First, it is an interdisciplinary project, drawing on a mix of methodological and theoretical approaches. Second, it compares the United States with other imperial enterprises and states. And third, it compares different social groups and identities in historical context. The program aims to help students develop critical thinking, research, and writing skills so that they will be able to function effectively in an ever-changing, complicated, and culturally diverse world.

Students will take courses and work closely with faculty who are committed to interdisciplinary, multicultural, and transnational work and who include these interlocking themes in their courses: (1) Political Culture and Economy addresses the ways in which global capitalism structures everyday life and life chances in the United States; (2) Comparative Race, Ethnicity, and Diaspora Studies features research concerning the myriad relations among different racial, ethnic, and diasporic groups; and (3) Cultural Representations and Practices support research into the history, aesthetics, and politics of different cultural forms, including music, visual culture, literature, film, mass media, popular culture, and vernacular performance.

Because of their broad-based exposure to the United States, collective learning experience, and ability to focus on topics of particular interest to them, American studies students find the major a useful preparation for careers in education, law, journalism, social work, community organizing, business, and government. The major also offers an excellent liberal education for students interested in exploring their responsibilities and opportunities as American citizens. Students who intend to go on to graduate school, whether in American studies or another discipline, should determine an appropriate selection of courses with their American studies faculty adviser.

Requirements for the Major

Students wishing to pursue a major in American studies must submit a proposed study plan specifying courses of study that satisfy the requirements for the major in a coherent manner and, at the same time, enable efficient pursuit of their particular interests. The study plan must be approved by the American Studies Department before the student is formally accepted into the major. Students are urged to submit their study plan no later than the third quarter of their sophomore year or, in the case of transfer students, no later than the first quarter of their junior year. Forms and information about the major are available from the American Studies Department office in 209 Humanities 1.

Upon acceptance to the major, each student should meet first with the departmental staff adviser and then a faculty adviser from the department. Through periodic conferences with these advisers, students can make appropriate revisions in their major plans and decide on the best way to fulfill the comprehensive requirement.

Course Requirements

To graduate with a major in American studies, a student is required to complete 12 courses with the approval of the department:

- American studies 10;
- one lower-division course chosen from the American studies 80 series;
- nine upper-division courses chosen from 100–189. Two courses outside the program that are integrated and related to American studies may be used to meet this requirement: e.g., two language courses in the same language at level 4 or above or two Education Abroad Program (EAP) courses or two upper-division courses in the same department or two upper-division courses in an area of U.S. ethnic study or 10 credits of fieldwork or internship;
- one senior seminar from the 190 series to fulfill the comprehensive exit requirement in the major; students may petition to complete a senior thesis project or teach a senior-directed seminar in lieu of taking the senior seminar.

Graduate Studies

Graduate students in the Literature and History of Consciousness Departments may work toward a parenthetical annotation in American studies on their Ph.D. degree documents. Students in other departments must initiate the request through their home departments. Guidelines and application forms are available in the American Studies Department office in 209 Humanities. The following are required for the annotation:

- a designated graduate adviser who is a faculty member of the American Studies Department and who will serve on the student's qualifying examination or dissertation committee;
- submission of a significant piece of scholarly writing in the area of American studies;
- five graduate courses in American studies selected from relevant offerings of any UCSC department or program, with at least three courses taught by faculty members of the American Studies Department;
- teaching experience as a teaching assistant or instructor in an American studies course.

Lower-Division Courses

10. Introduction to American Studies. F,W

Introduction to American studies through interdisciplinary examination of past and present California and its diverse peoples. Addresses social, political, and cultural issues, and examines California with attention to regional, national, and global contexts. (Formerly course 1, *America and Americans*.) Satisfies American History and Institutions Requirement. (General Education Code(s): IH, E.) (F) C. Ramirez, (W) A. Lonetree

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

80E. U.S. Racial and Ethnic Histories and Formations. F,W

Introduces key concepts and debates in study of race and ethnicity in U.S. by focusing on a particular ethnographic group (e.g., Native Americans, Mexican Americans, Asian Americans, African Americans) or by developing a comparative perspective. May be repeated for credit. (General Education Code(s): T5-Humanities and Arts or Social Sciences, E.) (F) A. Lonetree, (W) *The Staff*

80F. Introduction to U.S. Popular Cultures. F

Introduces key concepts and debates in popular culture and media studies and discusses their importance in relation to American studies. Addresses these issues by examining films, television programs, musical recordings, fashion, and so on and the ways in which they are produced, distributed, marketed, and consumed. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *The Staff*

80G. Introduction to U.S. Political Cultures. S

Introduces key concepts and debates around topics such as political economy, nationalism, globalization, citizenship, class, and social movements and addresses their importance to American studies. Examines these issues through attention to political theory, social transformations, and cultural representations. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *The Staff*

93. Field Study. F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

100. Key Concepts in American Studies. W,S

Provides majors with an in-depth introduction to American studies and the major at UCSC. Introduces key American studies concepts and highlights the emphases of this major. Careful attention paid to critical reading skills and analytical writing. Required of all American studies majors. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to American studies majors. Enrollment limited to 25. (General Education Code(s): W.) (W) C. Ramirez, (S) *The Staff*

101. Race and Ethnicity. *

A critical examination of sociological and historical literature on race/ethnic formations and relations in U.S. society within the socioeconomic and political contexts of capitalism and colonization. Concepts and theories are applied to contemporary issues of race and ethnic

relations. Course 1 recommended as preparation. Enrollment restricted to American studies majors. Enrollment limited to 24. (General Education Code(s): E.) *The Staff*

102A. Gender and U.S. Society. S

Introduction to the gendered analysis of U.S. society and culture from theoretical and historical perspectives. Particular attention given to the ways in which gender intersects with racial, ethnic, and class differences, focusing on the themes of work, politics, and sexuality. Course 1 is recommended prior to taking this course. *K. Lau*

102B. Sexuality and Culture. *

Examines how aspects of sexuality (such as sexual identities, preferences, roles, and desires) are fundamentally shaped by social-cultural and psychological factors. Topics include gender formation, the social construction of sexuality, and the historical emergence of the modern "gay" and "lesbian" identity of the U.S. Recommended for senior American studies majors. *The Staff*

105A. Oral History. *

Study and application of the theories, methods, and ethical issues involved in the practice of oral history. Critical readings and writing exercises will culminate in a 20-page oral history project. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to American studies majors. Enrollment limited to 24. (General Education Code(s): W.) *K. Lau*

105B. Understanding "America" through Ethnography. *

Examines ethics and politics of ethnographic research and various methodologies. Students collect their own ethnographic data to be analyzed with relevant theory in a final capstone project. Enrollment restricted to senior American studies majors. Enrollment limited to 20. *R. Ramirez*

107A. U.S. Popular Culture: 1800–1918. *

A survey of major popular cultural forms and texts in the pre-WWI era including Minstrelsy, Uncle Tom's Cabin, P.T. Barnum, Ramona, The Wizard of Oz, and Birth of a Nation, with attention to historical context and theory. *F. Robinson*

107B. U.S. Popular Culture: 1920–Present. *

Major popular cultural forms from the 1920s to the present. Topics include early "race" recordings; Depression radicalism; WWII entertainments; the Cold War; popular film genres; the 1970s and 1980s contemporary music (conjunto, jazz, rock, and rap). Particular attention to multicultural issues. Course 107A recommended. *E. Porter*

109A. Technology and American Culture. *

Assesses political conditions under which the U.S. became committed to certain technologies, discusses merits of recent accounts of "crisis" in our politics and environment, and examines alternatives to mainstream politics and technology. Enrollment restricted to sophomores, juniors, and seniors. *The Staff*

109B. Science Fiction in Multicultural America. W

Science fiction by authors and artists of diverse cultural backgrounds, contextualized within the political and economic conditions of the U.S. Enrollment restricted to sophomores, juniors, and seniors. *C. Ramirez*

111A. The West in American Culture. *

Features texts with Western settings and with representative casts of Western characters. The often contradictory

patterns that emerge from this regional literature and the qualities that attach to its familiar hero are explored. *F. Robinson*

112. Immigration and Assimilation. S

Examines immigration to U.S. from colonial era to present with special emphasis on issues of citizenship, social identities, and social membership. *The Staff*

113A. Imagining America. F

Examination of varied and often conflicting ways the ambiguous entity conventionally labeled "America" has been imagined, both positively and negatively, in political speeches, painting, fiction, film, television, music, drama, advertising, parades, and other modes of expression. *The Staff*

114A. Politics and American Culture. *

Examination of major conceptions of citizenship in the context of American society and culture, with particular attention both to the sources of these conceptions in Western political thought and to their elaboration and testing in specific historical situations. Enrollment restricted to juniors and seniors. *The Staff*

114B. Marxist Thought in American Culture. F

Explores history of Marxist thought and activism in the U.S. with special emphasis on uses and effects of Marxism within aggrieved communities of color. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *The Staff*

114C. Labor in U.S. Society. *

Examines the history of work and class in U.S. society with particular attention to how race and gender inform the constructions of multiple working classes. Drawing upon primary and secondary materials, the course analyzes the formations of labor unions, regional labor patterns, and the development of the capitalist market economy. *The Staff*

121C. Mixed Race in America. *

Examines what it means to be of mixed race in America along historical, social, political, and cinematic lines. Theories on racial and identity formation applied to understanding multiracial experiences of various racial groups in the U.S. (General Education Code(s): E.) *The Staff*

123. Native American Studies.

123F. Native American Women. W

Introduces students to the history of Native North American women's lives. Topics include the impact of colonization and Christianization on Native women, political activism, the role of Native women in tribal politics, and contemporary artistic production. (General Education Code(s): E.) *R. Ramirez*

123H. Native Americans: Decolonization, Identity, and Resistance. *

This course examines how Native Americans are constructed by the dominant discourse on race, culture, and gender and how they subvert these negative representations through autobiography, novels, and humor. (General Education Code(s): E.) *R. Ramirez*

123M. Celluloid Natives: American Indian History on Film. F

Examines how American Indian history and culture has been portrayed in Hollywood films, with an emphasis on films that represent Native Americans over the broad spectrum of Native American/white relations. (General Education Code(s): E.) *A. Lonetree*

123T. Inventing the Savage. S

Examines how colonialism is at the root cause of cultural trauma in Native American communities; how colonialism affects both the colonizer and the colonized; how Native American scholars have theorized cultural trauma; and using novels, how Native Americans create strategies to heal from the negative effects of colonialism. (General Education Code(s): E.) *R. Ramirez*

123X. American Indian History in the Twentieth Century. *

History of Native peoples of the U.S., from 1900 to present, with emphasis on Indian/white relations and continuing development of federal Indian policy and its impact. Attention also given to the persistence, change, and adaption of Native cultures to historical and contemporary social conditions. (General Education Code(s): E.) *A. Lonetree*

123Z. Native Americans and Museums. *

Provides a historical overview of the relationship between American Indians and museums. Current issues and practices in museums—primarily those associated with ethics, collecting practices, exhibitions, education/interpretation, and administration/governance—explored. (General Education Code(s): E.) *A. Lonetree*

125. African American Studies.

125A. Aspects of African American Culture. *

A seminar examining the dominant and defining characteristics of African American culture, covering such areas as folklore, religion, politics, music, verbal arts, and social ritual, as well as more "everyday" manifestations of the culture. May be repeated for credit. (General Education Code(s): E.) *The Staff*

125E. Jazz Cultures. W

Explores the meaning of jazz in American culture, particularly the social and cultural forces that have produced different jazz styles and the various ways that social conflicts and ideals have been displaced onto jazz. A prior familiarity with the music itself will be helpful but is not required. (General Education Code(s): E.) *E. Porter*

125G. African American Life in the City. *

Examines social and cultural history of three black urban communities: Chicago, Los Angeles, and New York. Focusing primarily on the mid-to-late 20th century; considers black life through sociological, musical, literary, and historical sources. (General Education Code(s): E.) *The Staff*

125H. Black Feminism. *

Explores elements of African American feminist thought and its articulation in writings, music, literature, and practice/activism in 20th-century U.S. Sexuality and reproduction is a primary theme—especially motherhood, politics of reproduction, and sexual narratives. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to junior and senior American studies majors. Enrollment limited to 25. (General Education Code(s): W, E.) *The Staff*

125X. Hip Hop Music Culture. *

Examines hip hop music and culture since its inception and addresses the contexts for its emergence in U.S. cities: sampling, cultural crossings, market forces, aesthetics, popular culture debates, race, culture, gender, sexuality, and class. (General Education Code(s): E.) *The Staff*

126. Chicano Studies.

126B. Chicana/o Music. *

Examines Chicana/o music. Topics include corridos and border rebellion, music and social movements, Chicano radio and record industries, Chicanas/os and the emergence of rock and roll, Latin American/Latino music, and contemporary Chicana/o music. (General Education Code(s): E.) *The Staff*

126C. Chicana/o Literature and Film. *

Examines the formations and contestations of social, political, and cultural identities for Chicanas and Chicanos through a critical study of select Mexican American texts and films. (General Education Code(s): E.) *The Staff*

127. Asian American Studies.

127A. Aspects of Asian American Culture. *

Selected topics on Asian American culture, religion, music, foodways, literature, theater, film, and/or art. May be repeated for credit. (General Education Code(s): E.) *The Staff*

127C. Asian American Literature and Culture: Memories of War. S

Course assumes that war is key element in transpacific formation of Asian America and attempts to examine wars in Asia/Pacific region from Filipino-American through the Pacific, Korean, and Vietnam Wars U.S. has participated in and to ask how war memories have shaped the Asian American experience and re-configured notion of the homeland. Looks at specific Asian American texts to discuss issues of ethnicity, politics of memory, immigration, and diaspora in respective war context and considers impact of cold war as transpacific structure of ideological determination. Enrollment limited to 60. (General Education Code(s): E.) *The Staff*

127D. Filipino Americans: History and Culture. *

Examines the history and culture of Filipinos in the U.S. from 1763 to present day within the context of colonial and postcolonial relations between the Philippines and the U.S. Topics include immigration, labor, community, identity, politics, and contemporary issues. (General Education Code(s): E.) *The Staff*

127E. Asian American Women. S

Examines the intersectionality of race, class, gender, and sexuality in the history and lives of Asian American women from a woman-centered perspective. Topics include immigration, work, family, identities, exploitation, and political and social activism. Students cannot receive credit for this course and History 189. (General Education Code(s): E.) *The Staff*

127F. Chinese Americans: History and Culture. *

Examines the history, culture, and politics of Chinese Americans from the California Gold Rush to present day within the context of socioeconomic and political developments in China and the U.S. Topics include immigration and labor patterns; race, gender, and class dynamics; family and community development; identity politics; and cultural expressions. (General Education Code(s): E.) *The Staff*

127K. South Asian Americans. *

Examines South Asian migration to the U.S., with specific attention to historical and political contexts of immigration and to (re)configurations of culture, politics, and identity in the South Asian American diaspora. (General Education Code(s): E.) *The Staff*

141. The Great Book of America. *

The course will feature texts that were conceived as, or have been widely received as, expressions of themes and values that are especially or essentially American. Moby Dick, Walden, Leaves of Grass, and Huckleberry Finn are such books. *F. Robinson*

145. Mark Twain and American Culture. W

A survey of Mark Twain's major writings with special attention to biography and historical content. The writer's status as a leading cultural spokesperson is also explored. Satisfies literature major requirement. Students cannot receive credit for this course and American Literature 120B. *F. Robinson*

157. Sexual Identities and Communities. *

Examines how gay, lesbian, bisexual, and transgendered people negotiate the intersections of their sexual and gender identities with their racial, ethnic, and class identities in the contemporary U.S. Considers the ramifications of these intersections for notions of "gay issues" and "queer communities." *The Staff*

180. Special Topics in American Studies. W

Highlights important, relevant, and topical themes in American studies and society. By closely examining one topic or theme, students connect larger issues and think across areas of study. Topics include: the prison industrial complex; radical traditions in America; race and cultural exchange; and citizenship in America. May be repeated for credit. *The Staff*

188. 9/11. *

Considers the events of September 11, 2001, and the subsequent changes in U.S. society and in the country's role across the globe. Focuses on three arenas where these transformations have occurred: politics, culture, popular culture, and racial and ethnic relations. *E. Porter*

190. Senior Seminars.

Capstone seminars enable American studies seniors to apply their overall training in interdisciplinary research and analysis to major problems in the field. Topics vary from year to year. Satisfies American studies senior comprehensive requirement.

190C. Debating American Culture. *

Examines major debates about national culture in the U.S., considered in the context of ethnic, class, gendered, and other subnational and transnational cultural formations and of relevant social, political, and cultural theory. Enrollment restricted to senior American studies majors. Enrollment limited to 20. *The Staff*

190D. New Directions in American Studies. S

Examines the history and state of the field of American studies. Investigates current debates in the field, with a focus on recent calls for a "post-nationalist" American studies, and begins to chart some of the directions in which the field is moving. Encourages students to reflect on their education in American studies at UCSC. (Formerly *American Studies and Cultural Studies*.) Enrollment restricted to senior American studies majors. Enrollment limited to 20. *C. Ramirez*

190E. Rethinking American Studies. *

As a culminating experience in the major, the seminar intends to encourage seniors to meditate critically on what American studies is and what it will be in the future. Focuses much attention on recent calls for a "post-nationalist" American studies, considers the possibilities/problems such imperatives bring, and analyzes recent work in this direction. Enrollment limited to 20. *The Staff*

190H. Race, Politics, and Region. *

Examines race relations in western U.S. with particular emphasis upon California since 1945. Students examine the experiences of African Americans, Asian Americans, European Americans, Mexican Americans, and Native Americans and how class and gender politics shape and, at times, become the language for race relations. Enrollment restricted to senior American studies majors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

190L. Culture and Politics of Virtual Worlds. F

Explores the ways in which the virtual and the real overlap, constitute, and critique each other, and uses each to illuminate cultural and theoretical discussions around race, gender, sexuality, and labor. Enrollment restricted to senior American studies majors. Enrollment limited to 25. *K. Lau*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) For students with upper-division standing who have submitted a proposal supported by a faculty member willing to supervise. *The Staff*

193. Field Study. F,W,S

Individual studies program undertaken off campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195A. Senior Project. F,W,S

For students continuing work on their senior thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195B. Senior Project. F,W,S

For students continuing work on their senior thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Individual study program off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. Approval of student's adviser and certification of adequate preparation required. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses**200. Proseminar in American Studies. W**

Introduces graduate students to current theories and methods in American studies, to the history of the field, and to the faculty in the department. Required introductory seminar for all students wishing to pursue a parenthetical notation in American studies. Enrollment restricted to graduate students. Enrollment limited to 10. *E. Porter*

205. Theorizing American Culture. *

A selective examination of theoretical and methodological issues central to American studies, of the history of attempts to consider the U.S. as manifesting a cultural system, and of contemporary critiques that problematize the focusing of cultural analysis on a nation-state. Enrollment restricted to graduate students. *H. Berger, F. Robinson*

207. Politics of Popular Music. *

Engages a number of the critical theoretical and methodological issues raised in contemporary studies of popular music. Explores these issues while reading case studies that range across scholarly disciplines and musical genres. Enrollment restricted to graduate students. Enrollment limited to 10. *E. Porter*

208. Readings in the History of the U.S. West. *

Explores recent trends in historical scholarship on the U.S. West, including the use of Western resources, the relationship between urban and rural places in the West, and the diversity of Western peoples. In order to reflect on the variety of ways in which scholars communicate their understandings of history, students also read a variety of academic books. Enrollment limited to 20. *The Staff*

210. Studies in Early American Nationality. *

Examines the relationship of the attempts to legitimize U.S. nationhood in the late eighteenth and nineteenth centuries and the construction during this period of the concept of a national culture. Particular stress is given to the ideological functions served by the developing conception of American nation as both polity and culture. Enrollment restricted to graduate students. Enrollment limited to 8. *R. Ramirez*

211. Nativity, Culture, Race, and Space. *

This seminar examines the concept of "nativity" (of being or claiming to be native to a particular location) and how it functions in historical and contemporary conflicts, ranging from historical settler colonialism to contemporary gentrification of urban areas. Enrollment restricted to graduate students. Enrollment limited to 10. *The Staff*

222. Tradition and Modernity in Black Culture. *

Examines the interplay of past and present in expressive culture by, for, and about African Americans, especially in respect to artistic and social innovations and their relationships to history, collective memory, and tradition. Upper-division students may enroll via permission code from instructor. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

223. Cultural Citizenship. *

Seminar examines the right to be different and belong in a participatory, democratic sense. Explores vernacular definitions of what confers political and cultural entitlement, taking into consideration factors ranging from the economic to notions of dignity and respect. Enrollment restricted to graduate students. Enrollment limited to 10. *R. Ramirez*

225. Black Feminist Thought and Practice. *

Explores the development of African American feminist thought and its articulations in writing, music, literature, and practice in the 20th-century U.S. Black women's sexuality a major theme, especially motherhood, politics of reproduction, and sexual narratives. Enrollment restricted to graduate students. Enrollment limited to 10. *The Staff*

226. Comparative American Studies: Race and Difference in Global Perspective. *

Explores race and difference in global perspective. Examines the relationship between democracy and pluralism,

with a focus on the movement of people between the global south and global north. Enrollment restricted to graduate students. Enrollment limited to 15. *C. Ramirez*

227. Studies in Black Cultural and Intellectual History. *

Examines key figures and movements in black intellectual and cultural history. Special consideration given to radical and avant-garde thought and expression. Specific focus varies from year to year. Enrollment restricted to graduate students. Enrollment limited to 10. *E. Porter*

295. Directed Reading. F,W,S

Directed reading which does not involve a term paper. Designed for graduate students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

A seminar study group for graduate students arranged between students and faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Independent study for graduate students who need to establish a research area for their thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Independent thesis research for graduate students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Anthropology

361 Social Sciences 1 Building
(831) 459- 3320
<http://anthro.ucsc.edu/>

Faculty and Professional Interests

Professor

DONALD BRENNIS

Linguistic anthropology, folklore, legal anthropology, ethnomusicology, overseas Indians, South Asia, disputing and dispute management, legal language, bureaucratic institutions

NANCY N. CHEN

Medical anthropology, visual anthropology, urban anthropology, Asian American identity, mental health, food, China

MAY N. DIAZ, Emerita

SHELLY ERRINGTON

Globalization of folk art, visual and social semiotics, photography, film, the Internet and digital media, Southeast Asia, and Latin America

ALISON GALLOWAY

Skeletal biology, forensic anthropology, human variation, history and ethics of physical anthropology, reproductive energetics and aging

DIANE GIFFORD-GONZALEZ

Neolithic Africa and Eurasia, colonial New Mexico, origins of food production, pastoralists, zooarchaeology, history of archaeology, interpretive theory, visual anthropology

JUDITH A. HABICHT-MAUCHE

Precontact and early contact North America; cross-cultural interaction and trade; ceramic technology; archaeology of gender, power, and identity; Southwest and Southern Plains

SUSAN HARDING

Culture, politics, narrative, gender, local/global studies, ethnographic writing, fundamentalism, Christianity, state-making, aging, America, and Spain

DIANE K. LEWIS, Emerita

DANIEL T. LINGER

Psychological anthropology, self and identity, politics, cultural theory, cities, violence, transnational experience, Brazil, Japan

CAROLYN MARTIN SHAW

African societies, colonial discourse, social theory, anthropology of women, sexuality

OLGA NÁJERA-RAMÍREZ

Folklore theory, ritual, festival, dance, greater Mexican culture, history and folklore, transnationalism, identity; expressive culture, ethnomusicology, bilingual communication, gender, history, and culture of Latin America, the U.S., and Mexico

TRILOKI NATH PANDEY

Native peoples of North America, cultures of India, political anthropology, anthropological theories and comparisons; native North America; tribal India; Nepal

RICHARD R. RANDOLPH, Emeritus

LISA ROFEL

Critical theory, anthropology of modernity, popular/public culture, gender and sexuality, cultures of capitalism, postcolonial feminist anthropology, China

STUART A. SCHLEGEL, Emeritus

ANNA TSING

Culture and politics, feminist theory and gender in the U.S., social landscapes and tropical forest ethnoecologies, ethnicity, local power and relations to the state in Indonesia, Southeast Asia, and the U.S.

ADRIENNE L. ZIHLMAN

Primate and human evolution, comparative functional anatomy of monkeys and apes, sex and gender, growth and development, life history and evolutionary theory, history of physical anthropology

Associate Professor

MELISSA L. CALDWELL

Poverty and welfare, religious development work, food, transnationalism, socialism and postsocialism, Russia, the former Soviet Union, and Eastern Europe

NATHANIEL J. DOMINY

Ecology and foraging behavior of humans and non-human primates; sensory ecology; color vision; primate evolution; tropical forests

Assistant Professor

MARK ANDERSON

Racial formation, diaspora, nationalism, transnationalism, culture and power; Latin America, African diaspora

MAYANTHI FERNANDO

Secularism, Islam in France and Europe, religious minorities and multiculturalism, politics of difference

ANDREW SALVADOR MATHEWS

Environmental anthropology, science and technology studies, conservation and development

J. CAMERON MONROE

Historical archaeology, complex societies, political economy, architecture and landscape, Africa and the African diaspora

MATTHEW WOLF-MEYER

Medical anthropology; science studies; actor-network theory; American studies; popular culture (comic books and graphic novels, science fiction, games, music, and film)



Professor

RAOUL BIRNBAUM (History of Art and Visual Culture)

Buddhist studies, especially Chinese practices from medieval times to the present; religion and visual culture in China

JOHN BROWN CHILDS (Sociology)

Ethnic conflict and transcommunal cooperation; sociology of knowledge; African American, Native American, Latino interactions

JAMES T. CLIFFORD (History of Consciousness)

History of anthropology, travel, and exoticism; transnational cultural studies, museum studies, indigenous studies

CAROLYN DEAN (History of Art and Visual Culture)

Cultural histories of the native Americas and colonial Latin America

A. RUSSELL FLEGAL (Environmental Toxicology)

Anthropogenic perturbations of biogeochemical cycles, applications of isotopic tracers in anthropology and archaeology

MARGARET (GRETA) A. GIBSON (Education)

Immigrants and education; minority status and schooling; community-school relationships; ethnicity, class, gender, and educational processes; qualitative research methods

STEPHEN R. GLIESSMAN (Environmental Studies)

Agroecology, sustainable agriculture, tropical land use and development, alternative trade networks, sustainable livelihoods and conservation, community and agroecology

DONNA HARAWAY (History of Consciousness and Feminist Studies)

Feminist theory, cultural and historical studies of science and technology, relation of life and human sciences, human-animal relations, and animal studies

PAUL KOCH (Earth Sciences)

Isotope biogeochemistry, vertebrate paleontology

MARC S. MANGEL (Applied Mathematics and Statistics)

Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

PATRICIA ZAVELLA (Latin American and Latino Studies)

Chicana/Latino studies, women's work and domestic labor, poverty, family, sexuality and social networks, feminist studies, ethnographic research methods, and transnational migration of Mexican/aleo workers and U.S. capital

Associate Professor

S. RAVI RAJAN (Environmental Studies)

Environmental history and political ecology, risk and disaster studies, science and technology studies, North-South environmental conflicts, environmental social theory, environmental ethics

Assistant Professor

RENYA RAMIREZ (American Studies)

Native American studies, Indian identity, Native Americans and anthropology, urban Indians, Native American women, cultural citizenship, expressive culture, and anti-racist education

MARCIA OCHOA (Community Studies)

Gender and sexuality, race and ethnicity, Latino studies, media and cultural studies, ethnography of media, feminism, queer theory, geography, multimedia production, graphic design, colonialism and modernity, Latin American studies—Colombia and Venezuela

ASSAF YASUR-LANDAU

Archeology of Israel, Bronze-Age Aegean, archeology of complex societies

Program Description

Anthropology studies people throughout the world and through time. Because it covers a wide range of topics—physical evolution, material remains of the past, and the world that humans create through their ideas and practices in present-day societies—anthropology is an especially integrative discipline.

The anthropology program at UCSC offers courses that reflect the diversity of the field.

- Cultural anthropology explores the movements of people, objects, and ideas in diverse societies, including our own. Cultural anthropology courses examine such topics as race and ethnicity, medicine, science, gender, sexuality, the environment, religion, law, popular culture, and politics.
- Archaeology uses the material evidence of human activities to understand past human lives. Archaeology at UCSC focuses on past people's interactions with one another at the local level and within their wider social and ecological contexts. Faculty research areas include the pre-colonial and early post-colonial history of East Africa and the American Southwest.
- Physical anthropology traces the human journey from its beginnings in Africa over five million years ago. Physical anthropology courses look at fossil evidence, evolutionary theory, human variation, and the behavior of primate relatives in order to analyze biological, social, and cultural changes over time.

UCSC students have the opportunity to do independent library and field research in cultural anthropology, archaeology, and physical anthropology. Laboratory courses in archaeology and physical anthropology offer practical experience in the analysis of biological and cultural materials. Students may use the social science media laboratory to develop technical and creative skills in visual and audio media. In cultural anthropology courses, students learn to carry out anthropological research through interviews, participant observation, surveys, the collection of oral histories, and the interpretation of archives.

Because anthropology is concerned with understanding human interaction, it is a useful major for anyone planning a career that involves working with people, especially those from diverse cultures. Some UCSC anthropology graduates are in social work, many are in teaching, and others pursue careers in law, city planning, politics, medicine, public health, cultural resource management, and journalism. Students intending to specialize in anthropology usually go on to graduate school because professional employment in the field almost always demands an advanced degree.

Most anthropology faculty have their offices in Social Sciences I Building. Social Sciences I also houses the Visual Culture Research Laboratory and laboratories for archaeology and physical anthropology where space is provided for laboratory and individual studies courses and for collections of mammalian skeletal material, casts of fossil hominids, ceramics, stone tools, and other archaeological artifacts.

The Anthropology Society, a campus club, is open to all students interested in anthropology. The Anthropology Colloquium showcases guest speakers and gives faculty and students an opportunity to discuss new approaches to anthropological questions. Students and faculty interested in archaeology also gather informally at the Archaeology/Physical Anthropology Forum to share information on fieldwork and employment opportunities.

Undergraduate Handbook

All undergraduate majors should obtain a copy of the Anthropology Department undergraduate handbook at UCSC from the department office (361 Social Sciences I Building). It outlines information on department procedures and requirements, program planning, independent study, faculty interests, and campus resources for anthropology majors.

Major Requirements

The Anthropology Department urges students to seek faculty advice early in planning for the major. Faculty hold regular office hours weekly and encourage students to come in to talk about their program or course work. Peer advisers are also available.

To graduate with an anthropology major, students must take courses 1, 2, 3, and either course 4 or an 80s-level course as background for upper-division courses. They must take a minimum of nine upper-division courses, including at least one course selected from each of these five categories:

Anthropological Theory Courses

- 100 *History and Theory of Physical Anthropology*
- 150 *Communicating Anthropology*
- 152 *Survey of Cultural Anthropological Theory*
- 170 *History of Archaeological Theory*

Sociocultural Anthropology Courses

- 123 *Psychological Anthropology*
- 124 *Anthropology of Religion*
- 126 *Sexuality and Society in Cross-Cultural Perspective*
- 127 *Ethnographies of Capitalism*
- 128 *Contemporary American Evangelical Culture*
- 131 *Women in Cross-Cultural Perspective*
- 132 *Photography and Anthropology*
- 133 *Narratives of the Popular*
- 134 *Medical Anthropology*
- 135A *Cities*
- 137 *Consuming Culture*
- 138 *Political Anthropology*
- 139 *Language and Culture*
- 142 *Anthropology of Law*
- 145X *Special Topics in Socio-Cultural Anthropology*
- 146 *Anthropology and the Environment*
- 151 *Workshop in Ethnography*
- 154 *Multimedia Ethnography*
- 155 *Cultural Encounters*
- 157 *Modernity and Its Others*
- 159 *Race and Anthropology*
- 164 *Anthropology of Dance*
- 165 *Anthropological Folklore*

Ethnographic Area Studies Courses

- 130A *Peoples and Cultures of Africa*
- 130B *Brazil*
- 130C *Politics and Culture in China*
- 130E *Culture and Politics of Island Southeast Asia*
- 130F *African Diasporas in the Americas*
- 130G *Asian Americans in Ethnography and Film*
- 130H *Ethnography of Russia and Eastern Europe*
- 130I *Cultures of India*

- 130M *Inside Mexico*
- 130L *Ethnographies of Latin America*
- 130N *Native Peoples of North America*
- 130T *Anthropological Approaches to Islam*
- 130X *Special Topics in Ethnography*

Physical Anthropology and Archaeology Courses

- 101 *Human Evolution*
- 102A *Human Skeletal Biology*
- 103 *Forensic Anthropology*
- 104 *Human Adaptability*
- 106 *Primate Behavior and Ecology*
- 107 *Human Functional Anatomy*
- 111 *Human Ecology*
- 172 *Archaeological Research Design*
- 174 *Origins of Complex Societies*
- 175A *African Archaeology*
- 175B *African Archaeology: Development*
- 175C *African Diaspora Archaeology*
- 176A *North American Archeology*
- 176B *Meso-American Archaeology*
- 178 *Historical Archaeology: A Global Perspective*
- 180 *Ceramic Analysis in Archaeology*
- 183 *Introduction to Quantitative Methods in Archaeology*
- 184 *Zoarchaeology*
- 185 *Osteology of Mammals, Birds, and Fish*

Senior Seminar Courses

- 190A *Tropical Forest Ecology*
- 190B *Field Methods in Primatology*
- 190C *Independent Field Research*
- 194A *Community*
- 194B *Chimpanzees: Biology, Behavior and Evolution*
- 194F *Memory*
- 194C *Food and Medicine*
- 194I *Consumption and Consumerism*
- 194K *Reading Ethnographies*
- 194L *Archaeology of the African Diaspora*
- 194M *Medical Anthropology*
- 194N *Comparison of Cultures*
- 194P *Space, Place, and Culture*
- 194S *The Anthropology of Sound*
- 194T *Poverty and Inequality*
- 194U *Environmental Anthropology: Nature, Culture, Politics*
- 194V *Picturing Cultures*
- 194X *Women in Politics: A Third World Perspective*
- 194Y *California Archaeology*
- 196A/B *Southwest American Archaeology*

Two-credit courses do not count toward the nine upper-division courses required for the major. Only one 5-credit individual studies course (197, 198, or 199) may be counted toward the nine required upper-division courses. Course 107L does not count toward the nine upper-division courses required for the major. Theory courses can only be counted toward the theory requirement or an upper-division elective.

Comprehensive Requirement

Students can fulfill the senior comprehensive requirement in anthropology either by passing an advanced senior seminar (194-series course, 190A-B-C, or 196A-B), by writing an acceptable independent senior thesis, or by passing an approved graduate-level topical seminar in anthropology.

- Senior seminars are small, writing-intensive classes focusing on advanced topics in anthropology. The prerequisite for admission to a senior seminar is

successful completion of courses 1, 2, and 3; senior seminars are restricted to anthropology majors.

- Students considering an independent thesis must arrange for the sponsorship and support of a faculty member before beginning research. An independent senior thesis (not written within a senior seminar) should be based on original research and reflect the student's understanding of fundamental theories and issues in anthropology. The thesis should be comparable in content, style, and length (generally 25–30 pages) to a professional journal article in its subfield. Students writing a senior thesis must complete five, instead of four, upper-division electives.
- Students who intend to satisfy the exit requirement by taking a graduate seminar must first get permission from the department. Not all graduate seminars are appropriate for fulfilling this requirement.

All majors, including double majors, must prepare a program of study in consultation with a member of the Anthropology Department. Students may arrange double majors in anthropology and another discipline by special petition. A combined major in anthropology and Earth and planetary sciences, leading to a B.A. degree, is also offered; for that program description, see Earth and Planetary Sciences, page 176. Students going on to graduate school should plan course schedules in close consultation with faculty advisers.

Many anthropology majors whose studies emphasize archaeology have benefited from concurrent study in the Cabrillo College Archaeological Technology Certificate Program. This vocational certification program is sponsored entirely by Cabrillo College, but credit for its summer field survey and excavation component may be transferred for credit at UCSC. Although courses in the Archaeological Technology Certificate Program do not count toward the UCSC anthropology major, students who have obtained the certificate in tandem with their bachelor's degree in anthropology have expanded their employment and advanced degree program opportunities. Students interested in exploring this possibility are encouraged to consult with UCSC archaeology faculty and to visit the program's web site at <http://www.cabrillo.edu/academics/archtech/>.

Transfer Students

If possible, transfer students should complete lower-division requirements for the major before coming to UCSC by taking classes equivalent to courses 1, 2, and 3. Department policy also allows up to 10 quarter credits (equivalent to two UCSC courses) of upper-division transfer credit toward the major requirement. Transfer students should bring a copy of their UCSC Transfer Credit Summary and an unofficial copy of all pertinent transcripts to the undergraduate adviser in the department office (361 Social Sciences 1 Building) as soon as possible after reaching campus so that prerequisites can be verified and course enrollment can proceed smoothly.

Peer Advisers

The Anthropology Department has instituted a peer adviser program as a supplement to academic advising offered by faculty members. The peer advisers are juniors and seniors who have been trained to help students with questions and general guidance through the anthropology major. Peer advisers hold regularly scheduled office hours in the department office.

Honors

The Anthropology Department awards "honors in the major" based on a ranked departmental grade point average that is calculated using all upper-division courses taken in the major with the exception that only one independent-study course can be used in this calculation. For students who have taken multiple independent-study courses in the department, the independent-study course that has the highest grade is used for the calculation. Approximately 15 percent of the graduating class is considered for honors based on their cumulative GPA through the quarter before graduation.

"Highest honors in the major" is determined by faculty review of all the departmental narrative evaluations for all students considered for honors within a particular quarter. The criteria for awarding highest honors in the major are overall superlative performance in the major and general breadth of excellence across the subfields of anthropology as reflected in the narrative evaluations. Receiving honors on the senior exit requirement is also considered as a factor in awarding highest honors, but is not always determinative.

Minor Requirements

Students earn a minor in anthropology by completing all of the requirements for the major with the following differences:

- The number of upper-division courses is reduced from nine to six. Of these, at least one must be from each of the following categories: (1) theory, (2) sociocultural anthropology, (3) ethnographic area studies, and (4) physical anthropology or archaeology.
- Independent study courses cannot be used toward completion of the minor.
- No senior seminar or thesis is required.

For more information regarding department policies, please consult the undergraduate adviser at the Anthropology Department office, 361 Social Sciences 1 Building. A handbook on the anthropology program is available there or on the anthropology web site.

Graduate Program

The anthropology doctoral program at UCSC consists of three tracks: cultural anthropology, anthropological archaeology, and physical anthropology. The majority of students are admitted to the cultural anthropology program. Smaller numbers of students are admitted to the programs in anthropological archaeology and physical anthropology.

Although applicants are accepted only for the Ph.D. program, students may obtain an M.A. degree after fulfilling specific requirements during the first two years.

The theme of emerging worlds—culture and power after progress unites the research interests of many faculty in the cultural anthropology graduate program at UCSC. In recent years, anthropology's central concept of culture has been subjected to extraordinary ethnographic and theoretical pressures. Across the social sciences, scholars are responding to emergent scientific and social dilemmas by turning to the concept of culture and the ethnographic method. Such disciplinary turns grow from a challenging new set of social configurations, which affect both scholarly and lay understandings of the present, past, and future: the demise of certainties about progress and modernization and the need to understand newly emergent worlds. Nineteenth- and 20th-century ideas of progress and programs of modernization both created the concept of

culture and relegated it to a nostalgic role as backward-looking sentiment. Anthropologists studied "vanishing worlds." In the last 30 years, however, such certainties have been challenged. Grand theories of human behavior that depended on the idea of a universal man have begun to fray around the edges. Heterogeneity and disjuncture have caught the attention of a wide range of social scientists, calling out for ethnographic investigation. In this context, scholarly discussions have turned toward culture, not as "tradition," but as the world-making networks, geographies, innovations, meanings, and assemblages that are carrying us into the future.

Our concentration on "emerging worlds" and on the construction of anthropological knowledge is especially well suited for drawing together diverse scholars and specialists in challenging and enriching conversations. Rather than reproduce the boundaries among the traditional subfields of anthropology, we explore how recombinations of these approaches can elucidate specific anthropological problems.

Working with their faculty advisory committee, students in cultural anthropology have considerable freedom to design their own programs of study after completing the two-quarter core course and the ethnographic practice course during the first year. To achieve Ph.D. candidacy, students are expected to pass a first-year review of their written work, take three additional 5-credit courses in anthropology (excluding independent study courses), maintain satisfactory academic progress, satisfy the ethnographic writing requirement and the foreign language requirement, pass a qualifying exam at the end of the third year, and meet the specific requirements of the Division of Graduate Studies. After advancing to Ph.D. candidacy, students carry out a sustained ethnographic fieldwork project and are expected to complete their dissertation within a year after returning from the field.

Graduate students in cultural anthropology may obtain a notation on the anthropology Ph.D. diploma indicating that they have specialized in feminist studies or Latin American and Latino studies (LALS) if they meet requirements spelled out by the individual committee composed of anthropology and feminist studies faculty or the anthropology and faculty from the program awarding the notation.

The Ph.D. program in anthropological archaeology is highly selective, focusing on the archaeology of late precolonial societies in East and West Africa and North America, especially the Southwest and California. The program also features an emerging concentration on the archaeology of colonial encounters among peoples of Europe, Africa, and the Americas. It is distinctive in insisting that theories of power, production and exchange, human ecology, gender, ethnicity, and technological practice be explored through rigorous laboratory and field research methods.

The Ph.D. program in physical anthropology combines a strong emphasis on hard and soft tissue anatomy with a broad evolutionary perspective. This highly selective track is characterized by intense mentoring of students, involvement of students in instruction as well as course work, and interdisciplinary training. Specific training is offered in skeletal biology, comparative primate anatomy, behavior and ecology, forensic anthropology, and evolutionary theory.

Although the areas of study of the archaeology and physical anthropology programs are distinct, their paths toward the Ph.D. are similar. In the first year, students take two foundational theory courses and pass a review of their work. Within the first two years of study, students complete at least two foundational materials/methods courses or laboratory courses in other departments;

two advanced laboratory apprenticeship courses or similar courses in other departments; two foundational courses in geographic/temporal areas or, in physical anthropology, topical areas; two graduate seminars with other anthropology or campus faculty; one quantitative methods course; and two terms of supervised teaching experience.

The third-year requirements are three laboratory apprenticeship courses, the grant writing seminar, and tutorials to prepare the student for the qualifying exams. All courses outside the department must be approved by the student's adviser. After advancing to Ph.D. candidacy, the student carries out a sustained laboratory or fieldwork project and is expected to complete the dissertation within a year after finishing research.

Lower-Division Courses

1. Introduction to Human Evolution. F

Study of evolution illustrated by Pleistocene hominid fossils and variation in living human groups. Behavior and evolution of primates examined as they contribute to the understanding of human evolution. Required for all anthropology majors. (General Education Code(s): IN.) *L. Milligan*

2. Introduction to Cultural Anthropology. S

A number of different peoples are studied and a variety of approaches to the nature of the culture and to the study of specific cultures presented. Required for all anthropology majors. (General Education Code(s): IS.) *O. Nájera Ramírez*

3. Introduction to Archaeology. W

Overview of ways of learning about the human past beyond the scope of written history. Reviews development of archaeology, fundamental methods and theories, and archaeology's contribution to understanding human origins, the emergence of farming, and the origins of complex societies. (General Education Code(s): IS.) *J. Habicht Mauche*

4. Public Life and Contemporary Issues. S

How can cultural anthropology help us to understand current events unfolding locally, nationally, and globally? Students learn how to "read" newspapers differently—that is, through the lens of cultural analysis. The world of everyday politics and society, as it unfolds in debates happening right now, forms the topical substance of the course. (General Education Code(s): IS.) *A. Mathews*

42. Student-Directed Seminar.

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

80B. African Women. W

Survey of the position and roles of women in African societies with different social, political, and economic organizations. Will be offered in the 2006–07 academic year. Offered in alternate academic years. (General Education Code(s): T3-Social Sciences, E.) *C. Shaw*

80D. Africa Today. *

Present-day values and social life of selected sub-Saharan African people examined using anthropological studies and African literature. (General Education Code(s): T3-Social Sciences, E.) *C. Shaw*

80G. Barrio Popular Culture. *

Introduces students to a broad sampling of verbal and nonverbal forms of Mexican folklore. Concentrates on experiencing these forms through texts, film, and if possible, performances. Attention to how these forms have been used by scholars to comment on Mexican culture is

an underlying theme. Knowledge of Spanish is useful but not required. Will be offered in the 2009–2010 academic year. (General Education Code(s): T3-Social Sciences, E.) *O. Nájera Ramírez*

80H. Acoustic Culture. F

Explores relationships between culture and the acoustic worlds, including environmental, verbal, and musical, which humans inhabit. How can paying attention to cultures of listening and sound-making help us think about cultural life and experience in new ways? (General Education Code(s): T3-Social Sciences.) *D. Brenneis*

80I. Culture and Power in Latin America. *

Introduces key issues in the anthropology of Latin America, with emphasis on identity formation, cultural practices, and power. Major themes include race, class, and gender as intersecting forms of oppression, violence, and terror and indigenous social movements. Will be offered in the 2009–2010 academic year. (General Education Code(s): T3-Social Sciences, E.) *M. Anderson*

80J. Introduction to Visual Culture. W

Introduces current issues in cultural anthropology using film as a medium with which to explore culture. Raises questions about visual representations and the portrayal of cultural difference in the context of global inequalities. (General Education Code(s): T3-Social Sciences.) *S. Errington*

80K. Culture through Food. S

Examines anthropology of food and politics of eating. Cultural and social uses of food in rituals of solidarity or fasting, identities and meanings of food for individuals, and consumption in the global context are key components of study. (General Education Code(s): T3-Social Sciences.) *M. Caldwell*

80N. Anthropology of Globalization. *

Introduces anthropological concepts and approaches to historical and contemporary globalizations. Using ethnographies, films, and other cultural productions, raises questions about the impacts of transnational capitalism, colonialism, migration/movement, and media on "local" and "global" identities, cultures, and communities. (General Education Code(s): T3-Social Sciences.) *The Staff*

80P. India and Indian Diaspora through Films. F

Explores several themes of relevance in contemporary India and Indian diaspora, concentrating on anthropological research and various documentary and popular Bollywood films. Through films and ethnographies, students analyze the nature of anthropological contributions to the study of Indian societies. (General Education Code(s): T3-Social Sciences, E.) *A. Pandey*

81A. Mexican Folklórico Dance (2 credits). F

Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. Students taught choreographed dances from various regions of Mexico and also learn dance techniques (técnica) and stage make-up application. Additional workshops and lectures offered to supplement class. Open to all students; no previous experience required. (Also offered as Latin American&Latino Studies 81A. Students cannot receive credit for both courses.) May be repeated for credit. (General Education Code(s): A.) *O. Nájera Ramírez*

81B. Mexican Folklórico Dance (2 credits). W

Second course in series. Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. (Also offered as Latin American&Latino Studies 81B. Students cannot receive credit for both courses.) May be repeated for credit. (General Education Code(s): A.) *O. Nájera Ramírez*

81C. Mexican Folklórico Dance (2 credits). S

Third course in series. Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. (Also offered as Latin American&Latino Studies 81C. Students cannot receive credit for both courses.) Prerequisite(s): course 81A or 81B. May be repeated for credit. (General Education Code(s): A.) *O. Nájera Ramírez*

81J. Introduction to Visual Culture Lab (2 credits). W

Optional digital photography lab. Students learn to compose shots, download photos, resize them, and put them into a meaningful sequence. Concurrent enrollment in Anthropology 80J required. Enrollment limited to 36. *S. Errington*

93. Field Study. F,W,S

Supervised research or organized projects on anthropological topics for lower-division students. Conducted either on or off campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

100. History and Theory of Physical Anthropology. S

Provides an historical overview from the 18th century to the present of race, ape-human relationships, and human nature. Emergence of an evolutionary framework and of fossil, genetic, and primate information becomes the basis for reformulating ideas about human biology within anthropology. Prerequisite(s): courses 1, 2, and 3. *A. Zihlman*

101. Human Evolution. W

Study of human evolution covering the last five million years. Examines the fossil evidence and emphasizes the reconstruction of behavior from the paleontological and anatomical evidence. Prerequisite(s): course 1. Offered in alternate academic years. *A. Zihlman*

102A. Human Skeletal Biology. W

Presents basic human osteology allowing students to identify skeletal material by element. Emphasizes the dynamic nature of bone by integrating anatomy with a discussion of bone physiology within the context of the human life cycle. Prerequisite(s): course 1. Enrollment limited to 16. *The Staff*

104. Human Adaptability. W

Explores the major environmental factors (temperature, altitude, diet, and disease); how they are perceived by the human body; the physiological, micro- and macro-anatomical responses; and how behavior and culture can modify the impact of these stresses. Course 1 is highly recommended as preparation. *L. Milligan*

106. Primate Behavior and Ecology. F

The nature of primate social systems and social bonds is examined in the light of evolutionary and ecological concepts. Students cannot receive credit for this course and course 206. Prerequisite(s): course 1. *E. Vogel*

107. Human Functional Anatomy. S

Study of structure and function of the human body through lectures with an evolutionary perspective including regional anatomy and body systems. Students cannot receive credit for this course and Anthropology 207. (Also offered as Biology: Molecular Cell & Dev 135. Students cannot receive credit for both courses.) Prerequisite(s):

course 1; concurrent enrollment in course 107L required. Enrollment restricted to anthropology and Earth sciences/anthropology combined majors. *N. Dominy*

107L. Human Functional Anatomy Laboratory. S
Study of structure and function of the human body using dissection, comparative vertebrate anatomy, anatomical models, and computer-assisted instruction. Students are billed a \$60.00 materials fee. Students cannot receive credit for this course and Anthropology 207L. (Also offered as Biology: Molecular Cell & Dev 135L. Students cannot receive credit for both courses.) Prerequisite(s): course 1; concurrent enrollment in course 107 required. Enrollment restricted to anthropology and Earth sciences/anthropology combined majors. Enrollment limited to 20. *N. Dominy*

110. Comparative Functional Anatomy. F
Comparative and evolutionary anatomy of human performance. Examines locomotor systems and their underlying structure and evolution through videos, skeletons, and dissections in a variety of mammals, primates, and humans. Students are billed a materials fee. Anthropology of Movement.) Prerequisite(s): courses 102A or 107 or 185; or by interview. Enrollment limited to 20. *A. Zihlman*

111. Human Ecology. F
Reviews the environmental, physiological, behavioral, and cultural ways that humans interact with their physical surroundings. The effects of human culture on the environment and of the environment on the shape of human culture is emphasized. Will be offered in the 2008-09 academic year. *N. Dominy*

112. Life Cycles. S
Examines the human life cycle using an evolutionary framework. Examines key aspects of the human life stages using findings and concepts from developmental biology, physiology, nutrition, evolutionary ecology, and life-history theory. Prerequisite(s): course 1. *L. Milligan*

123. Psychological Anthropology. S
An introduction to some of the central theoretical issues in psychological anthropology. Psychoanalytic, cognitive, and relativist perspectives on the link between person and society are discussed and compared. *D. Linger*

124. Anthropology of Religion. S
Study of the phenomenon of religion as manifested in ethnographic literature, with special attention to traditional and recent modes of analysis of religious behavior. Special topics include myth, religious healing, witchcraft and sorcery, ritual, and millenarian movements. *A. Pandey*

126. Sexuality and Society in Cross-Cultural Perspective. F
The meaning and social processes associated with sexuality in selected societies. Examination of variations in sexual expressions and control of sexuality, and in economic and political organizations, highlights the interrelationship of sex and society. Prerequisite(s): course 2. *C. Shaw*

127. Ethnographies of Capitalism. *
Challenges approaches to capitalism that treat it as socioeconomic relations separable from "culture." Readings include ethnographies demonstrating the inextricability of cultural meanings from capitalist practices. Topics include capitalism's relationship to colonialism, nationalism, socialism, gender, and the commodification of aesthetics. Will be offered in the 2009–2010 academic year. *L. Rofel*

128. Contemporary American Evangelical Cultures. W
Study of contemporary, American, born-again Protestant discourse using ethnographic materials and interpretive theories. Topics include biblical literalism, Christian conversion and self-fabulation, charismatic gifts, preaching, sacrificial giving, prosperity theology, apocalypticism, creationism, pro-family and pro-life rhetoric, and televangelism. (Formerly *Born-Again Religion and Culture*.) *S. Harding*

130. Ethnographic Area Studies.
130A. Peoples and Cultures of Africa. *
Survey of sub-Saharan societies. Analysis of principles of social organization and factors of cultural unity of selected western, eastern, central, and southern African peoples. (General Education Code(s): E.) *The Staff*

130B. Brazil. *
Examines Brazilian culture and its link to interpersonal relationships, religion, politics, and psychological experience. Will be offered in the 2009–2010 academic year. (General Education Code(s): E.) *D. Linger*

130C. Politics and Culture in China. S
Joins substantive information "about" Chinese society and culture with debates in social theory and rethinks conventional wisdom about colonialism and modernity. Topics include representations of "Chineseness," class revolution, Chinese diaspora, popular culture, family and kinship, nationalism, history/memory, race and gender. (General Education Code(s): E.) *L. Rofel*

130E. Culture and Politics of Island Southeast Asia. W
Southeast Asia includes a variety of societies exhibiting many ecological adaptations, religions, marriage systems, and experiences with colonial powers. Case studies of particular societies, chosen to reveal variety, are examined comparatively. Emphasis on religion and social organization. Prerequisite(s): course 2. (General Education Code(s): E.) *A. Tsing*

130F. African Diasporas in the Americas. S
Focuses on African diasporas of the Caribbean, United States, and Latin America. Themes include: theorizing diaspora, historical formations, slavery, analytical approaches to cultures of the African diaspora, religion, music, comparative identity formation and racism, gender dynamics, social movements, and transnationalism. (General Education Code(s): E.) *M. Anderson*

130G. Asian Americans in Ethnography and Film. *
Critically examines category of Asian Americans. Addresses historic representations of Asians and Asian Americans in ethnographic research and film. Explores contemporary issues of race, culture, and politics through ethnographic practice and cultural production. Will be offered in the 2009–2010 academic year. (General Education Code(s): E.) *N. Chen*

130H. Ethnography of Russia and Eastern Europe. W
Introduces students to the ethnography of Eurasia, with special attention to the lived experience and legacy of state socialism in this region. Topics include new ideas of personhood, changing economic practices, public health, and international development. (General Education Code(s): E.) *M. Caldwell*

130I. Cultures of India. *
An examination of anthropological studies of tribal, rural, and urban cultures of India and a look at changes taking place in India. Will be offered in the

2009–2010 academic year. Prerequisite(s): course 2. Offered in alternate academic years. (General Education Code(s): E.) *T. Pandey*

130L. Ethnographies of Latin America. *
A broad introduction to issues and areas of cultural production and transformation in the Caribbean, Mexico, and Central and South America. Colonial, neocolonial, class, ethnic, gender, religious, ecological, and political relations intersect as represented in ethnographies and film. Prerequisite(s): course 2. (General Education Code(s): E.) *The Staff*

130M. Inside Mexico. F
Examines various communities within the Republic of Mexico as represented in ethnographic texts and other forms of cultural production, particularly music and dance. Emphasis on the interplay between the concept of regionalism and national identity. Previous course work in Mexican culture and/or history strongly recommended. Some reading in Spanish is required. (General Education Code(s): E.) *A. Mathews*

130N. Native Peoples of North America. F
A survey of Native American cultures and experience during the past century, with emphasis on Pueblo cultures of the American Southwest. (General Education Code(s): E.) *T. Pandey*

130T. Anthropological Approaches to Islam. F
Analyzes post-colonial forms of Islam, with particular attention to Muslim societies and cultures in the Middle East, North Africa, and Europe. Emphasizes the relationship between power, knowledge, and representation in anthropological approaches to Islam and Muslims. (General Education Code(s): E.) *M. Fernando*

130X. Special Topics in Ethnography. F,W,S
This course on special topics in ethnography will be taught on a rotating basis by various faculty members. Precise focus of each year's courses will vary according to the instructor and will be announced by the department. May be repeated for credit. *The Staff*

131. Women in Cross-Cultural Perspective. *
Examines the diversity of women's as well as men's roles, experiences, and self-conceptions in a number of societies to explore how women and men shape, and are shaped by, particular forms of social life. Prerequisite(s): course 2. Offered in alternate academic years. *The Staff*

132. Photography and Anthropology. W
Moving historically from woodcuts and paintings to the World Wide Web, but emphasizing the invention and development of documentary photography, this course explores the world of images depicting society and culture. Major theoretical approaches to "reading" pictures will be emphasized, and students must produce a final project incorporating visual images. Prerequisite(s): course 2 or History of Art and Visual Culture 10D or 10E or 10F or 10G or Art 30. *S. Errington*

132L. Photography and Anthropology Laboratory (2 credits). W
This still photography lab trains students in the basic operations and techniques of the camera and the creation of a set of still photographs to use for social documentation. It includes lectures, demonstrations, hands-on instruction, and a continuous review of the students' work in progress. It does not include darkroom work. Concurrent enrollment in course 132 required. Enrollment restricted to anthropology majors. Enrollment limited to 30. *S. Errington*

133. Narratives of the Popular. F

Addresses the increasing importance of popular culture as the terrain upon which to address issues of culture and power. Emphasizes an ethnographic approach to popular culture as sociocultural phenomena. Students learn about a variety of activities including television and film viewing, music, fashion, photography, postcards, comic books, and urban spatial relations and architecture. Offered in alternate academic years. *The Staff*

134. Medical Anthropology: An Introduction. F

Cross-cultural study of health, disease, and illness behavior from ecological and ethnomedical perspectives. Implications for biomedical health care policy. Will be offered in the 2008-09 academic year. *M. Wolf-Meyer*

135A. Cities. *

Examines cities from an anthropological perspective. Reviews pertinent social scientific literature of the 19th and early 20th centuries. Surveys the concepts and methods used by contemporary anthropologists to investigate urban phenomena. *D. Linger*

137. Consuming Culture. *

Explores consumption as a cultural form. Beginning with theories of capitalism and exchange, it then focuses on sites and modes of consumption and display such as department stores, museums and zoos, advertisements and photography, cultural tourism. Prerequisite(s): course 2. *N. Chen*

138. Political Anthropology. *

The ideas, in selected non-Western societies, about the nature of power, order, social cohesion, and the political organization of these societies. (Also offered as Legal Studies 138. Students cannot receive credit for both courses.) Offered in alternate academic years. *T. Pandey*

139. Language and Culture. F

Examination of language system and language use in relationship to cultural contexts of communication in Western and non-Western societies. Topics include the Sapir-Whorf linguistic relativity hypothesis; linguistic constructions of gender; speech variation in relation to class, ethnicity, and national identity; and the emergence of self in communicative acts. Prerequisite(s): course 2. *D. Brenneis*

142. Anthropology of Law. W

An ethnographically informed consideration of law, dispute management, and social control in a range of societies including the contemporary U.S. Topics include conflict management processes, theories of justice, legal discourse, and relations among local, national, and transnational legal systems. (Also offered as Legal Studies 142. Students cannot receive credit for both courses.) Enrollment restricted to anthropology and legal studies majors. *D. Brenneis*

145X. Special Topics in Socio-Cultural Anthropology. F

Taught annually on a rotating basis by faculty members. Each year's topic varies by instructor and is announced by the department. *The Staff*

146. Anthropology and the Environment. W

Examines recent approaches to study of nature and the environment. Considers historical relationship between nature, science, and colonial expansion as well as key issues of contemporary environmental concern: conservation, environmental justice, and social movements. Prerequisite(s): course 2. *A. Mathews*

150. Communicating Anthropology. S

Encourages anthropology majors to explore different means of communicating anthropology with much attention to individual writing and presentation skills. Intensive work on library research; recognizing, comparing, and making arguments; and analyzing ethnographies, articles, reviews, and films. Prerequisite(s): two of the following courses: 1, 2, or 3; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to sophomore and junior anthropology majors. (General Education Code(s): W.) *A. Tsing*

151. Workshop in Ethnography. W

Through demonstration, practice, and participation, acquire skills in collecting and analyzing cultural data. Work with members of other cultures and with each other to learn to identify significant cultural patterns. Lectures and readings provide added perspective and a theoretical base. Prerequisite(s): course 2. Enrollment limited to 20. *S. Harding*

152. Survey of Cultural Anthropological Theory. W

Major figures, ideas, and writings in 19th- and 20th-century cultural anthropology surveyed. Prerequisite(s): course 2 and satisfaction of the Entry Level Writing and Composition requirements; enrollment restricted to anthropology majors. (General Education Code(s): W.) *D. Linger*

154. Multimedia Ethnography. S

Students learn the fundamentals of photography or video production and audio recording in order to create mini-ethnographies. Prerequisite(s): courses 1, 2, and 3. Concurrent enrollment in course 154L is required. Enrollment restricted to anthropology majors. Enrollment limited to 40. *S. Errington*

154L. Multimedia Laboratory (2 credits). S

Designed to instruct in aesthetics and technical production of a short digital slideshow. Using iMovie3 editing program, produce a digital slideshow incorporating sound (narration, music, and sound effects) and still images. Concurrent enrollment in course 154 required. Enrollment limited to 12. *S. Errington*

155. Cultural Encounters. *

Explores cross-cultural encounters through a combination of theoretical and ethnographic texts. Various faculty members teach on a rotating basis. The focus of each year's course(s) varies according to the instructor and will be announced by the department. Will be offered in the 2009-2010 academic year. Prerequisite(s): course 2 or permission of instructor. May be repeated for credit. *S. Harding*

157. Modernity and Its Others. S

Beginning with the conquest of the Americas, considers how Western thinkers have explained seemingly "irrational" ways of being and thinking (like witchcraft, human sacrifice, and bodily mutilation), and asks how we interpret beliefs and practices radically different from our own. *The Staff*

159. Race and Anthropology. *

Examines concept of race in anthropology. Begins with histories of race in anthropology; turns to contemporary analysis of racism, identity formation, and diaspora; and concludes with current debates on the validity of "race" as an object of analysis. *M. Anderson*

164. The Anthropology of Dance. *

An intense reading seminar which critically reviews anthropological works in dance ethnography and

dance theory. Recommended for anthropology majors. Prerequisite(s): course 2. Enrollment limited to 25. Offered in alternate academic years. *O. Nájera Ramírez*

165. Anthropological Folklore. *

Survey of the major forms of folklore with emphasis upon games, humor, superstitions, and folk-narratives (myth, legend, and folktales). Addresses methodological issues in folklore and theoretical approaches to the study of folklore. Prerequisite(s): course 2. Offered in alternate academic years. *O. Nájera Ramírez*

170. History of Archaeological Theory. F

Historical review of prehistoric archaeology from antiquarianism to the present. Emphasis on development of archaeological theory and its relation to evolutionary and anthropological theory. Students cannot receive credit for this course and course 270. Prerequisite(s): course 3; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to anthropology and Earth sciences/anthropology combined majors. Recommended for juniors. Offered in alternate academic years. (General Education Code(s): W.) *D. Gifford-Gonzalez, J. Monroe*

172. Archaeological Research Design. S

Introduces theories and methods for recovering and analyzing archaeological data. Critically explores the nature of archaeological evidence and how archaeologists know what they know. Strongly recommended for those contemplating further studies in archaeology. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 3, and one upper-division archaeology course. Strongly recommended for those contemplating further studies in archaeology. Enrollment limited to 25. Offered in alternate academic years. (General Education Code(s): W.) *The Staff*

174. Origins of Complex Societies. F

Deals with evidence and theories concerning the origins of complex society; the transition from egalitarian, foraging societies to the hierarchical, economically specialized societies often referred to as "civilizations." Focuses on both Old World and New World cultures. Prerequisite(s): course 3. *The Staff*

175A. African Archaeology: 2.5 Million BP to Farming. *

Archaeological history of Africa from the first 2.5 million-year-old artifacts to the emergence of African pastoralism and farming. Disciplinary models and assumptions critically examined in their historic and political contexts. Students cannot receive credit for this course and course 275A. (Formerly *African Archaeology*.) Prerequisite(s): course 3 or by permission of instructor. Enrollment restricted to junior and senior anthropology and Earth sciences/anthropology combined majors. Enrollment limited to 45. *D. Gifford-Gonzalez*

175B. African Archaeology: Development of Complex Societies. W

Introduces the evolution of African kingdoms and states from the emergence of farming communities to initial contact with Europe. Particular attention paid to the origins of social inequality and the evolution of centralized polities. Students cannot receive credit for this course and Anthropology 275B. (Also offered as History 158B. Students cannot receive credit for both courses.) Prerequisite(s): course 3; course 175A strongly recommended. *J. Monroe*

175C. African Diaspora. *

Introduces the African diaspora from an archaeological perspective. Focuses on examining the cultural, social, economic, and political lives of Africans and their descen-

dants in the New World and West Africa from the 15th through 19th centuries. Students cannot receive credit for this course and Anthropology 275C. Will be offered in the 2009–2010 academic year. (Also offered as History 158C. Students cannot receive credit for both courses.) Prerequisite(s): course 3; courses 175A and 175B strongly recommended. *J. Monroe*

176A. North American Archaeology. S

Development of Native cultures in North America. Topics include peopling of the New World, early foragers, spread of agriculture and complex societies in the Southwest and Eastern Woodlands, and review of cultural developments in the West and Far North. *J. Habicht Mauche*

176B. Meso-American Archaeology. *

Review of the archaeological and ethnohistorical evidence for the origins and development of pre-Columbian civilizations in Meso-America including the Olmec, Maya, Zapotec, Mixtec Teotihuacan, Toltec, Tarascan, and Aztec. Will be offered in the 2009–2010 academic year. Prerequisite(s): course 3. *The Staff*

178. Historical Archaeology: A Global Perspective. S

Introduces archaeology of European colonialism and the early-modern world. Topics include historical archaeological methods; the nature of European colonial expansion in New and Old Worlds; culture contact and change; and power and resistance in colonial societies. Students cannot receive credit for this course and Anthropology 278. (Also offered as History 159. Students cannot receive credit for both courses.) Prerequisite(s): course 3 or consent of instructor. *J. Monroe*

180. Ceramic Analysis in Archaeology. *

Focuses on theories and techniques used by archaeologists to bridge the gap between the recovery of ceramic materials and their interpretation within cultural contexts. Topics include the origins of pottery, production methods, classification and typology, seriation, functional analysis, materials analysis and description, organization of production, trade, and the analysis of style. Students are billed a materials fee. Students cannot receive credit for this course and course 280. Prerequisite(s): course 3. Concurrent enrollment in course 180L required. Enrollment restricted to anthropology majors. *J. Habicht Mauche*

180L. Ceramic Analysis Laboratory (2 credits). *

Practicum in ceramic materials analysis and description. Students perform material experiments in materials selection and processing, hand-building techniques, and open-pit firing. Demonstrations of standard techniques of attribute analysis and the mineralogical and chemical characterization of ceramic materials are presented. Students cannot receive credit for this course and course 280L. Prerequisite(s): course 3. Concurrent enrollment in course 180 required. Enrollment restricted to anthropology majors. Enrollment limited to 16. *J. Habicht Mauche*

183. Introduction to Quantitative Methods in Archaeology. *

An introduction to the use of statistics and other formal methods in solving archaeological problems. Teaches basic interests, terms, and concepts important in quantitative archaeological thought through lectures, assigned readings, problem sets, and in-class discussions. Prerequisite(s): course 1 or 3. *The Staff*

184. Zooarchaeology. F

Lectures and seminar on archaeological faunal analysis. Topics include mammalian evolution and osteology, vertebrate taphonomy, reconstruction of human diet from

faunal remains, foraging strategy theory, data collection and management, and methods of quantitative analysis. Students cannot receive credit for this course and course 284. Prerequisite(s): course 3. Offered in alternate academic years. *D. Gifford-Gonzalez*

185. Osteology of Mammals, Birds, and Fish. W

Practicum in archaeological faunal analysis. Students learn to identify bones of all larger mammal species of central California plus selected bird and fish species. Students cannot receive credit for this course and course 285. Prerequisite(s): courses 184 or 102 or Biology 138/L or Earth Sciences 100 or Environmental Studies 105/L, and permission of instructor. Enrollment limited to 16. Offered in alternate academic years. *D. Gifford-Gonzalez*

190A. Primate Field Ecology: Tropical Forest Ecology. W

Explores tropical forest ecology with emphases on plant-life history variation and patterns of diversity. Topics include: photosynthesis, competition, and plant-animal interactions, such as pollination, herbivory, and seed dispersal. Special focus on neotropical forests and adaptations to life in humid environments. Students cannot receive credit for this course and course 290A. Competitive selection based on application and interview during previous fall quarter. Concurrent enrollment in courses 190B and 190C required. Enrollment limited to 15. *N. Dominy*

190B. Primate Field Ecology: Field Methods in Primatology. W

Field-oriented course in primate behavioral ecology. Combines lectures on approaches and methodologies with practical field studies. Students complete field project in primate ecology and behavior and learn natural history of the plants and animals of Costa Rica. Students cannot receive credit for this course and course 290B. Competitive selection based on application and interview during previous fall quarter. Concurrent enrollment in courses 190A and 190C required. Students are billed a materials fee. Enrollment limited to 15. *N. Dominy*

190C. Primate Field Ecology: Independent Field Research. W

Students carry out substantial field projects at two locations in Costa Rica under the supervision of course instructors. Students develop research proposals, analyze data, and prepare final research papers and oral presentations. Students cannot receive credit for this course and course 290C. Competitive selection based on application and interview during previous fall quarter. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Concurrent enrollment in courses 190A and 190B required. Enrollment limited to 15. (General Education Code(s): W.) *N. Dominy*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Students submit petition to sponsoring agency. *The Staff*

193. Field Study. F,W,S

Students submit petition to sponsoring agency. *The Staff*

194. Senior Seminar.

194A. Community. S

Critically considers four concepts of community: community as place, community of interests, community as social relations, and community as intentional goal. Students examine internal dynamics of communities, social relations between communities in complex societies, and the successes and failures of particular intentional communities. Prerequisite(s): courses 1, 2,

and 3, and satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 20. (General Education Code(s): W.) *C. Shaw*

194B. Chimpanzees: Biology, Behavior and Evolution. F

Explores studies on wild and captive chimpanzees with reference to other apes and humans. Topics include sociality, tool using, locomotion, traditions, and life history; social and physical dimensions of growth and development; language studies, genetics, and applications to human evolution. Prerequisite(s): courses 1, 2, and 3; satisfaction of the Entry Level Writing and Composition requirement. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *A. Zihlman*

194C. Food and Medicine. *

Critically examines intersections of food, medicine, and culture. Special attention to "studying up" of industrial food system and pharmaceutical industry. Additional focus on anthropology of food, medicine, nutrition, and consumption. Prerequisite(s): courses 1, 2, and 3; satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *N. Chen*

194F. Memory. W

Intensive and fast-paced seminar focusing on theoretical and ethnographic studies of memory as a means for dealing with the past. Examines how ordinary people and societies have coped with the past through acts of selective remembering and forgetting. Prerequisite(s): courses 1, 2, and 3; satisfaction of the Entry Level Writing and Composition requirement. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *D. Linger*

194I. Consumption and Consumerism. S

Investigates cultural analysis of consumer society, commodities, and consumer practices. Students develop their own research projects. Themes include: critiques of consumer society; symbolic analysis of goods, consumption as resistance, anthropologies of marketing, culture jamming; consumption and (post) colonialism. Prerequisite(s): courses 1, 2, and 3; satisfaction of the Entry Level Writing and Composition requirement. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Anderson*

194K. Reading Ethnographies. F

Explores issues in the representation of culture through reading and discussing ethnographies. Recent experimental ethnographies open topics including the relation between fieldwork and writing, textual strategies, and the politics of ethnographic writing and research. Prerequisite(s): courses 1, 2, and 3; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *S. Harding*

194L. Archaeology of the African Diaspora. S

Senior seminar on African diaspora archaeology. Draws on archaeological, historical, and anthropological perspectives to examine the cultural, social, economic, and political lives of Africans and their descendants in the New World and West Africa from the 15th through 19th centuries. Prerequisite(s): courses 1, 2, 3; satisfaction of the Entry Level Writing and Composition requirement. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *J. Monroe*

194M. Medical Anthropology. *

Focuses on critical issues in the social sciences of health and healing. Designed for students pursuing graduate work in medical anthropology and/or public health. Will be offered in the 2009–2010 academic year. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, 3, and 134. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *N. Chen*

194N. Comparison of Cultures. F

Seminar for upper-division students interested in theories and methodology of social and cultural anthropology. Devoted to critical discussion of different methods of comparison practiced in anthropology. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; courses 1, 2, and 3. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *T. Pandey*

194P. Space, Place, and Culture. *

Examines ways anthropologists have studied relationship between space, place, and culture. Covers early formulations acknowledging people in different cultural contexts ascribe particular meanings to places and to the concept of space and then traces the ways these questions have come to the fore in more recent scholarship. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *The Staff*

194S. Hearing Culture: The Anthropology of Sound. S

Explores relationships between culture and acoustic worlds—environmental, verbal, and musical—within which we live. How sound is shaped by human belief and practice and the role sound plays in cultural and social life, both past and present. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3. Enrollment restricted to senior anthropology majors. Enrollment limited to 15. (General Education Code(s): W.) *D. Brenneis*

194T. Poverty and Inequality. *

Through ethnographies about homelessness, food deprivation, and unemployment, examines the institutions through which poverty is recognized, the systems of morality shaping debates about need and appropriate behavior, and the effects of community responses to poverty. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Caldwell*

194U. Environmental Anthropology: Nature, Culture, Politics. W

Presents key readings in environmental anthropology focusing on environmental conflicts. Students guided in developing research paper on a society environment topic of their choice. Class is writing intensive with in-class discussion and final presentations. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *A. Mathews*

194V. Picturing Cultures. *

A historical, analytical, and practical exploration of the uses of still and moving pictures in ethnographic representations, research, and production. Prerequisite(s):

satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3; and course 80J, 120, 132, or 154. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *S. Errington*

194X. Women in Politics: A Third World Perspective. *

Focuses cross-culturally on the status of women in the Third World and their formal and informal participation in politics. Also discussed are organized efforts, through participation in both national and autonomous movements, for women's rights. Will be offered in the 2009–2010 academic year. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *A. Pandey*

194Y. Archaeologies of Space and Landscape. *

Examines contemporary archaeological perspectives on space and landscape. Focuses on how archaeology can contribute to an appreciation of the economic, cultural, and political factors that shape human perception, use, and construction of the physical world. Will be offered in the 2009–2010 academic year. Prerequisite(s): courses 1, 2, 3, and satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior anthropology majors. Enrollment limited to 20. (General Education Code(s): W.) *J. Monroe*

196A. Archaeology of the American Southwest (3 credits). *

Outlines development of Native cultures in the American Southwest from Paleo-Indian times through early European contact. Students must enroll in courses 196A and 196B. Students cannot receive credit for courses 196A-B and 194I. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, and 3. Enrollment restricted to anthropology majors. Enrollment limited to 25. (General Education Code(s): W.) *J. Habicht Mauche*

196B. Archaeology of the American Southwest (3 credits). *

Outlines development of Native cultures in the American Southwest from Paleo-Indian times through early European contact. Students must enroll in courses 196A and 196B. Students cannot receive credit for courses 196A-B and 194I. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 1, 2, 3, and 196A. Enrollment restricted to anthropology majors. Enrollment limited to 25. (General Education Code(s): W.) *J. Habicht Mauche*

197. Laboratory Tutorial. F,W,S

Independent laboratory research on selected topics in archeology and physical anthropology. Interview with appropriate instructor required. May be repeated for credit. *The Staff*

197F. Laboratory Tutorial (2 credits). F,W,S

Independent laboratory research on selected topics in archaeology and physical anthropology. Interview with appropriate instructor required. Enrollment restricted to anthropology majors. May be repeated for credit. *D. Gifford-Gonzalez, A. Zihlman, J. Habicht Mauche, A. Galoway, N. Dominy, J. Monroe*

198. Independent Field Study. F,W,S

Off-campus field study. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Graduate Courses***200. Theoretical Foundations of Physical Anthropological Research. S**

Provides historical and theoretical foundation of physical anthropology. Grounds students in the changing frameworks and perspectives during the last 150 years regarding questions in human biology, evolution, nature, and culture, by examining texts and scientific journals. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Zihlman*

200A. Core Graduate Course (10 credits). F

Introduces history, ethnography, and theory of cultural anthropology with emphasis on awareness of construction of anthropological canon and areas of conflict within it, leading up to contemporary debates on a variety of issues. Two-term course; students must enroll in both quarters. Enrollment restricted to anthropology graduate students. Enrollment limited to 12. *S. Harding, L. Rofel*

200B. Core Graduate Course. W

Introduces history, ethnography, and theory of cultural anthropology with emphasis on awareness of construction of anthropological canon and areas of conflict within it, leading up to contemporary debates on a variety of issues. Multiple-term course; students must enroll in both quarters to receive academic credit. Enrollment restricted to anthropology graduate students. Enrollment limited to 12. *T. Pandey*

201. Human Evolution. W

Provides an overview of the first five million years of human evolution and a framework for studying evolution and reconstructing the human past. Emphasizes that all lines of evidence must be included: hominid fossils, archaeology, paleoecology, and molecular data. Will be offered in the 2008–2009 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Zihlman*

202A. Skeletal Biology. W

Focuses on human skeletal biology, the identification of elements, physiology of hard tissue formation, growth, and maintenance. Students are required to show competence in skeletal identification to pass this class. Prerequisite(s): course 102A or permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 5. *The Staff*

206. Primate Behavior. F

An overview of primate evolution and review of the major groups of primates in terms of their ecological, locomotor, dietary, and social adaptations. Theoretical frameworks, such as behavioral ecology, sexual selection, and life history, are evaluated from long-term studies of primate behavior. Students cannot receive credit for this course and course 106. Enrollment restricted to graduate students. Enrollment limited to 15. *E. Vogel*

207. Human Functional Anatomy. S

Study of the human body from molecules to organ systems, emphasizing evolution and medical applications. Students cannot receive credit for this course, course 107, and Biology 135. Concurrent enrollment in course 207L required. Enrollment restricted to graduate students. Enrollment limited to 15. *N. Dominy*

207L. Human Functional Anatomy Laboratory. S

Study of the human body using dissection and comparative anatomy exercises for advanced anatomy students.

Students are billed a laboratory fee. Students cannot receive credit for this course, course 107L, and Biology 135L. Concurrent enrollment in course 207 required. Enrollment restricted to graduate students. Enrollment limited to 15. *N. Dominy*

208A. Ethnographic Practice. S

Introduces graduate students to the practice of fieldwork. Students design and carry out a quarter-long research project exploring a range of methods and producing an analytical case study. Readings and discussion emphasize both methodological critique and successful implementation. Enrollment restricted to anthropology graduate students. Enrollment limited to 15. *A. Tsing*

208L. Video Laboratory (2 credits). *

Provides students with hands-on training with a variety of audiovisual equipment. Through lectures, demonstrations, hands-on field exercises, and review of students' media exercises, students learn the fundamentals of photography, video production, and audio recording in the field. Concurrent enrollment in course 208A required. Enrollment restricted to anthropology graduate students. Enrollment limited to 15. *A. Tsing*

211. Human Ecology. F

Reviews environmental, physiological, behavioral, and cultural ways that humans interact with their physical surroundings. Effects of human culture on the environment, and of the environment on the shape of human culture will be emphasized. Will be offered in the 2008–2009 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *N. Dominy*

212. The Human Life Cycle. *

Examines the human life cycle using an evolutionary framework. Examines key aspects of the human life stages using findings and concepts from developmental biology, physiology, nutrition, evolutionary ecology, and life history theory. These stages include: gestation, infancy, childhood, juvenile and adolescent periods, and senescence. Each stage of the life cycle is compared and contrasted with the developmental life of nonhuman primates and mammals. Other related topics include developmental plasticity and epigenetics. Enrollment restricted to graduate students. Enrollment limited to 15. *L. Milligan*

216. Methods in Physical Anthropology. *

Topical methodologies in physical anthropology. Particular emphasis placed on the use of molecular techniques, spatial pattern analysis, morphometrics, stable isotopes, and Bayesian statistics. Contact time structured as a weekly three-hour meeting. Enrollment restricted to graduate students. Enrollment limited to 15. *N. Dominy*

228. Grant Writing. F

Devoted entirely to writing grant proposals. Students either work on their graduate education fellowships or their doctoral dissertation grants or both. Reading materials consist of granting agency documents plus examples of successful applications. Enrollment restricted to anthropology graduate students. Enrollment limited to 15. May be repeated for credit. *C. Shaw*

229. Constructing Regions. W

Discusses centrality of the idea of "regions" in studies of culture, the history of "locating" social theory, and debates about area studies. Students develop area of transregional bibliographies. Primarily for second- or third-year anthropology graduate students reading "area" literatures. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Anderson*

233. Politics of Nature. *

Advanced graduate seminar in environmental anthropology and science and technology studies, focusing on how nature is produced in the modern world and what political and practical significance this has in different contexts. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Mathews*

234. Feminist Anthropology. *

Examines how feminist anthropology has created its object of knowledge: gender differentiation in cross-cultural perspective. Reading across feminist theory and ethnography, focuses on nature/culture, post-colonial debates, the intersection of gender with race and nationalism, and gender and transnationalism. Will be offered in the 2009–2010 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Tsing*

243. Cultures of Capitalism. *

Introduction to selected themes in political economy, stressing the work of Marx. Topics include the development of capitalism, colonialism, dependency, world systems, state formation, class consciousness, commodity fetishism, the nature of late capitalism, post-modernism, and the aesthetics of mass culture. Through political economy's interlocutors, raises questions about gender, race and ethnicity, and post-structuralist critiques. Will be offered in the 2009–2010 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *L. Rofel*

249. Ecological Discourses. *

Explores narratives of nature and their practical consequences in contests over "wild places" and their resources. Readings focus on the histories of forests and on analytic frameworks—ecology, social history, interpretation, cultural studies—with which to investigate competing constructions of the environment. Will be offered in the 2009–2010 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Tsing*

252. Survey of Cultural Anthropological Theory. W

Major figures, ideas, and writing in 19th- and 20th-century cultural anthropology surveyed. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Linger*

253. Advanced Cultural Theory. *

Examines cultural anthropology's interdisciplinary practices of knowledge formation at an advanced level. Drawing on various types of theoretical texts, the course elaborates on the relationship between culture and power, taking up different themes each time it is taught. Enrollment restricted to graduate students. Enrollment limited to 15. *L. Rofel*

255. Anthropology of Secularism. F

Examines secularism as a practice of government with a concomitant set of ethics. Topics include: the notion of religion necessary for secularism; forms of moral and political inclusion/exclusion enacted by secular governance; and the kind of ethical subject secularism engenders. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Fernando*

256. International Developmental Aid. S

Explores theoretical and methodological issues in the field of international development, with an emphasis on ethnographic analysis. Topics include hierarchies of value, altruism and philanthropy, geographies of dependency and responsibility, ethics of compassion, and public anthropology. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Caldwell*

270. History of Archaeology. F

Historical review of prehistoric archaeology from antiquarianism to the present. Emphasis on the development of archaeological theory, its relation to evolutionary and anthropological theory, and themes ongoing over time. Students cannot receive credit for this course and course 170. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Gifford-Gonzalez, J. Monroe*

275A. Seminar on Early African Archaeology. *

Tutorial on archaeology of Africa, from 2.5 million years ago to emergence of African pastoralism and farming. Weekly examination of disciplinary models and assumptions in historic context, emphasizing overarching themes in prehistoric archaeology. Students cannot receive credit for this course and course 175A. (Formerly *Tutorial on African Archaeology*.) Enrollment restricted to graduate students or by consent of instructor. Enrollment limited to 15. *D. Gifford-Gonzalez*

275B. Tutorial in Archaeology of African Complex Societies. W

Graduate tutorial on the archaeology of precolonial African kingdoms and states. Particular attention paid toward the origins of social inequality and the evolution of centralized polities. Students cannot receive credit for this course and course 175B. Prerequisite(s): Enrollment restricted to graduate students. Enrollment limited to 15. *J. Monroe*

275C. Tutorial in African Diaspora Archaeology. *

Graduate tutorial on African diaspora archaeology. Focuses on the cultural, social, economic, and political lives of Africans and their descendants in the New World and West Africa from the 15th through 19th centuries. Students cannot receive credit for this course and course 175C. Will be offered in the 2009–2010 academic year. Prerequisite(s): Enrollment restricted to graduate students. Enrollment limited to 15. *J. Monroe*

275D. Issues in Africanist Archeology. *

Advanced readings and discussion in Africanist archaeology. Focus to be guided by the needs of advanced students. This course does not replace the 275-series and should only be taken by students who have successfully completed at least one of these courses. Will be offered in the 2009–2010 academic year. Prerequisite(s): course 275A or 275B or 275C. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *D. Gifford-Gonzalez*

276A. Advanced Topics in North American Archaeology. W

In-depth examination of development of Native cultures in North America from end of last ice age to time of European contact. Focuses on specific regional trajectories and problems of social change. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Habicht Mauche*

276D. Archaeology of the Peopling of the Americas. *

Using a multidisciplinary approach, examines physical geology, paleoenvironment, human biology, linguistics, and culture history of Americas at end of last Ice Age. Particular emphasis on reconstructing timing, routes, and context of first peopling of the American continents. Taught in conjunction with Earth Sciences 276. Students cannot receive credit for both courses. Will be offered in the 2009–2010 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Habicht Mauche*

277. Tutorial on European Conquest of the Americas. *

Uses ethnographic, archaeological, and historical sources to examine clash of cultures between Native Americans and Europeans during the 15th through 19th centuries. Emphasizes critical analyses of social, political, and demographic impacts of contact on Native American societies. Will be offered in the 2009–2010 academic year. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Habicht Mauche*

278. Tutorial on Historical Archaeology. S

Tutorial on archaeology of European colonialism and the early-modern world. Focuses on the nature of European colonial expansion in New and Old Worlds; culture contact and change; and power and resistance in colonial societies. Students cannot receive credit for this course and course 178. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Monroe*

280. Advanced Ceramic Analysis. *

Advanced graduate seminar that focuses on techniques and theories used to bridge the gap between the recovery of ceramic remains from archaeological contexts and their interpretation with respect to various anthropological issues and problems. Students cannot receive credit for this course and course 180. Enrollment restricted to graduate students. Concurrent enrollment in Anthropology 280L required. Enrollment limited to 5. *J. Habicht Mauche*

280L. Advanced Ceramic Analysis Laboratory (2 credits). *

Emphasizes advanced techniques of ceramic analysis, including materials selection and processing, hand-building, and open-pit firings. Standard techniques for describing and measuring formal and technological attributes of pottery also presented. Students cannot receive credit for this course and course 180L. Enrollment restricted to graduate students. Concurrent enrollment in Anthropology 280 required. Enrollment limited to 5. *J. Habicht Mauche*

281. Landscape Archaeology. *

Graduate seminar on contemporary archaeological perspectives about space and landscape. Focuses on archaeological contributions to understanding economic, cultural, and political factors that shape human perception, use, and construction of the physical world. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Monroe*

284. Tutorial in Zooarchaeology. F

Lectures and seminar on archaeological faunal analysis. Topics include: mammalian evolution and osteology; vertebrate taphonomy; reconstruction of human diet from faunal remains; foraging strategy theory; data collection and management; and methods of quantitative analysis. Students cannot receive credit for this course and course 184. (Formerly *Zooarchaeological Research Design*.) Enrollment restricted to graduate students. *D. Gifford-Gonzalez*

285. Osteology of Mammals, Birds, and Fish. W

Practicum in vertebrate osteology, covering all larger mammal species of central California, plus selected bird and fish species, and topics in evolution and ecology of selected taxa. Students cannot receive credit for this course and course 185. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Gifford-Gonzalez*

286. Zooarchaeological Research Design. W

Seminar on research design in zooarchaeology using archaeological monographs and clusters of related research papers. Students produce a research design in the form of a draft NSF research proposal based on the use of

archaeofaunal materials. Prerequisite(s): course 284; or an equivalent advanced course on zooarchaeological theory and method, and permission of the instructor. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Gifford-Gonzalez*

289. Writing in the Anthropological Sciences. *

Workshop on writing styles in anthropological sciences, including specialized, general anthropological, and mainstream scientific journals, monographs, and public education pieces. Cultivates flexible writing skill through comparative analysis of data presentation and rhetoric, with drafts in different formats. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Gifford-Gonzalez*

290A. Primate Field Ecology: Tropical Forest Ecology. W

Tropical forest ecology with emphases on plant-life history variation and patterns of diversity. Topics include: photosynthesis, competition, and plant-animal interactions, such as pollination, herbivory, and seed dispersal. Special focus on neotropical forests and adaptations to life in humid environments. Students cannot receive credit for this course and course 190A. Competitive selection based on application and interview during previous fall quarter. Enrollment restricted to graduate students. Concurrent enrollment in courses 290B and 290C required. Enrollment limited to 15. *N. Dominy*

290B. Primate Field Ecology: Field Methods in Primatology. W

Field-oriented course in primate behavioral ecology. Combines lectures on approaches and methodologies with practical field studies. Students complete field project in primate ecology and behavior and learn natural history of the plants and animals of Costa Rica. Students cannot receive credit for this course and course 190B. Competitive selection based on application and interview during previous fall quarter. Enrollment restricted to graduate students. Concurrent enrollment in courses 290A and 290C required. Students are billed a materials fee. Enrollment limited to 15. *N. Dominy*

290C. Primate Field Ecology: Independent Field Research. W

Students carry out substantial field projects at two locations in Costa Rica under the supervision of course instructors. Students develop research proposals, analyze data, and prepare final research papers and oral presentations. Students cannot receive credit for this course and course 190C. Competitive selection based on application and interview during previous fall quarter. Enrollment restricted to graduate students. Concurrent enrollment in courses 290A and 290B required. Enrollment limited to 15. *N. Dominy*

292. Graduate Colloquium (2 credits). F,W,S

Designed to offer an institutionalized mechanism for the presentation of research papers and teaching efforts by faculty and advanced graduate students. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

294N. Comparison of Cultures. F

Seminar for students interested in theories and methodology of social and cultural anthropology devoted to critical discussion of different methods of comparison practiced in anthropology. Enrollment restricted to graduate students. Enrollment limited to 15. *T. Pandey*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. *The Staff*

298. Advanced Laboratory Apprenticeship. F,W,S

Supervised tutorial in specialized analytic methods in archaeology or physical anthropology. Students collaborate on laboratory research with a departmental mentor or, with advisor's consent, with researchers on or off campus, preparing a manuscript for publication or an extensive literature review. Permission of instructor required. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Prerequisite(s): petition on file with sponsoring agency. *The Staff*

Applied Mathematics and Statistics

See Engineering, page 210.

Art

Elena Baskin Visual Arts Studios
Room E-104
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visart@ucsc.edu
<http://art.ucsc.edu>

Faculty and Professional Interests

Professor

PATRICK AHERNE, Emeritus

JOYCE BRODSKY, Emerita

DOYLE FOREMAN, Emeritus

FRANK GALUSZKA
Painting, book arts

HARDY HANSON, Emeritus

FRED A. HUNNICUTT, Emeritus

NORMAN LOCKS
Photography

DOUGLAS E. MCCLELLAN, Emeritus

JENNIE LIND MCDADE, Emerita

KATHRYN E. METZ, Emerita

JASPER A. ROSE, Emeritus

ELIZABETH STEPHENS
Intermedia, electronic art, sculpture, and performance art

DONALD L. WEYGANDT, Emeritus

JACK ZAJAC, Emeritus

Associate Professor

E. G. CRICHTON
Intermedia, electronic arts, photography, installation

JIMIN LEE
Etching, lithography, monoprinting, book arts, ukiyo-e

LEWIS WATTS
Photography

Assistant Professor

ELLIOT ANDERSON
Electronic art, digital arts/new media

MELISSA GWYN
Painting, drawing

DEE HIBBERT-JONES
Public art, sculpture

DEREK MURRAY
*Contemporary art, globalization, theory and criticism,
African-diaspora art, visual-culture studies, cultural theory*

JENNIFER PARKER
Sculpture, installation, video, and performance art

Lecturer

KEN ALLEY
Photography

TIM CRAIGHEAD
Drawing, painting

SUSAN FRIEDMAN
Photography

HANNA HANNAH
Drawing, painting

MIRIAM HITCHCOCK
Drawing, painting

KATHLEEN PERRY
Intermedia, photography, sculpture

PAUL RANGELL
Lithography, drawing

SUSANA TERRELL
Drawing, painting

RICHARD WOHLFEILER
Printmaking, theory

Program Description

The Art Department offers an integrated program of study in theory and practice exploring the power of visual communication for personal expression and public interaction. The department provides students with the means to pursue this exploration through courses that provide the practical skills for art production in a variety of media within the contexts of critical thinking and broad-based social perspectives.

The art program at UCSC is composed of courses in drawing, painting, photography, sculpture, print media, intermedia, critical theory, electronic art, public art, and interactive technologies. Baskin visual arts studios provide world-class facilities for art production in these areas. The Art Department is committed to pursuing a continuing dialogue about what constitutes basic preparation in the arts while offering students experience in established practices, new genres, and new technologies. Foundation courses are open to all non-art students after priority enrollment. Art and pre-art majors have enrollment priority in all art courses. Non-art majors may enroll in art courses on the first day of class if space permits.

Students graduating with a major in art may become professional artists or pursue careers in such diverse areas as arts management, museum and gallery practices, communication technologies, public school teaching, media arts, and publishing. Many students who want to teach at the college level continue their education in graduate school.

Declaring the Pre-Art Major

Students must declare the pre-art major in order to enroll in introductory studio courses. Students should declare their pre-art major in the first quarter of their freshman year to insure their ability to enroll in studio courses, but may declare early in their sophomore

year also. Juniors cannot declare pre-art. Students may declare the pre-art major at any time. Please note that students who have declared the pre-art major still need to follow the procedure for acceptance to the full major; a student may not graduate as a pre-art major.

Acceptance to the Art Major: Freshmen

Students may apply for admission to the art major after completing at least three lower-division studio courses at UCSC (not foundation courses) with grades of B or better. If one of these classes is graded B- or lower, the student must take a different lower-division studio course and receive a B to be eligible to declare art. Students cannot take more than four lower-division studio classes to obtain the requisite B grades. While completing this lower-division course work, it is critical that each student meet with a faculty adviser regarding the student's potential to proceed to the major level.

Junior Transfer Students

Junior transfer students are accepted into the art major for fall quarter after passing a portfolio review in early April. Their acceptance is contingent upon their acceptance to UCSC. Acceptance to UCSC does not guarantee admittance to the art program, nor does passing the portfolio review guarantee that UCSC will accept the student to the university. Transfer students must identify themselves as potential art majors when applying to the university in order to receive information on the portfolio review deadlines and the materials required for the review. All junior transfers will be required to take Art 60, Forms and Ideas, and one art seminar in their junior year at UCSC in lieu of the first-year foundation program requirements.

Requirements for the Art Major

The minimum requirements for the art major are completion of seven lower-division and nine upper-division courses and satisfaction of the senior comprehensive requirement. A maximum of three courses total from outside the Art Department (including EAP courses) may be substituted for regular art courses with the approval of a major adviser. In these courses, students must have received a grade of B or higher. Students should plan carefully when using this option.

Students plan their course of study in consultation with a faculty adviser.

Lower-Division Requirements (Freshmen)

Students complete seven courses as follows:

- the foundation series consists of two courses: 80C *Introduction to Visual Arts* (fall quarter), and 10H *3-D Foundation* (winter quarter)
or
10G *2-D Foundation* (spring quarter)
- three courses from the following list (with a grade of B or better):
20 *Introduction to Drawing for the Major*
21 *Introduction to Computer Art*
22 *Introduction to Electronics for Intermedia*
23 *Intermedia I*
24A/B *Introduction to Painting. A: Oil, B: Acrylic**
25 *Relief Printmaking*
25 *Relief Printmaking*
26 *Introduction to Printmaking*
27 *Monoprinting/Mixed Media Printing*
28 *Figurative Sculpture*
30 *Introduction to Photography for Art Majors*
39 *Public Art I: Community, Site, and Place*
40 *Sculpture I*

- students may apply either 24A or 24B, but not both, toward the lower-division course requirements for declaring the full art major.
- two courses from history of art and visual culture, one with a Western focus and one with a non-Western focus; students may substitute one history of art and visual culture (HAVC) course from the 80 series or upper-division (HAVC) classes for this requirement.

Requirements (Junior Transfers)

In lieu of the foundation courses, junior transfers complete the following:

- 60 *Forms and Ideas*, and
One of the following art seminars:
149A or B *Contemporary Visual Media: Issues of theory and Practice*,
or
150C *Issues in Collaboration and Interactivity*
- three lower-division studios (equivalent to those found in the above list) should be taken at the community college, college, or university in preparation for the mandatory portfolio review prior to acceptance to the art major.
- two courses from history of art and visual culture, one with a Western focus and one with a non-Western focus, may be taken at the community college, college, or university, if available, or at UCSC.

Art Major Planner

The following is a recommended academic plan for freshmen to complete during their first two years as preparation for the art major.

Year	Fall	Winter	Spring
1st (frsh)	Art 80C	Art 10H* low-div studio	Art 10G* low-div studio
2nd (soph)	Low-div studio HAVC**	HAVC**	

*Students take only one foundation course of their choice

**Courses from history of art and visual culture, one with a Western focus, and one with a non-Western focus

Upper-Division Requirements

Students complete nine courses as follows: five upper-division (100+ numbered) studio courses;

- 10 credits of senior studio courses or equivalent senior-level work in the area of focus;
- two upper-division non-studio courses from history of art and visual culture, film and digital media theory, or art critical theory seminars. Students may choose two upper-division courses from another department relevant to the area of focus in consultation with a faculty adviser, however, courses from departments other than film and digital media or history of art and visual culture constitute substitutions, which will be counted toward the maximum number of three allowed.

The last three quarters of course work for the major must be completed in residence at UCSC.

Comprehensive Requirement

Senior majors should meet with their faculty adviser about this requirement. Students may satisfy the comprehensive requirement with one of the following two options:

1. Completing 10 credits of senior studio course work in the area of focus;

2. Completing 10 credits of upper-division studio course work in the area of focus; and
 - a. Presenting an exhibition and, by appointment, meeting with a faculty member for review and critique of the exhibition; or
 - b. Submitting a portfolio and, by appointment, meeting with a faculty member for review and critique of the portfolio.

Study Abroad

The UC Education Abroad Program (EAP) offers students the opportunity to study abroad. Art majors may participate in EAP in their junior year. Pre-art majors are not approved to study abroad. Art students may not go abroad in their senior year, as the last three quarters of course work must be in residence at UCSC. When considering attending EAP, the student should be mindful that only three courses may be substituted in the art major and each must receive a grade of B or better.

Materials Fee

Art students should be aware of the materials fee required for some studio courses. The fee is billed to the student's account for specific course materials purchased by the Art Department through the university. Fees generally range from \$5 to \$150 per course. Students may incur additional expense purchasing individual supplies.

Lower-Division Courses

10. Foundation Series in Art.

Introduces general education students and prospective majors to theory and practice of art and contemporary discourse surrounding it. Courses 10G and 10H comprise large lecture sections that meet once a week and smaller studio sections that meet once or twice a week. Courses include both lecture and studio components and are not intended to be technique-intensive studio classes. Students must register for both lecture and studio sections. *The Staff*

10G. 2D Foundation. S

Introduction to two-dimensional art practice and theory. Readings and lectures address both history and contemporary contexts of 2D art practice. Covers issues of content, representation, communication, and process. In the studio, students apply concepts covered in lecture to art projects. Students are billed a materials fee. Enrollment restricted to pre-art and art majors during priority enrollment. Enrollment limited to 100. (General Education Code(s): A.) *The Staff*

10H. 3D Foundation. W

Introduction to three-dimensional sculpture, intermedia, performance art, and technologically based contemporary art. Weekly lectures and section discussions introduce historical, theoretical, and critical methods of viewing and understanding contemporary art. Studio assignments introduce students to a range of contemporary techniques and materials used to make sculptural, performative, and technologically based work. Students are billed a materials fee. Enrollment restricted to pre-art and art majors during priority enrollment. Enrollment limited to 100. (General Education Code(s): A.) *W. Hibbert-Jones, E. Stephens, J. Parker*

20. Introduction to Drawing for the Major. F,W,S

Introduction to the methods, materials, and purposes of drawing to develop perceptual and conceptual skills through a series of assignments, providing various

approaches to drawing as a tool for creative exploration. Discussions and critiques facilitate the development of critical skills. Designed for students considering the art major. Students are billed a materials fee. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, F. Galuszka, M. Gwyn*

21. Introduction to Computer Art. F,S

Basic introduction to the use of a computer as a fine art tool and medium. Addresses basic skills, concepts relevant to contemporary art theories, and practices. Provides a hands-on introduction to fundamentals of graphics, image acquisition, and manipulation and programming with demonstrations of relevant software. Students work independently and in groups. Assignments include digital image acquisition and manipulation, basic scripting, hypertext and web publishing, and computer programming. Lectures, readings, and discussions examine new technology artwork and technology's relationship to contemporary culture. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, E. Anderson*

22. Introduction to Electronics for Intermedia. F,W

Provides basic introduction to electronic devices for use in making intermedia art. Provides hands-on experience working with sensors, motors, switches, gears, lights, simple circuits, and hardware store devices to create kinetic and interactive works of art. Produce sculptural or installation-based projects. Demonstrations, lectures, and critical discussion of work given to develop concepts and technical skills. Students are billed a materials fee. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, E. Anderson*

23. Intermedia I. F,W

Introduction to combining media, materials, and forms to explore contemporary art practices such as installation, time based work, performance, collaboration, and interactivity. Assignments encourage an exploration of conscious subject matter, process, and technique. Discussions, reading handouts, and critiques help develop perceptual and conceptual skills. Skill workshops introduce new techniques. Students are billed a materials fee. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, E. Stephens, E. Crichton*

24A. Introduction to Painting: Oil. F,W,S

Introduction to medium of oil painting and to painting process. Assignments develop understanding of potential of this medium as a tool for perceptual and conceptual exploration. Slide lectures introduce assignments and are basis for class discussion of contemporary and historical art activity in the field. Students are billed a materials fee. (Formerly course 24.) Prerequisite(s): course 20 or 80A. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, F. Galuszka, M. Gwyn*

24B. Introduction to Painting: Acrylic. W

Introduction to acrylic painting and to painting process. Assignments develop understanding of this medium's potential as a tool for perceptual and conceptual exploration. Slide lectures introduce assignments and are basis for class discussion of contemporary and historical art activity in this field. Students are billed a materials fee. Prerequisite(s): course 20 or 80A. Enrollment restricted

to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *F. Galuszka*

25. Relief Printmaking. S

Introduction and development of relief printmaking. Course explores the traditions and contemporary issues of relief printmaking with emphasis on color work including reduction process, multiplate and viscosity printing. Students will build a portfolio using a wide spectrum of this complex relief process. Students are billed a materials fee. Prerequisite(s): courses 20 or 80A. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. *J. Lee, P. Rangell*

26. Introduction to Printmaking. F

Survey of print medium: basic terminology, techniques, application of tools, materials, and condensed history of development of printmaking. Assignments consist of individual and collaborative projects aimed at building skills and gathering technical experience. Introduction to relief printing (black and white and color), intaglio, letterpress, and interface between photography/computer and the handmade print. Exploration of print media for communication of issues including formal aesthetics, social/psychological and personal narrative. Students are billed a materials fee. Prerequisite(s): course 20 or 80A. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, J. Lee, P. Rangell*

27. Monoprinting/Mixed Media Printing. W

Explores crossover discipline that combines skills of drawing and painting with printmaking, offering a wide range of possibility for personal expression using both oil-based and water-based inks on a variety of plates. Registration and over-printing methods are demonstrated along with mixed media prints. Students are billed a materials fee. Prerequisite(s): courses 20 or 80A. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *J. Lee*

28. Introduction to Figurative Sculpture. *

Introduction to a wide range of techniques for creating sculpture, based on and about the body/figure, through the exploration of contemporary concepts and ideas. Provides demonstrations, slide lectures, and critical discussion of work to develop concepts and technical skills. Students are billed a materials fee. Enrollment restricted to art, pre-art, and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *W. Hibbert-Jones, J. Parker*

30. Introduction to Photography for Art Majors. F,W,S

Introduction to photography as an art form that explores visual ideas beginning with camera-ready use, negative development, and printing. Prepares for further work in photography or for collaboration with other media in art including computer arts and two- and three-dimensional mixed media. Critically examines photographic works while reading historical and theoretical texts. Students are billed a materials fee. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, L. Watts, N. Locks*

39. Public Art I: Community, Site, and Place. F

Introduces contemporary public art through studio practice, slides, and readings. Create public art works, design scale models, drawings, and project proposals. Includes a local community-based public art project and an ephemeral landscape project. Students are billed a ma-

materials fee. Enrollment restricted to pre-major art students and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, W. Hibbert-Jones*

40. Sculpture I. W,S

Introduction to a range of concepts and forms used to make contemporary sculpture. Assignments facilitate becoming familiar with sculptural techniques and materials to enable students to visually manifest their sculptural ideas. Combines lectures and demonstrations with work time in class. Students are billed a materials fee. Enrollment restricted to pre-art and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, W. Hibbert-Jones, E. Stephens, J. Parker*

42. Student-Directed Seminar. *

Seminars taught by upper-division students under faculty supervision. Does not fulfill major requirement. (See course 192.) *The Staff*

60. Forms and Ideas. F,W

Required for all junior transfer student art majors. Introduction to the art program, emphasizing awareness of contemporary visual practices and theory. Combines studio practice and theory. Students are billed a materials fee. Enrollment restricted to junior transfer art majors. Enrollment limited to 20. (General Education Code(s): A.) *The Staff, D. Murray*

70A. Bookbinding. F

Students learn techniques of bookbinding, construction, and design, and fundamentals of letterpress printing. Students are billed a materials fee. May not be used to fulfill art major requirements. (Also offered as Cowell College 70A. Students cannot receive credit for both courses.) Enrollment limited to 12. (General Education Code(s): A.) *P. Ritscher*

70B. Printing I: Elements of Printing. W

Learn fundamental skills in fine letterpress printing, including hand typesetting and instruction in the operation of printing presses. Basic typography explored as students design and print a small edition of a selected text. Students are billed a materials fee. May not be used to fulfill art major requirements. (Also offered as Cowell College 70B. Students cannot receive credit for both courses.) Prerequisite(s): course 70A. Enrollment limited to 12. (General Education Code(s): A.) *P. Ritscher*

70C. Printing II: Typography and Book Design. S

Students learn fundamental skills in fine letterpress printing, including hand typesetting and instruction in the operation of printing presses. Basic typography explored as students design and print a small edition of a selected text. Students are billed a materials fee. May not be used to fulfill art major requirements. (Also offered as Cowell College 70C. Students cannot receive credit for both courses.) Prerequisite(s): course 70B or by instructor permission. Enrollment limited to 12. May be repeated for credit. (General Education Code(s): A.) *P. Ritscher*

80A. Introduction to Drawing. F,S

Introductory course for beginners and students not majoring in art. Covers the history of what are considered master drawings from prehistory to the present. Various media are examined and assigned in specific exercises. Course is a balance of historical study and practice through assigned homework exercises. A disciplined performance is expected. Enrollment limited to 90. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80C. Introduction to Visual Arts. F

Focus is placed on contemporary issues in critical theory and studio practice in comparison with theory and practice in other historical contexts. Students are introduced to topics that involve the social, political, and aesthetic role of visual images in both the private and public domains. While theory and practice are addressed in the context of Western cultures, guest speakers introduce topics related to the visual practices of their cultures. Enrollment limited to 200. (General Education Code(s): T4-Humanities and Arts, A.) *D. Murray*

80D. Introduction to Photography. F,S

Introductory course for beginners and nonmajors. Various techniques examined and assigned in specific exercises. Work on projects using color film; this is a non-darkroom course. Examples given of photography from 1826 to the present. Balances historical study and practice through assigned homework exercises. Students are billed a materials fee. Enrollment limited to 90. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80F. Introduction to Issues in Digital Media. W

Digital media is revolutionizing ways in which artists create and exchange information. Introduces digital media through lectures, demonstrations, and exercises. Topics include networks, imaging, MIDI, interactivity, audio/video, and the World Wide Web. Enrollment limited to 100. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, A.) *The Staff, E. Anderson*

80V. Issues and Artists. S

Focuses on key issues in contemporary art, art theory, and curatorial practice through lectures, discussions, and readings. Course consists of weekly series of lectures designed to familiarize students with theories and practice surrounding seven current topics of interest in the larger art world. Instructor introduces each topic theoretically and shows work of relevant artists and curators. Guest artists and curators present their work in relation to the topic. May not be used to fulfill major requirements. Enrollment limited to 100. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff, E. Stephens, L. Watts, E. Crichton*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

100. Gallery/Museum Management and Practices (2 credits). *

Focuses on providing practical experience in all phases of exhibition design and implementation. General tasks of program operation supplemented with selective reading and written assignments designed to enhance theoretical understanding of broader issues in art administration. Includes field trips to galleries and museums as well as in-class visits by artists and arts professionals. Enrollment restricted to art, pre-art, and history of art and visual culture majors. Enrollment limited to 20. *S. Graham*

101. Intermediate/Advanced Drawing. F,W,S

Work moves toward individual directions in drawing. A variety of media are explored. Each student is expected to do 150 hours of drawing over the quarter. Students are billed a materials fee. Prerequisite(s): course 20. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, F. Galuszka, M. Gwyn*

102. Figure Drawing. F,S

Focuses on drawing from the human figure and exploring the figure for the purpose of personal expression and social communication. Intended for the intermediate/advanced drawing student. Students are billed a materials fee. Prerequisite(s): course 20. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff, F. Galuszka*

103. Intermediate/Advanced Painting. F,W,S

Continuation of the development of a basic foundation in painting with emphasis on the development of individual, experimental procedures. Students are billed a materials fee. Prerequisite(s): course 24A or 24B. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, F. Galuszka, M. Gwyn*

104. Special Topics in Painting. *

Special studies in painting as announced. Students are billed a materials fee. Prerequisite(s): course 24A or 24B, and 103. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *F. Galuszka, M. Gwyn*

106A. Senior Studio in Drawing and Painting. W,S

An intensive studio experience for art majors, meeting three full days per week. Major emphasis is on the development of individual projects in preparation for the senior exhibition. Satisfies senior exit requirement. 106A and 106B must be taken concurrently. Students are billed a materials fee. Course is designed for senior art majors. Portfolio review prior to advance enrollment required; students should complete course 103 as preparation. Enrollment limited to 18. May be repeated for credit. *F. Galuszka, M. Gwyn*

106B. Senior Studio in Drawing and Painting. W,S

An intensive studio experience for art majors, meeting three full days per week. Major emphasis is on the development of individual projects in preparation for the senior exhibition. Satisfies senior exit requirement. Course is designed for senior art majors. Portfolio review prior to advance enrollment required; students should complete course 103 as preparation. Courses 106A and 106B must be taken concurrently. Enrollment limited to 18. May be repeated for credit. *F. Galuszka, M. Gwyn*

107. Mixed Media Works on Paper. *

This course stresses alternative drawing processes, techniques, and materials. Intended for the intermediate or advanced student. Students are billed a materials fee. Prerequisite(s): course 20. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff, F. Galuszka, P. Rangell*

107A. Outdoor Painter's Project. *

Along with an increasing general concern to preserve our natural environment, there has been the resurgence of interest in celebrating the landscape through painting. This impulse to strengthen the bond between art and nature has provided a degree of urgency, revitalizing a tradition that had once been a simple nostalgia for a romantic and rural past. Explores the potential for meaning in outdoor painting today. Emphasis is placed on group excursions and intensive discussion that includes visiting artists. Enrollment limited to 20. *The Staff*

109. Intermedia II. F

Further investigation in combining media, materials, and forms to explore a variety of contemporary art practices. Students develop their projects thematically throughout

the quarter. Assignments encourage experimentation with time and motion, text and images, collaboration, installation, performance, and interactivity. Discussions, reading handouts, and critiques further the development of perceptual and conceptual skills. Skill workshops introduce new techniques. Students are billed a materials fee. Prerequisite(s): course 22 or 23 or 29 or 39 or 40. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *E. Stephens, E. Crichton*

110. Special Topics in Intermedia. *

Exploring interactive strategies for making art. Projects experiment with combining forms and mediums to engage an audience. Students are billed a materials fee. Prerequisite(s): course 23 or 29 or 39 or 40. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *E. Stephens, E. Crichton*

111. Book Arts II. F,W,S

Individual projects to complete printing and binding of small books. Taught in conjunction with course 70. Does not fulfill a requirement for the art major. Students are billed a materials fee. Enrollment limited to 12. May be repeated for credit. *The Staff*

112. Intaglio I. F

Introduces students to various methods used in making intaglio prints. Encourages individual artistic growth of imagery and technique through assignments designed to explore the medium. Includes discussion and critique of work with equal emphasis on technique and concept. Students are billed a materials fee. Prerequisite(s): course 25, 26, or 27. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff, J. Lee*

113. Intaglio II. W

This presentation of advanced intaglio techniques emphasizes a variety of multi-plate color printing and photo etching processes. The course concentrates on individual development in style and concept through the intaglio process. Students are billed a materials fee. Prerequisite(s): course 25, 26, 27, or 112. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *J. Lee*

114. Lithography I. W

Introduction to drawing, processing, and printing of lithographs from stone. Emphasis on discovery of tonal, textural, and expressive potential from the surface of the stone, while establishing individual directions in imagery. Condensed history of the medium, technical theory, and critique in lecture and demonstrations. Students are billed a materials fee. Prerequisite(s): course 20, 25, 26, or 27. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *P. Rangell*

115. Lithography II. S

Continuation of course 114. Introduction of tusche wash, aluminum plates, transfers, photo-lithography (computer interface), and multiple color techniques. Emphasis on experimentation, refinement of craft and approach, defining individual imagery, and expanding scale. Further investigation of the history of the medium and contemporary practice. Students are billed a materials fee. Prerequisite(s): course 114. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *P. Rangell*

116A. Senior Studio in Print Media. S

An intensive studio experience for majors, meeting three full days per week. Provides an opportunity for in-depth practice in all print media in preparation for the senior

exhibition. In addition to individual projects, students work collaboratively and in series. Prints incorporating multiple colors and concurrent media, and utilizing a larger scale are encouraged. Readings and research are required. Satisfies senior exit requirement. Students are billed a materials fee. Portfolio review prior to advance enrollment required; students should complete courses 113 and 114, or 112 and 115, as preparation. Courses A and B must be taken concurrently. (Formerly *Senior Studio in Printmaking*.) Enrollment limited to 18. May be repeated for credit. *J. Lee, P. Rangell*

116B. Senior Studio in Print Media. S

An intensive studio experience for majors, meeting three full days per week. Provides an opportunity for in-depth practice in all print media in preparation for the senior exhibition. In addition to individual projects, students work collaboratively and in series. Prints incorporating multiple colors and concurrent media, and utilizing a larger scale are encouraged. Readings and research are required. Satisfies senior exit requirement. Portfolio review prior to advance enrollment required; students should complete courses 113 and 114, or 112 and 115, as preparation. Courses A and B must be taken concurrently. Enrollment limited to 18. May be repeated for credit. *J. Lee, P. Rangell*

117. Special Topics in Printmaking. *

Special studies in printmaking, as announced. Students are billed for a materials fee. Prerequisite(s): course 25, 26, or 27. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, J. Lee, P. Rangell*

117X. Seminar in Printmaking: 1475-2008. W

Through a chronological overview, this course touches on topics regarding the history of printmaking from the late medieval period to the present. Covers commerce of art, censorship, propaganda, politics, issues of gender, and the distribution of art and ideas over the centuries. Enrollment restricted to junior and senior art majors. Enrollment limited to 20. *J. Lee*

118. Computer Art: Theories, Methods, and Practices. W

Examines computer interactivity and interface in art making through theory and practice. Students develop interactive installation and sculptural works of art. Assignments may include the acquisition and creation of digital images, two-dimensional animation, programming with MAX/MSP/Jitter, basic electronics and sensors, and digital video and audio. Discussions, readings, and critiques address content, aesthetics, concepts, and expression as well as a practical grasp of relevant software. Students are encouraged to develop research projects and explore experimental practices. Students are billed a materials fee. Prerequisite(s): course 21 or 22 or 109 or prior basic programming experience and permission of instructor. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff, E. Anderson*

119. Digital Video. S

An exploration of the video medium including production using the digital video format. Digital video cameras will be used to produce digital source material to be manipulated in a non-linear digital editing system. Image manipulation, effects, and editing will be explored. A variety of video structures, theories, concepts, and forms will be examined through production, discussions, and viewing students' and artists' work. Prerequisite(s): course 21 or 22 or 23 or 80F or 118, or by permission of instructor. Enrollment restricted to art majors. Enrollment limited to 18. May be repeated for credit. (General Education Code(s): A.) *The Staff, E. Anderson*

120. Advanced Projects in Computer Art I. *

Independent and collaborative creative projects using advanced computer methods. May include networking projects, virtual representations, interactive multimedia, installation, performance, robotics, and three-dimensional modeling. Emphasis on advanced critical and experimental approaches to computers as a unique art medium and contemporary research issues. Students are required to enroll in scheduled lab sections. Students are billed a materials fee. Prerequisite(s): course 118. Enrollment limited to 20. May be repeated for credit. *E. Anderson*

121. Advanced Projects in Computer Art II. *

Independent and collaborative creative projects using advanced computer methods, which may be a continuation of projects initiated in course 120. May include networking projects, virtual representations, interactive multimedia, installation, performance, 3D modeling and animation, or robotics. Emphasis on advanced critical and experimental approaches to computers as a unique art medium, and contemporary research issues. Students are required to enroll in scheduled lab section. Students are billed for a materials fee. Enrollment limited to 20. May be repeated for credit. *The Staff, E. Anderson*

123. Digital Printmaking in Contemporary Art Practice. F

Addresses electronic imaging, output, and transferring as means of producing prints. Students gain knowledge and experience in using computer equipment including digital cameras, scanners, printers, and a variety of software. Investigation of conceptual and technical identities between digital image-making and traditional methods, as well as crossing over them to contemporary trends in art practice. Students are billed a materials fee. Prerequisite(s): course 25 or 26 or 27, or permission of instructor. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff*

126. Art of Bookmaking. F

Introduction to production of small edition books and multiples utilizing sequential visual imaging, narrative content, and mixed media in bookmaking. Provides instruction in conceptualizing, producing, and distributing printed artists' multiples. Ideas encouraged within a broad range of possibilities via the format of artists' books. Students are billed a materials fee. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff*

127A. Visiting Artist Special Topics: A, F,W

Students work collaboratively with a professional visiting artist on his/her research to develop their studio skills, discuss current critical and theoretical readings, and learn skills necessary to becoming a professional artist. Enrollment by portfolio review and restricted to junior and senior art majors. Concurrent enrollment in course 127B is required. Students are billed a materials fee. Enrollment restricted to junior art majors. Enrollment limited to 20. May be repeated for credit. *The Staff*

127B. Visiting Artist Special Topics: B, F,W

Students develop independent projects under the advice and guidance of a professional visiting artist during weekly studio classes and discussions. Enrollment by portfolio review and restricted to junior and senior art majors. Concurrent enrollment in course 127A required. Enrollment restricted to junior art majors. Enrollment limited to 20. May be repeated for credit. *The Staff*

130. Intermediate Photography. F,W,S

Continuation of course 30. Students explore visual ideas, directing their work toward individualized goals. Required work includes making photographic prints, reading historical and theoretical works, and examination of photographs. Students are billed a materials fee. Prerequisite(s): course 30. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, L. Watts, N. Locks*

131. Advanced Photography. *

Continuation of course 130. Students produce a portfolio of photographs, read historical and theoretical works, and study photographs and other art works. Students are billed a materials fee. Prerequisite(s): one of the following: course 130 and either course 132 or 134 or by passing 10 credits of 130. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, L. Watts, N. Locks*

132. Color in Photography. F,W

Concentration on making photographic works in color. Students produce a portfolio of color photographs, read historical and theoretical works, and study photographs and other art works. Individualized projects may include work with color transparencies, color xerox, computer-generated imagery, or mixed media. Students are billed for a materials fee. Prerequisite(s): course 130. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, L. Watts, N. Locks*

133A. Senior Studio in Photography. W,S

An intensive studio experience, with major emphasis on the development of individual projects leading to a required senior exhibition. Satisfies senior exit requirement. Students are billed a materials fee. Portfolio review prior to advance enrollment required. Courses 133A and 133B must be taken concurrently. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *L. Watts, N. Locks*

133B. Senior Studio in Photography. W,S

An intensive studio experience, with major emphasis on the development of individual projects leading to a required senior exhibition. Satisfies senior exit requirement. Portfolio review prior to advance enrollment required. Courses 133A and 133B must be taken concurrently. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *L. Watts, N. Locks*

134. Special Topics in Photography. F,W,S

Special studies in photography, concentrating on specific subject matter or media. Topics may include documentary photography, landscape, alternative processes, or mixed media. Students are billed a materials fee. Prerequisite(s): course 30. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, L. Watts, N. Locks, E. Crichton*

135. Introduction to Digital Photography. F,W,S

Introduction to basic theories behind the digital production, manipulation, and output of photographic images. Through readings and production, students address major issues specific to working with images in an increasingly digital environment. Students are billed a materials fee. Prerequisite(s): course 30. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff, L. Watts, E. Crichton*

136. Advanced Digital Photography. *

A continuation of course 135 to further study the practice, theories, and criticisms of the digital production, manipulation, and output of photographic images. Major issues specific to the production of digital images will

be addressed through readings and discussion, including techniques and theories drawn from a course reader and a textbook on advanced Photoshop skills. A final project is required. Students are billed a materials fee. Prerequisite(s): course 135 or portfolio review. Enrollment restricted to art majors. May be repeated for credit. (General Education Code(s): A.) *N. Locks*

139. Intermediate to Advanced Sculpture (Foundry). W,S

This intermediate/advanced course provides the information and facilities necessary to express ideas through the indirect process of metal casting. The "lost wax" method is used to manifest ideas in sculpture. Lectures and demonstrations are combined with work time in class. Students generate sculpture forms in wax then gate, invest, weld, chase, patina, and present at least one finished piece. Students are billed a materials fee. May be repeated for credit. Prerequisite(s): one of the following: course 23, 28, 29, 39, 40, or 41. Enrollment restricted to art majors. Enrollment limited to 17. May be repeated for credit. *W. Hibbert-Jones, E. Stephens, J. Parker*

140. Metal Sculpture. W

Focus on teaching intermediate to advanced students the processes and techniques of direct metal fabrication for contemporary sculpture. Explores a range of welding, cutting, and forming techniques and processes through demonstrations, slide lectures, field trips, and studio time. Demonstrations, slide lectures, and critical discussion of work help develop technical and conceptual skills. Students are billed a materials fee. Prerequisite(s): one of the following courses: 22, 23, 28, 29, 40, or 41. Enrollment restricted to art majors. Enrollment limited to 16. May be repeated for credit. *The Staff, W. Hibbert-Jones, E. Stephens, J. Parker*

141. Sculpture II. F

More advanced fabrication techniques in sculpture using wood, metal, industrial, and other materials. Techniques include carpentry and woodshop skills, and an introduction to sculptural forms, processes, and ideas. Demonstrations, slide lectures, and critical discussion of work help develop technical and conceptual skills. Students are billed a materials fee. Prerequisite(s): course 23, 28, 29, 39, or 40. Enrollment restricted to pre-art, art, and history of art and visual culture majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *W. Hibbert-Jones, E. Stephens, J. Parker*

146. Special Topics in Intermedia: Conceptual and Process-Oriented Approaches. *

Special subjects to be offered by regular staff or visiting artists as announced. Students are billed a materials fee. Prerequisite(s): one of the following courses: 23, 28, 29, 39, or 40. Enrollment restricted to junior and senior art majors. Enrollment limited to 20. May be repeated for credit. *The Staff, E. Stephens, E. Crichton*

148. Special Topics in Sculpture. S

Special topics in sculpture as announced, concentrating on specific aspects of subject matter and media. Students are billed a materials fee. Prerequisite(s): course 23 or 28 or 29 or 39 or 40 or 143 or 145. Enrollment restricted to art majors. Enrollment limited to 20. Offered in alternate academic years. May be repeated for credit. *The Staff, W. Hibbert-Jones, E. Stephens, J. Parker*

149A. Contemporary Visual Media: Issues of Theory and Practice. W,S

Through class discussions of a core of readings, selected issues in critical theory relevant to contemporary visual

practices are examined. Enrollment restricted to juniors and seniors. Enrollment limited to 20. *The Staff, D. Murray*

149B. Contemporary Visual Media: Issues of Theory and Practice. *

Continuation of course 149A with emphasis on readings about visual practices related to issues of class, gender, sexuality, ethnicity, postcolonialism and postnationalism. Enrollment restricted to juniors and seniors. Enrollment limited to 20. *The Staff, D. Murray*

150. Seminar in Contemporary Art. F**150C. Issues in Collaboration and Interactivity. F**

This writing-specific seminar explores collaboration and interactivity in contemporary art and visual cultures. Emphasis is on artworks where interaction and collaboration produce controversial and challenging results. Examines the convergence of media forms and artist collaborations, and the intersection of competing theoretical ideas and ideologies. The intention is to understand how artists and visual producers respond to an increasingly shifting society where rapid cultural change, advances in technology, and the effects of globalization reconfigure how we perceive the world. Prerequisite(s): Satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior art majors. Enrollment limited to 20. (General Education Code(s): W.) *The Staff, D. Murray*

151. Introduction to Gallery Management. *

Provides practical experience in all phases of an exhibition program's design and implementation including curation, registration, preparation, and publicity. The general tasks of program operation are supplemented with selected reading and written assignments designed to enhance theoretical understanding of broader issues in art administration, including an introduction to the political and ethical realities professionals face. Enrollment restricted to art majors. Enrollment limited to 20. *The Staff*

156. Topics in Public Art II: Memory, Landscape, and Artist as Activist. W

In-depth exploration of art in the public sphere. Students build an understanding of public art sparked by practical experience designing and developing projects. Theoretical aspects of contemporary public art, and an introduction to the range of current public art practices will be introduced through readings, lectures, and artist's talks. The combination of practical hands-on technique and theoretical ideology will enable students to fully develop their own project within the class. Students are billed a materials fee. Prerequisite(s): course 23, 39, 40, or by permission of instructor. Enrollment restricted to art majors. Enrollment limited to 20. May be repeated for credit. *W. Hibbert-Jones*

159A. Senior Studio: Intermedia, Sculpture, Electronic Art, and Public Art. S

An intensive studio experience for art majors concentrating in the areas of intermedia, sculpture, public art, installation art, electronic art, and interactive art. Major emphasis is on development of individual and collaborative projects in preparation for the senior exhibition. Readings and research required. Class discussions focus on project work and critiques, assigned reading, and the development of a written component by each student. Satisfies senior exit requirement. Students are billed a materials fee. Portfolio review prior to advance enrollment required. Enrollment restricted to art majors. Courses

159A and 159B must be taken concurrently. Enrollment limited to 18. May be repeated for credit. *E. Anderson, W. Hibbert-Jones, E. Stephens, J. Parker, E. Crichton*

159B. Senior Studio: Intermedia, Sculpture, Electronic Art, and Public Art. S

An intensive studio experience for art majors concentrating in the areas of intermedia, sculpture, public art, installation art, electronic art, and interactive art. Major emphasis is on development of individual and collaborative projects in preparation for the senior exhibition. Readings and research required. Class discussions focus on project work and critiques, assigned reading, and the development of a written component by each student. Satisfies senior exit requirement. Portfolio review prior to advance enrollment required. Enrollment restricted to art majors. Courses 159A and 159B must be taken concurrently. Enrollment limited to 18. May be repeated for credit. *E. Anderson, W. Hibbert-Jones, E. Stephens, J. Parker, E. Crichton*

161. Picturing Identity: Document and Culture. *

Studio addresses issues of race, gender, culture, personal identity, and visual representation. Examines ways ideas of identity are given visual form and communicated in fine arts and mass media. Students research ways traditionally underrepresented groups in society have been and are being represented in mass media; they then visually interpret that information in forms of visual artifacts. This process and interpretation serve as springboard to examination of expanded ideas of identity, including personal and/or family culture and history, gender, and ethnicity. Encourages use of broad range of mediums available to construct visual representations of identity. Students are billed a materials fee. Enrollment restricted to pre-art, art, film and digital media, and history of art and visual culture majors. Enrollment limited to 20. (General Education Code(s): A.) *L. Watts*

191. Teaching Apprenticeship. F,W,S

Designed for art majors at the upper-division level. Each student assists in a lower-division art course under the direct supervision of a faculty member. Students assist in technical instruction, critiques, and class discussions. May not be repeated for credit. Does not count toward upper-division major requirements. Enrollment restricted to art majors. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Students should have upper-division standing with a proposal supported by a faculty member willing to supervise. Students submit petition to sponsoring agency. Enrollment limited to 5. *The Staff*

193. Field Study. F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. To be used primarily by upper-division students doing part-time off-campus study. Students submit petition to sponsoring agency. Petitions may be obtained in the Art Department Office. May be repeated for credit. *The Staff*

196. Senior Project. F,W,S

Student will concentrate on completing work for comprehensive exhibition under the direction of his or her art adviser, with help from other faculty as needed. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

197. Individual Study. F,W,S

Individual study in areas approved by sponsoring instructors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Provides for department-sponsored independent study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual study in areas approved by sponsoring instructors. Students submit petition to sponsoring agency. Students are billed a materials fee. May be repeated for credit. *The Staff*

Graduate Courses

297. Independent Study. F,W,S

Independent study or research for graduate students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Art History

See History of Art and Visual Culture, page 300.

Arts Division

D Building, Porter College
(831) 459-4940
<http://arts.usc.edu>

The Division of the Arts offers both creative and critical studies of art and culture at the undergraduate and graduate level. Instruction in the arts inspires and develops the capacity for individual and collaborative creative thought, analysis, and action within and beyond the university. The Division of the Arts faculty consists of artists, historians, critics, and theorists working across the arts in a global, international, and national context. Undergraduate education in the arts includes programs in the production of art, film and digital media, music, theater (dance, drama, playwriting, design) as well as critical and historical studies in all these fields plus the history of art and visual culture. Established graduate programs include the interdisciplinary digital arts/new media MFA program, the music composition DMA and musicology Ph.D., and the fifth-year certificate in theater arts. New Ph.D. programs in film and digital media and in visual studies are expected to admit their first classes in 2009-10, while graduate programs in art and theater arts are currently in development.

The Division of the Arts provides students with access to excellent work spaces, including a new digital arts facility with two experimental media labs, along with a state-of-the-art music recital hall, practice rooms, electronic music studios, and recording facilities, three theaters for dramatic productions, filmmaking studios and editing suites, surround-sound screening theaters, drama and dance studios, painting and printmaking studios, a foundry, photography and computer laboratories, and specialized lecture and seminar classrooms. McHenry Library houses an extensive collection of books and periodicals on the arts, as well as an analogue and digital slide collection, music scores and recording, and one of the largest collections of films and DVDs in the University of California system. Exhibition space in the arts includes galleries for students and faculty shows; the Sesnon Gallery presents curated exhibitions to the university community and the general public.

The Center for Art and Visual Studies (CAVS), a focus for interdisciplinary exhibitions, conferences, symposia, and seminars is currently in development.

The departments and majors in the Division of the Arts are listed in detail under Art, Film and Digital Media, History of Art and Visual Culture, Music, Theater Arts, and Digital Arts and New Media.

Among the Division of the Arts' many performing and fine arts programs, Shakespeare Santa Cruz is an internationally recognized professional repertory company. The campus hosts several film festivals each year, including the Women of Color Film and Video Festival and Cine Maiz. Student work is regularly broadcast on SCTV, and Eyecandy publishes student writing on film, television, and digital media. The Music Department hosts an annual Festival of Contemporary Music in April and presents a variety of solo and ensemble concert programs throughout the year. The Art Department hosts regularly scheduled public presentations as well as studio art courses taught by artists and critics through the visiting artists program. The digital arts and new media MFA program hosts an annual exhibition of thesis projects, engage students in interdisciplinary research collaborations with faculty that result in internationally recognized publications and exhibitions, and sponsors the Art, Technology, and Culture speakers series with the Division of the Arts. The History of Art and Visual Culture Department hosts a series of speakers and seminars each year on rotating topics that are supported by the Rebele Chair.

Asian Studies

See East Asian Studies, page 186.

For language instruction, see Chinese, page 162, and Japanese, page 314.

Astronomy and Astrophysics

Astronomy Department Office
201 Interdisciplinary Sciences Building
(831) 459-2844
<http://www.astro.usc.edu>

Faculty and Professional Interests

Professor/Astronomer

PETER H. BODENHEIMER, Emeritus

MICHAEL J. BOLTE

Dynamics of star clusters, ages of star clusters, chemical enrichment history of the galaxy, observations of interacting galaxies

JEAN P. BRODIE

Galaxies, instrumentation

HARLAND W. EPPS

Astronomical optics and instrumentation

SANDRA M. FABER

Galaxies, stellar populations, cosmology, instrumentation

PURAGRA (RAJA) GUHATHAKURTA

Faint blue galaxies, study of faint stars using multicolor CCD data, search for Kuiper belt comets, gravitational lensing by galaxy clusters, HST studies of dense globular cluster cores, near infrared Tully-Fisher diagram, galactic "cirrus" clouds, interacting galaxies, dwarf galaxies

GARTH D. ILLINGWORTH
Stellar and galaxy dynamics, instrumentation

BURTON F. JONES, Emeritus

DAVID C. KOO
Cosmology, birth and evolution of galaxies and quasars

ROBERT P. KRAFT, Emeritus

CLAIRE MAX
Adaptive optics, planetary science

JOSEPH S. MILLER
Active galaxies, quasi-stellar objects

JERRY E. NELSON
Design and construction of large telescopes; project scientist for the two Keck telescope and Thirty Meter telescope

DAVID M. RANK, Emeritus

GRAEME H. SMITH
Stellar populations, chromospheric activity among late-type stars

STEVEN S. VOGT
Stellar spectroscopy, instrumentation

MERLE F. WALKER, Emeritus

Astronomer

LLOYD B. ROBINSON, Emeritus

Associate Professor/Associate Astronomer

REBECCA BERNSTEIN
Galaxy formation and evolution, astronomical instrumentation and optical design

JASON PROCHASKA
Damped Ly α systems in quasars, Lyman limit systems, stellar abundances, thick disk imaging of our galaxy

CONSTANCE ROCKOSI
Galactic structure, stellar populations, CCD detectors, astronomical instrumentation

Professor

GEORGE R. BLUMENTHAL
Cosmology, galaxy formation, high-energy astrophysics

FRANK D. DRAKE, Emeritus

JOHN FAULKNER, Emeritus

GREGORY LAUGHLIN
Extra-solar planets, numerical astrophysics, astrophysical phenomena of the extremely distant future

DOUGLAS N. C. LIN
Fluid dynamics, star formation, galactic structure, planetary systems, accretion disks

PIERO MADAU
Cosmology, high-energy astrophysics

BRUCE H. MARGON
High-energy astrophysics, space astronomy

WILLIAM G. MATHEWS, Emeritus

STEPHEN E. THORSETT
Radio astronomy, high-energy astrophysics, compact objects, relativity

STANFORD E. WOOSLEY
Nuclear astrophysics, stellar structure

Assistant Professor

JONATHAN FORTNEY
Planetary atmospheres and interiors, extrasolar planets

MARK KRUMHOLZ
Star formation, interstellar medium, numerical methods

ENRICO RAMIREZ-RUIZ
Stellar explosions, gamma-ray bursts accretion physics, nearcompact stars

Adjunct Associate Professor

RACHEL J. DEWEY
Radio astronomy, pulsar astrophysics, VLBI astrometry

ALEXANDER HEGER
Stellar evolution, nucleosynthesis

STEPHEN MURRAY
Formation of globular clusters and dwarf galaxies and the structure and evolution of the interstellar medium in young galaxies



Professor

JOEL R. PRIMACK (Physics)
Theory of fundamental particles, cosmology, astrophysics

GARY GLATZMAIER (Earth and Planetary Sciences)
Computer simulation of geodynamics and planetary dynamics

Assistant Professor

ANTHONY N. AGUIRRE (Physics)
Cosmology of the early and late universe: inflation and the global structure of cosmological models; the intergalactic medium and its enrichment with heavy elements; galaxy formation, evolution, and feedback processes; dark matter; theories of modified gravity

PASCALÉ GARAUD (Applied Mathematics)
Astrophysics, geophysics, fluid dynamics, numerical resolutions of differential equations, and mathematical modeling of natural flows

DAVID SMITH (Physics)
High-energy astrophysics; X-ray and gamma-ray detectors and instrumentation; solar, terrestrial, and planetary sources of gamma radiation

Research Astronomer

DONALD GAVEL
Adaptive optics

ROBERT B. HANSON
Astrometry, galactic structure, and statistical astronomy

ROBERT KIBRICK
Development of computer software and wide-area networks in support of remote control and data-acquisition systems for telescopes and astronomical instruments

REMINGTON STONE
Photometry, spectrophotometry, spectrophotometric standard stars, optical SETI

RICHARD STOVER
Instrumentation, cataclysmic variables

MINGZHI WEI
Development of astronomical CCD detectors and CCD controllers

Associate Research Astronomer

DREW PHILLIPS
Extragalactic star-formation, gas-phase abundances, galaxy kinematics, and galaxy formation and evolutions; development of astronomical optics and instrumentation

SCOTT SEVERSON
Astronomical instrumentation, adaptive optics, near-infrared astronomy

Research Physicist

TERRY MAST
Astronomical instrumentation

Program Description

The science of astronomy has the universe as its domain. Galaxies, stars, planets, and an ever-increasing variety of phenomena observed from ground- and space-based observatories are among the objects of study. Areas of special interest at UCSC include cosmology, the formation and evolution of planets, stars, and galaxies, high-energy astrophysics, active galaxies, supernovae and nucleosynthesis, extra-solar planets, interstellar medium, intergalactic medium, solar system dynamics, and all aspects of observational optical and infrared astronomy. Astronomers use concepts from and contribute to the development of many other scientific disciplines, including optics, mechanics, relativity, atomic and nuclear physics, applied mathematics, chemistry, geology, and meteorology. The interdisciplinary nature of astronomy, including its historical and philosophical elements, makes its study valuable to those planning careers in a variety of fields.

The Astronomy and Astrophysics Department offers a broad undergraduate curriculum that fulfills the needs of students seeking a general education but also enables students wishing to obtain a minor or major in astrophysics to study the subject in greater depth.

The graduate program is intended for those with a professional interest in the subject. The interests of the faculty embrace a wide range of both theoretical and observational aspects of astronomy. Current research and course offerings include our solar system and other solar systems, stellar structure and evolution, stellar spectroscopy, the interstellar medium, galactic structure, active galaxies and quasars, cosmology, general relativity and gravitational radiation, the origin of the elements, infrared and radio astronomy, advanced astronomical instrumentation, astrobiology, high-energy astrophysics, and X-ray and gamma-ray astronomy.

Graduate students have access to state-of-the-art instrument development and data reduction technology, the UCO/Lick Observatory computer network, and an unusually extensive astronomical library at the Lick Observatory headquarters on campus. Graduate students may conduct supervised research using selected telescopic facilities of the Lick Observatory on Mount Hamilton, 55 miles from Santa Cruz. The 10-meter Keck Telescope in Hawaii, the world's largest, is administered from the UCSC campus and is used for frontier research by UC astronomers.

The Center for Adaptive Optics (CfAO) is also headquartered at UCSC. Education is central to the CfAO's mission, and a key element of this is the support provided by the center to graduate students. In addition to research, the center provides interdisciplinary access to a nationwide network of scientists in astronomy and vision science.

Undergraduate Courses

Instruction in astronomy for undergraduates at UCSC is designed to meet the needs of several groups of students.

Courses 2, 3, 4, 5, 8, 80A, 80B, and 80D, providing a general survey of the universe as now understood from historical and modern observations, are offered for those not specializing in a scientific discipline.

Courses 11, 12, 13, 14, 15, 16, and 18, emphasizing basic physical laws and theories as applied to astronomy, taken together provide a survey of modern astronomy

for students with some facility in mathematics. Taken separately, these courses provide an in-depth introduction to gravitational interaction, stellar evolution, and extragalactic astrophysics. These courses are designed for students intending to major in a scientific subject, although qualified nonscience majors may enroll. A good high school background in mathematics and physics is required.

Prior or concurrent enrollment in a basic calculus course (Mathematics 11A or 19A) and a basic physics course (Physics 5A/L or 6A/L) is helpful but not required.

Finally, a more thorough quantitative treatment of selected topics in astronomy and astrophysics at the upper-division level is provided by courses 112, 113, 117, and 118. Completion of course work in calculus of several variables (Mathematics 22 or 23A-B) and Physics 5B/M or 6B/M and 101A is required for these advanced courses.

Astrophysics Minor

For undergraduate students having a particular interest in the subject, a minor in astronomy and astrophysics is offered. Most students who minor in astronomy and astrophysics are majors in another science, though majors in other fields are also possible. The minor in astronomy and astrophysics requires that students take the Physics 5 or 6 series (with associated laboratories), a minimum of two courses from the Astronomy 11–18 series, and a minimum of three courses from the following: Astronomy 112–118, Physics 101A. A senior thesis on an astronomy-related topic is also encouraged. Interested students should contact the Astronomy Department office for further information.

Astrophysics Major

The UCSC major in astrophysics is administered by the Physics Department and combines a core physics major with advanced electives in astrophysics, an astrophysics laboratory course, and senior thesis work on a topic in astrophysics. It is a rigorous program designed to prepare students for a broad range of technical careers or for entry into graduate or professional programs. A full description of the major can be found in the physics section of this catalog.

Preparation for Graduate Work in Astrophysics

The UCSC graduate program in astronomy and astrophysics is designed for Ph.D. students seeking a professional career in teaching and research. In view of the thorough preparation in mathematics and physics required for graduate study, most entering astronomy graduate students major in physics or astrophysics as undergraduates.

The suggested minimum requirements for admission to graduate standing at UCSC include the following undergraduate courses:

Basic physics. Mechanics, wave motion, sound, light, electricity and magnetism, thermodynamics, atomic physics, and quantum mechanics (Physics 5A, 5B, and 5C).

Basic mathematics. Calculus (Mathematics 19A-B and 23A-B or equivalent) and statistics (Mathematics and Statistics 5).

Intermediate-level physics. Mechanics (Physics 105); electricity, magnetism, and optics (Physics 110A-B); mathematical methods in physics (Physics 116A-B-C); nuclear and particle physics (Physics 129); and quantum mechanics (Physics 139A-B).

Intermediate-level mathematics. Linear algebra (Mathematics 21), complex analysis (Mathematics 103), and ordinary and partial differential equations (Mathematics 106A and 106B).

Graduate Program

Graduate instruction is built upon a two-year cycle of 13 one-quarter courses in astronomy and physics that are required of all students.

Six courses are specifically required:

Astronomy 202, *Electromagnetism and Plasma Physics*

Astronomy 204A, *Physics of Astrophysics I*

Astronomy 204B, *Physics of Astrophysics II*

Astronomy 205, *Introduction to Astronomical Research*

Astronomy 220A, *Stella Structure and Evolution*

Astronomy 240A, *Galactic and Extragalactic Stellar Systems*

Seven courses are chosen from the list of electives given below.

Students must meet at least quarterly with an assigned adviser.

Each student must also be a teaching assistant for at least one quarter.

By the end of their second year, students must complete one quarter of independent study with a faculty member and give a department talk on that work. Also toward the end of their second year, students must pass a written examination based on course material, relevant physics, and general astronomical knowledge.

After passing a board review based on the above-mentioned requirements and a qualifying exam based on a proposed thesis topic (expected to be taken before the end of the third year), students pursue independent research leading to the doctoral dissertation. Upon completion of the Ph.D. dissertation, students must pass an oral dissertation defense.

Students are encouraged to engage in research projects under the supervision of the faculty during the early part of their graduate career. Exceptions are rare and are granted on a case-by-case basis to individual students.

Electives may be drawn from this list:

Galaxies and Cosmology (at least two):

Astronomy 214, *Structure Formation in the Universe*

Astronomy 224, *Origin and Evolution of the Universe*

Astronomy 230, *Low-Density Astrophysics*

Astronomy 233, *Physical Cosmology*

Astronomy 240B, *Galactic and Extragalactic Stellar Systems*

Astronomy 240C, *Galactic and Extragalactic Stellar Systems*

Astronomy 253, *Stellar Dynamics*

Stars and Planets (at least two):

Astronomy 212, *Dynamical Astronomy*

Astronomy 220B, *Star and Planet Formation*

Astronomy 220C, *Advanced Stages of Stellar Evolution and Nucleosynthesis*

Astronomy 222, *Planetary Science*

Astronomy 225, *Physics of Compact Objects*

Astronomy 237, *Accretion of Early and Late Stages of Stellar Evolution*

Other:

Astronomy 207, *Future Directions/Future Missions*

Astronomy 226, *General Relativity*

Astronomy 231, *Astrophysical Gas Dynamics*

Astronomy 235, *Numerical Techniques*

Astronomy 257, *Modern Observational Techniques*

Astronomy 260, *Instrumentation for Astronomy*

Astronomy 275, *Radio Astronomy*

Astronomy 289C, *Adaptive Optics and Its Applications*

Earth Sciences 275, *Magnetohydrodynamics*

Education 286, *Research and Practice in Science Training for Research*

Engineering 206, *Bayesian Statistics*

Physics 210, *Classical Mechanics*

Physics 215, *Introduction to Non-Relativistic Quantum Mechanics*

Physics 216, *Advanced Topics in Non-Relativistic Quantum Mechanics*

Physics 217, *Quantum Field Theory I*

Physics 218, *Quantum Field Theory II*

Lower-Division Courses

2. Overview of the Universe. F,W,S

An overview of the main ideas in our current view of the universe, and how they originated. Galaxies, quasars, stars, pulsars, and planets. Intended primarily for nonscience majors interested in a one-quarter survey of classical and modern astronomy. (General Education Code(s): IN, Q.) *S. Vogt, P. Guba Thakurta, A. Steinacker, R. Bernstein*

3. Introductory Astronomy: The Solar System. W

Properties of the solar system, the sun, solar system exploration, the physical nature of the Earth and the other planets, comets and asteroids, origin of the solar system, possibility of life on other worlds, planet formation, and search for planets beyond the solar system. Intended for nonscience majors. Courses 3, 4, and 5 are independent and may be taken separately or sequentially. (General Education Code(s): IN, Q.) *D. Lin*

4. Introductory Astronomy: The Stars. F

Stellar evolution: observed properties of stars, internal structure of stars, stages of a star's life including stellar births, white dwarfs, supernovae, pulsars, neutron stars, and black holes. Planet and constellation identification. Intended for nonscience majors. Courses 3, 4, and 5 are independent and may be taken separately or sequentially. (General Education Code(s): IN, Q.) *A. Steinacker*

5. Introductory Astronomy: The Formation and Evolution of the Universe. S

The universe explained. Fundamental concepts of modern cosmology (Big Bang, dark matter, curved space, black holes, star and galaxy formation), the basic physics underlying them, and their scientific development. Intended for non-science majors. Courses 3, 4, and 5 are independent and may be taken separately. (General Education Code(s): IN, Q.) *J. Brodie*

12. Stars and Stellar Evolution. W

Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. Offered in alternate academic years. (General Education Code(s): IN, Q.) *S. Woosley*

13. Galaxies, Cosmology, and High Energy Astrophysics. S

Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. (General Education Code(s): IN, Q.) *D. Koo*

14. Observational Astronomy. *

Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. Enrollment limited to 60. Offered in alternate academic years. (General Education Code(s): IN, Q.) *The Staff*

15. Dead Stars and Black Holes. *

Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. (General Education Code(s): IN, Q.) *E. Ramirez-Ruiz*

16. Astrobiology: Life in the Universe. F

Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. Enrollment limited to 50. (General Education Code(s): IN, Q.) *A. Steinacker*

18. Planets and Planetary Systems. S

Intended for science majors and qualified non-science majors. Knowledge of high school physics and an understanding of mathematics at the Math 2 level required. Offered in alternate academic years. (General Education Code(s): IN, Q.) *C. Max*

70. Honors Undergraduate Seminar in Astrophysical Research (2 credits). F

Explores current problems in astrophysical research and how they are being solved by practicing scientists. Each presentation-discussion focuses on a different problem or question, explaining how the problem relates to broader astronomical issues, describing the methods used to solve the problem and reviewing the hoped for, or anticipated outcome. Intended for students considering a career in the physical sciences. Enrollment by permission of instructor, with preference to first and second year students majoring in physics or earth sciences. *G. Smith, S. Faber*

80A. The Space-Age Solar System. W

Exploration of the solar system during the space age: the early history of rocket development, the Apollo program and the exploration of the moon, studying the earth from space, and the planets of the solar system as revealed by unmanned spacecraft. Intended for nonscience majors. (General Education Code(s): T2-Natural Sciences.) *G. Smith*

80D. Historical Astronomy. S

Historical development of astronomical thought, from stone megaliths to the expanding universe; Western astronomy from ancient Greece to the 20th century; prehistorical and non-Western astronomy; role of astronomy in development of modern science; political, social, and cultural aspects of astronomy. Prerequisite(s) satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): T2-Natural Sciences, W.) *A. Steinacker*

*Upper-Division Courses***112. Physics of Stars. S**

The leading observational facts about stars as interpreted by current theories of stellar structure and evolution. Spectroscopy, abundances of the elements, nucleosynthesis, stellar atmospheres, stellar populations. Final stages of

evolution, including white dwarfs, neutron stars, supernovae. Prerequisite(s): Mathematics 22 or 23A, Physics 5B or 6B, and 101A. *J. Fortney*

113. Physical Cosmology. W

Physical examination of our evolving universe: the Big Bang model; simple aspects of general relativity; particle physics in the early universe; production of various background radiations; production of elements; tests of geometry of the universe; dark energy and dark matter; and formation and evolution of galaxies and large-scale structure. Prerequisite(s): Mathematics 22 or 23A, Physics 5B or 6B, and 101A. *P. Madau*

117. High Energy Astrophysics. S

Theory and practice of space and ground-based x-ray and gamma-ray astronomical detectors. High-energy emission processes, neutron stars, black holes. Observations of x-ray binaries, pulsars, magnetars, clusters, gamma-ray bursts, the x-ray background. High-energy cosmic rays. Neutrino and gravitational-wave astronomy. Prerequisite(s): Mathematics 22 or 23A, Physics 5B or 6B, and 101A. *E. Ramirez-Ruiz*

118. Physics of Planetary Systems. *

Determination of the physical properties of the solar system, its individual planets, and extrasolar planetary systems through ground-based and space-based observations, laboratory measurements, and theory. Theories of the origin and evolution of planets and planetary systems. Prerequisite(s): Mathematics 22 or 23A or 23B, Physics 5B or 6B, and 101A. Offered in alternate academic years. *A. Steinacker*

135. Astrophysics Advanced Laboratory. *

Introduction to the techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Offered in some academic years as a multiple-term course: 135A in fall and 135B in winter, depending on astronomical conditions. (Also offered as Physics 135. Students cannot receive credit for both courses.) Prerequisite(s): Physics 133 and at least one astronomy course. Intended primarily for juniors and seniors majoring or minoring in astrophysics. *R. Dewey*

135A. Astrophysics Advanced Laboratory (3 credits). F

Introduction to techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Intended primarily for juniors and seniors majoring or minoring in astrophysics. Offered in some academic years as single-term course 135 in fall, depending on astronomical conditions. (Also offered as Physics 135A. Students cannot receive credit for both courses.) Prerequisite(s): Physics 133 and at least one astronomy course. *R. Dewey*

135B. Astrophysics Advanced Laboratory (2 credits). W

Introduction to techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Intended primarily for juniors and seniors majoring or minoring in astrophysics. Offered in some academic years as single-term course 135 in fall, depending on astronomical conditions. (Also offered as Physics 135B. Students cannot receive credit for both courses.) Prerequisite(s): Physics 133 and at least one astronomy course. *R. Dewey*

171. General Relativity, Black Holes, and Cosmology. *

Special relativity is reviewed. Curved space-time, including the metric and geodesics, are illustrated with simple examples. The Einstein equations are solved for cases of high symmetry. Black-hole physics and cosmology are

discussed, including recent developments. (Also offered as Physics 171. Students cannot receive credit for both courses.) Prerequisite(s): courses 105, 110A, 110B, and 116A-B-C. *A. Aguirre*

199. Tutorial. F,W,S

The Staff

*Graduate Courses***202. Electromagnetism and Plasma Physics. ***

Topics in classical radiation: multipole radiation, synchrotron and Cerenkov radiation, Compton scattering, bremsstrahlung, stimulated and coherent emission, diffraction and scattering. Topics in plasma physics: plasma waves, Debye length, adiabatic invariants, wave propagation in plasmas, Landau damping, two-stream instability. Offered in alternate academic years. *E. Ramirez-Ruiz*

204A. Physics of Astrophysics I. *

Explores how physical conditions in astrophysical objects can be diagnosed from their spectra. Discussion topics include how energy flows determine the thermal state of radiating objects and how the physics of radiative transfer can explain the emergent spectral characteristics of stars, accretion disks, Lyman-alpha clouds, and microwave background. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Laughlin*

204B. Physics of Astrophysics II. *

Fluid mechanics, equation of motion, inviscid and viscous flow, boundary layers, turbulence, compressibility, sound and non-linear waves, heat and momentum transport, instabilities, magnetohydrodynamics, Alfvén waves, antipolar diffusion, plasma physics, stability. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Laughlin*

205. Introduction to Astronomical Research. F

Lectures by UCSF faculty on current areas of astronomical and astrophysical research being carried out locally. Enrollment restricted to graduate students. *H. Epps*

207. Future Directions/Future Missions. W

Examines possible key science goals for the the next decade, such as planet detection, galaxy formation, and "dark energy" cosmology; the means for addressing these goals, such as new space missions and/or ground-based facilities; and the political, technical, and scientific constraints on such research. Looks at the role of the Decadal Survey. Examines a few existing programs (DEEP, ALMA, SNAP, NGST) as examples. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Illingworth*

212. Dynamical Astronomy. S

Surveys dynamical processes in astrophysical systems on scales ranging from the planetary to the cosmological, stability and evolution of planetary orbits, scattering processes and the few-body problem, processes in stellar clusters, spiral structure and galactic dynamics, galactic collisions, and evolution of large-scale structure. Enrollment restricted to graduate students. *G. Laughlin*

214. Structure Formation in the Universe. F

Course builds upon course 240C (offered in alternate) and covers a similar set of topics with a larger emphasis on first stars and black holes, galaxy formation, the physics of the intergalactic medium, and high-redshift sources. Enrollment restricted to graduate students. *P. Madau*

220A. Stellar Structure and Evolution. F

Survey of stellar structure and evolution. Physical properties of stellar material. Convective and radiative energy transport. Stellar models and evolutionary tracks through

all phases. Comparison with observations. Enrollment restricted to graduate students. Offered in alternate academic years. *J. Fortney*

220B. Star and Planet Formation. W

Theory of star formation. Interpretation of observations in star forming regions. Theory and observations of protoplanetary disks. Origin and evolution of the solar nebula. Formation and evolution of the terrestrial planets and the giant planets. Prerequisite(s): course 220A. Offered in alternate academic years. *M. Krumholz*

220C. Advanced Stages of Stellar Evolution and Nucleosynthesis. S

The evolution of massive stars beyond helium burning; properties of white dwarf stars; physics and observations of novae, supernovae, and other high energy stellar phenomena; nuclear systematics and reaction rates; the origin and production of all the chemical elements. Prerequisite(s): course 220A. Enrollment restricted to graduate students. Offered in alternate academic years. *S. Woosley*

222. Planetary Science. *

Gross dynamical and chemical properties of solar system, interior structure, plate tectonics, atmosphere of terrestrial planets, structure and evolution of giant planets, generation of magnetic fields, planet-satellite tidal interaction, planetary rings, comets, meteorites, formation and long-term stability of solar system. Enrollment restricted to graduate students. Offered in alternate academic years. *D. Lin*

224. Origin and Evolution of the Universe. *

Introduction to the particle physics and cosmology of the very early universe: relativistic cosmology, initial conditions, inflation and grand unified theories, baryosynthesis, nucleosynthesis, gravitational collapse, hypotheses regarding the dark matter and consequences for formation of galaxies and large scale structure. (Also offered as Physics 224. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Offered in alternate academic years. *J. Primack*

225. Physics of Compact Objects. W

Physics of dense matter: equations of state. Structure and cooling of white dwarfs and neutron stars. Observations and phenomenology of pulsars. Elementary relativity; properties of black holes. Compact objects in binary systems: X-ray sources, binary pulsars. Pulsars in globular clusters. Offered in alternate academic years. *E. Ramirez-Ruiz*

226. General Relativity. *

Develops the formalism of Einstein's general relativity, including solar system tests, gravitational waves, cosmology, and black holes. (Also offered as Physics 226. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Offered in alternate academic years. *A. Aguirre*

230. Low-Density Astrophysics. F

Fundamental physical theory of gaseous nebulae and the interstellar medium. Ionization, thermal balance, theory and observation of emission spectra. Interstellar absorption lines, extinction by interstellar dust. Ultraviolet, optical, infrared, and radio spectra of gaseous nebulae. Offered in alternate academic years. *J. Prochaska*

233. Physical Cosmology. W

Survey of modern physical cosmology, including Newtonian cosmology, curved space-times, observational tests of cosmology, the early universe, inflation, nucleosynthesis,

dark matter, and the formation of structure in the universe. Prerequisite(s): course 202. Offered in alternate academic years. *J. Primack*

235. Numerical Techniques. *

Gives students a theoretical and practical grounding in the use of numerical methods and simulations for solving astrophysical problems. Topics include N-body, SPH and grid-based hydro methods as well as stellar evolution and radiation transport techniques. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Laughlin*

237. Accretion in Early and Late Stages of Stellar Evolution. *

Theories of spherical accretion, structure and stability of steady-state accretion disks, and the evolution of time-dependent accretion disks. Applications of these theories to the formation of the solar system as well as the structure and evolution of dwarf novae and X-ray sources are emphasized. Offered in alternate academic years. *D. Lin*

240A. Galactic and Extragalactic Stellar Systems. *

Structure and evolutionary histories of nearby galaxies. Stellar populations, galactic dynamics, dark matter, galactic structure and mass distributions. Peculiar galaxies and starbursting galaxies. Structure and content of the Milky Way. Evolution of density perturbations in the early universe. Hierarchical clustering model for galaxy formation and evolution. Offered in alternate academic years. *C. Rockosi*

240B. Galactic and Extragalactic Stellar Systems. *

Galaxy formation and evolution from observations of intermediate-to-high redshift galaxies (z 0.5-5). Complements and builds on 240A. Cluster galaxies and field galaxies. Foundation from classic papers on distant galaxies. Recent discoveries from IR and sub-mm measurements. Impact of AGNs and QSOs. Overview of modeling approaches. Identify theoretical and observational issues. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Illingworth*

240C. Galactic and Extragalactic Stellar Systems. *

Cosmological models. Recombination epoch and thermal history of the intergalactic medium. Formation of first structures: minihalos, stars, and black holes. Cosmological reionization and early metal enrichment. Radiative transfer in a clumpy universe. Quasar absorption systems. Galaxies at high redshifts and cosmic star formation history. The nature of QSOs and active galaxies. Extragalactic background radiation. Enrollment restricted to graduate students. Offered in alternate academic years. *P. Madau*

253. Stellar Dynamics. *

Kinematics and relaxation of stellar systems. Potential and orbit theories. Dynamics of globular clusters, spiral and elliptical galaxies. Dynamical friction, mergers, and galactic cannibalism. Galaxy clustering in the early universe. Offered in alternate academic years. *D. Lin*

257. Modern Observational Techniques. *

Astronomical telescopes and detectors. Astronomical observing techniques. The reduction of observations. Machine shop practice in instrument construction. Offered in alternate academic years. *M. Bolte*

260. Instrumentation for Astronomy. W

An introduction to astronomical instrumentation for infrared and visible wavelengths. Topics include instrument requirements imposed by dust, atmosphere, and telescope; optical, mechanical, and structural design principles and components; electronic and software

instrument control. Imaging cameras and spectrographs are described. Offered in alternate academic years. Enrollment restricted to graduate students. *C. Rockosi*

275. Radio Astronomy. *

Theory and practice of radio telescopes, radiometers, and data handling systems. Principles of aperture synthesis. Theory of continuum and line radio emission mechanisms, and application to actual astronomical observations. Galactic radio sources, quasars, and pulsars. Offered occasionally. *S. Thorsett*

289. Special Topics in Astrophysics.

Occasional courses in particular areas of current interest. *The Staff*

289C. Adaptive Optics and Its Application. *

Introduction to adaptive optics and its astronomical applications. Topics include effects of atmospheric turbulence on astronomical images, basic principles of feedback control, wavefront sensors and correctors, laser guide stars, how to analyze and optimize performance of adaptive optics systems, and techniques for utilizing current and future systems for astronomical observations. Prerequisite(s): Enrollment restricted to graduate students. Offered in alternate academic years. *C. Max*

292. Seminar (no credit). F,W,S

Seminar attended by faculty, graduate students, and upper-division undergraduate students. *The Staff*

297. Independent Study. F,W,S

Independent study or research for graduate students who have not yet begun work on their theses. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. *The Staff*

Biochemistry and Molecular Biology

230 Physical Sciences Building
(831) 459-4125
<http://www.chemistry.ucsc.edu>

Faculty and Professional Interests

MANUEL ARES, Molecular, Cell, and Developmental Biology
RNA processing, structure and function of RNA

ROBERTO A. BOGOMOLNI, Chemistry and Biochemistry
Biophysical chemistry, photobiology, light energy conversion and signal transduction in biological systems

BARRY J. BOWMAN, Molecular, Cell, and Developmental Biology
Membrane biochemistry and genetics, biochemistry and molecular biology of membrane proteins

JOSHUA DEUTSCH, Physics
Condensed matter theory

ÓLÓF EINARSDÓTTIR, Chemistry and Biochemistry
Time-resolved spectroscopy, biophysics and bioenergetics, heme-copper oxidases, electron transfer, proton translocation

JERRY F. FELDMAN, Emeritus

LINDSAY HINCK, Molecular, Cell, and Developmental Biology
Neurobiology, cell biology, development

THEODORE R. HOLMAN, Chemistry and Biochemistry

Biochemistry and bioinorganic chemistry; lipoxigenase enzymology, protein engineering, inhibitor discovery, computer inhibitor design, mass spectroscopy, and electron paramagnetic resonance

DOUGLAS KELLOGG, Molecular, Cell, and Developmental Biology

Coordination of cell growth and cell division

ROBERT S. LOKEY, Chemistry and Biochemistry

Organic chemistry; combinatorial synthesis, biotechnology, molecular cell biology

ROBERT A. LUDWIG, Molecular, Cell, and Developmental Biology

Plant microbe interactions, photorespiration, genetic recombination in plants

PRADIP MASCHARAK, Chemistry and Biochemistry

Bioinorganic chemistry, design of antitumor drugs, modeling of active sites of metalloenzymes, design of catalysts for hydrocarbon oxidation, studies on intermediates in non-heme oxygenase chemistry, design of NO-donors for photodynamic therapy

GLENN L. MILLHAUSER, Chemistry and Biochemistry

Electron spin resonance; nuclear magnetic resonance, melanocortin receptor signaling, agouti proteins, prions, peptide synthesis

HARRY F. NOLLER, Robert L. Sinsheimer Professor, Molecular, Cell, and Developmental Biology
Ribosomes, RNA structure and function, RNA protein interaction

CLIFTON A. POODRY, Emeritus

SETH M. RUBIN

Biomolecular mechanisms of cell-cycle regulation and cancers; structural biology and biochemistry; macromolecular x-ray crystallography; nuclear magnetic resonance

THOMAS W. SCHLEICH, Chemistry and Biochemistry

Biomedical magnetic resonance spectroscopy, magnetic resonance imaging, nuclear magnetic resonance spectroscopy, biophysical chemistry

WILLIAM G. SCOTT, Chemistry and Biochemistry
Structure and function of RNA, proteins, and their complexes, origin of life

WILLIAM SULLIVAN, Molecular, Cell, and Developmental Biology

Genetics, cell biology, development of the Drosophila embryo

LINCOLN TAIZ, Molecular, Cell, and Developmental Biology

Plant development, light regulation of stomatal opening

FRANK J. TALAMANTES, Emeritus

JOHN W. TAMKUN, Molecular, Cell, and Developmental Biology

Transcriptional regulation, molecular genetics of Drosophila development, regulation of gene expression

ALAN M. ZAHLER, Molecular, Cell, and Developmental Biology

Molecular biology, splice site selection, and alternative pre-mRNA processing

MARTHA C. ZUNIGA, Molecular, Cell, and Developmental Biology

Molecular, cellular, and developmental biology of the immune system

Program Description

Research at the macromolecular, molecular, and atomic levels is revolutionizing our understanding of the fundamental processes of life. Students interested in joining this search are best prepared by undertaking course work in biology, chemistry, physics, mathematics, and computer science. Toward this end, an undergraduate major in biochemistry and molecular biology (BMB) is offered by faculty who are actively engaged in research on biological systems.

Students who declare the BMB major earn a bachelor of science degree. The BMB major constitutes an integrated curriculum of basic instruction in biology, chemistry, mathematics, and physics, followed by the opportunity to pursue advanced study in specialized areas of interest. In modern, well-equipped laboratories, distinguished faculty are engaged in frontline research at UCSC. The Department of Chemistry and Biochemistry hosts a very active seminar series of national and international scholars in which advanced undergraduates are encouraged to participate.

The BMB program features close faculty-student interaction, small upper-division classes, stimulating learning environments, and opportunities for independent research and study. Students majoring in BMB are encouraged to become involved in research under the guidance of a faculty sponsor. Many students participating in this aspect of the program have made important contributions to the scientific literature.

Given the wide scope and interdisciplinary nature of this program, a considerable degree of flexibility has been incorporated into the major. All prospective majors should consult the Department of Chemistry and Biochemistry to be assigned a BMB adviser as early as possible. Junior transfer students or others with questions should consult the Department of Chemistry and Biochemistry undergraduate program adviser. To become a BMB major, a student must file a declaration of major petition through the Department of Chemistry and Biochemistry. A double major of BMB with the biological sciences majors or chemistry is not permitted. No minor is offered.

Requirements for the B.S. Degree

Core Courses

- Chemistry 1A, 1B/M, and 1C/N, *General Chemistry/Laboratory*
- Biology: Molecular, Cell, and Developmental 20A, *Cell and Molecular Biology*, and Biology: Ecology and Evolutionary 20B, *Development and Physiology*
- Mathematics 11A-B, *Calculus with Applications* or 19A-B, *Calculus for Science, Engineering, and Mathematics*; and 22, *Introduction to Calculus of Several Variables*
- Physics 5A/L, 5B/M, 5CN or 6A/L, 6B/M, 6C/N, *Introductory Physics/Introductory Physics Laboratory*
- Biology 105, *Genetics*
- Biology 110, *Cell Biology*
- Biology 115, *Eukaryotic Molecular Biology*
- Chemistry 108A/L and 108B/M; or 112A/L, 112B/M, and 112C/N, *Organic Chemistry/Laboratory*

- Chemistry 163A, *Quantum Mechanics and Basic Spectroscopy* and 163B, *Thermodynamics and Kinetic Theory*
- Biochemistry and Molecular Biology 100A, 100B, and 100C, *Biochemistry*

Biochemistry and Molecular Biology Planner

The following is a recommended academic plan for students to complete the biochemistry and molecular biology major.

YEAR	FALL	WINTER	SPRING
1st (frsh)	Math 11A or 19A college core Chem 1A	Math 11B or 19B Chem 1B/M gen ed	Math 22 Chem 1C/N Biol 20A
2nd (soph)	Chem 108A/L Phys 6A/L Bioe 20B	Chem 108B/M Phys 6B/M	Phys 6C/N Biol 105
3rd (jr)	Bioc 100A Lab elective	Bioc 100B Biol 115	Bioc 100C Biol 110
4th (sr)	Chem 163A Lab elective	Chem 163B	

Laboratory Elective

Two laboratory courses selected from the following list are required. Students should be sure to plan for completing appropriate prerequisites.

Biochemistry and Molecular Biology

110 *Biochemistry Laboratory*

Biology

- 100L *Biochemistry Laboratory*
- 105L *Eukaryotic Genetics Laboratory*
- 105M *Microbial Genetics*
- 109L *Yeast Molecular Genetics Laboratory*
- 110L *Cell Biology Laboratory*
- 116L *Eukaryotic Molecular Biology Laboratory*
- 119L *Microbiology Laboratory*
- 186L *Undergraduate Research in MCD Biology*
- 187L *Molecular Biotechnology Laboratory*

Comprehensive Requirement

Students have two options for fulfilling the senior comprehensive requirement: (a) achieving a score at or above the 50th percentile on the Graduate Record Examination (GRE) Biochemistry, Cell, and Molecular Biology Subject Test, or (b) completing a senior thesis sponsored or co-sponsored by a faculty member affiliated with the biochemistry and molecular biology program.

Program Planning Notes

Students who do not begin the lower-division requirements during their first year may have difficulty completing the program within four years. Transfer students may also have problems completing the program within the usual time, depending upon whether they took equivalent courses at their previous institutions. The department adviser works closely with students interested in pursuing the major to insure that they begin the program immediately and follow the appropriate steps toward its completion.

It is strongly recommended that students avail themselves of the opportunities to obtain firsthand research experience through either independent study or senior

thesis research. A tutorial course or a senior thesis research course may not be substituted for the required laboratory elective.

A number of graduate courses in biochemistry and molecular biology are offered by the biology, chemistry, and biochemistry programs. Advanced undergraduates with the necessary background may take one or more of these courses with the consent of the instructor; however, graduate courses may not be substituted for the required elective courses.

Letter Grade Policy

For all students entering UCSC in fall 2001 and later, all courses used to satisfy any of the biological sciences majors must be taken for a letter grade.

Major Disqualification Policy

All biochemistry and molecular biology majors are covered by the biology major disqualification and letter grade policies in the Biological Sciences section.

Materials Fee

Biochemistry and molecular biology students should be aware of the materials fee required for some laboratory courses. The fee is billed to the student's account for specific laboratory materials purchased by the Department of Chemistry and Biochemistry through the university. Fees generally range from \$15 to \$50 per course. Students may incur additional expenses purchasing individual supplies.

Upper-Division Courses

100A. Biochemistry. F

Fundamentals of molecular biology, structure and function of nucleic acids, and protein structure. Designed for students preparing for research careers in biochemistry and molecular biology. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Prerequisite(s): Chemistry 108B or 112C; Biology 20A; Biology 105 strongly recommended as preparation. *H. Noller*

100B. Biochemistry. W

Covers enzyme mechanisms, kinetics, regulations, membrane composition and structure, specialized membrane functions, active transport and electro-chemical storage, excitable membranes and neurotransmitters, membrane receptors and sensory transduction mechanisms. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Prerequisite(s): course 100A *S. Rubin*

100C. Biochemistry. S

Biochemistry: intermediary metabolism and bioenergetics. How enzymatically catalyzed reactions are organized and regulated; how energy from molecules is extracted for chemical work. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. prerequisite(s): course 100B *R. Ludwig*

110. Biochemistry Laboratory. S

An introduction to the major techniques used in the isolation and characterization of biological components. Laboratory: 8 hours; lecture: 1-1/4 hours. Students are billed a materials fee. Prerequisite(s): course 100B *O. Einarsdóttir*

Bioengineering

See Engineering, page 215.

Bioinformatics

See Engineering, page 217.

Biological Sciences

The biological sciences at UC Santa Cruz are comprised of two academic departments: Ecology and Evolutionary Biology (courses BIOE) and Molecular, Cell, and Developmental Biology (courses BIOL). The two academic departments collectively sponsor the undergraduate program while each offers its own independent graduate program. Faculty within the biological sciences are affiliated with either Ecology and Evolutionary Biology, or Molecular, Cell, and Developmental Biology.

Undergraduate Program and Advising Office
387 Thimann Laboratories
(831) 459-4143
<http://biosci.ucsc.edu/>

Undergraduate Program Description

The biological sciences have entered into an exciting new era in which phenomena that once seemed insoluble mysteries—such as embryonic development, the functions of the brain, and the dynamics of ecosystems—are now yielding their secrets as the technology to study them becomes more and more sophisticated. From molecular biology, with its potential to revolutionize medicine and agriculture, to ecology, with its lessons for the sustainable management of the environment, biologists are fully engaged in meeting the challenges of the future, helping to improve the quality of human life and to preserve habitats and biodiversity. Thus, it is no surprise that the biological sciences are at the heart of many of today's most pressing intellectual and social concerns.

The Departments of Ecology and Evolutionary Biology (EEB) and Molecular, Cell, and Developmental Biology (MCDB) offer a broad spectrum of courses that reflect the exciting new developments and directions in the field of biology. An outstanding group of faculty, each with a vigorous, internationally recognized research program, is available to teach courses in their specialties as well as core courses for the major. Areas of research strength within the departments include RNA molecular biology, molecular and cellular aspects of genetics and development, neurobiology, endocrinology, immunology, microbial biochemistry, plant biology, animal behavior, physiology, evolution, ecology, and marine biology. UCSC is unique in the UC system in providing exceptional opportunities for undergraduate research, allowing students to interact one-on-one with faculty and other researchers in a laboratory or field setting.

Biological Sciences Majors

Students may plan a program that leads to one of several B.A. or more advanced B.S. degrees. Students may choose from the following major options:

Majors jointly sponsored by Ecology and Evolutionary Biology (EEB) and Molecular, Cell, and Developmental Biology (MCDB):

Biology B.A. (general)

Biology B.S. (general)

Majors sponsored by Ecology and Evolutionary Biology (EEB):

Ecology and evolution B.S.

Marine biology B.S.

Plant sciences B.S.

Environmental studies/biology combined major B.A. (administered in conjunction with the Environmental Studies Department)

Majors sponsored by Molecular, Cell, and Developmental Biology (MCDB):

Health sciences B.S.

Molecular, cell, and developmental biology B.S.

Neuroscience and behavior B.A.

Neuroscience and behavior B.S.

Biochemistry and molecular biology B.S. (administered in conjunction with the Chemistry and Biochemistry Department)

Bioinformatics B.S. (administered in conjunction with the School of Engineering)

Bioengineering B.S. (administered in conjunction with the School of Engineering)

Advanced undergraduates, with the guidance of faculty mentors, have access to extensive departmental laboratory facilities for independent research. Fieldwork draws on a remarkable variety of terrestrial habitats, as well as ready access to Monterey Bay and the open Pacific. Marine studies are supported by a coastal facility with running seawater, with a research vessel available for offshore work. Año Nuevo Island, north of Santa Cruz, is the site of extensive behavioral studies of marine mammals. Hospitals, convalescent and physical therapy centers, veterinary clinics, and other enterprises in the vicinity of the campus provide the opportunity to pursue field projects and internships comparable to on-the-job training. This array of opportunities for directed independent study enables biological science majors to enhance their upper-division programs to reflect and strengthen their own interests and goals in the sciences.

Prerequisites for the Biological Sciences

The introductory biology sequence, is prerequisite to virtually all upper-division biology courses. BIOL 20A has a prerequisite of Chemistry 1B, Chemistry 1B has a prerequisite of Chemistry 1A, and thus students cannot enroll in BIOL 20A until they have completed Chemistry 1A and 1B. Therefore, it is essential for students considering a major in the biological sciences to start chemistry as soon as possible. Students who have not taken Chemistry 1A or 1B but are prepared to begin biology may begin the introductory sequence with BIOE 20C. The entire introductory biology sequence should be taken the first and second year, concurrently with or following the general chemistry sequence (Chemistry 1A, 1B/M and 1C/N).

The biology placement examination is an online self-assessment tool to help students assess their academic preparation for introductory biology. All students interested in majoring in the biological sciences should take the biology placement exam at: <http://biosci.ucsc.edu/bioplacex.html>. Students who score below 35 on the placement exam should consider taking the introductory preparation course, BIOE 3, *Concepts in Biology*, before enrolling in the introductory series. Students scoring 35 or higher may begin the introductory sequence with either course BIOL 20A, *Cell and Molecular Biology* or BIOE 20C, *Ecology and Evolution*.

The Mathematics Department offers a placement exam several times a year. Biological science majors are expected to take this exam. If the results indicate a need for precalculus, students need to take Mathematics 3 as soon as possible. Students with even less preparation may need to take college algebra at another institution.

Students intending to major in health sciences should take the Spanish placement exam, offered by the language program, to determine with which course they should begin the Spanish sequence.

Course Substitution/Transfer Credit Policy

At least half of the upper-division courses (numbered 100–190) required for each major must be taken through the biological sciences program at UCSC, not as transfer credits from another department or institution. Transfer students are advised to contact the Biological Sciences Undergraduate Advising office before enrolling in numerous upper-division courses at other institutions. For more information on transferring courses to UCSC, please consult the biological sciences undergraduate web site at <http://biosci.ucsc.edu>.

A maximum of one upper-division course requirement may be met with a research-based independent study or graduate-level UCSC biology course or a course offered by another UCSC department.

Declaration Process for Biological Sciences Majors

Declaration guidelines for biology majors can be found on the biological sciences undergraduate web site at <http://biosci.ucsc.edu>.

Comprehensive Requirement

All majors in the biological sciences require a comprehensive requirement. This requirement can be satisfied in one of the following ways:

- by passing course 190 Senior Seminar;
- by receiving a passing grade in an internship, independent research, or field course:

Biological Sciences-EEB

BIOE 114L, *Field Methods in Herpetological Research*

BIOE 141L, *Behavioral Ecology Field Course*

BIOE 145L, *Field Methods in Plant Ecology*

BIOE 150L, *Ecological Field Methods*

BIOE 151, *Ecology and Conservation in Practice*

BIOE 158L, *Marine Ecology Lab*

BIOE 159, *Marine Ecology Field Quarter*

BIOE 161L, *Kelp Forest Ecology Lab*

BIOE 183, *Undergraduate Research in EEB*

Biological Sciences-MCDB

BIOL 100L, *Biochemistry Lab*

BIOL 105L, *Eukaryotic Genetics Lab*

BIOL 105M, *Microbial Genetics Lab*

BIOL 109L, *Yeast Molecular Genetics Lab*

BIOL 110L, *Cell Biology Lab*

BIOL 111L, *Immunology Lab*

BIOL 115L, *Eukaryotic Molecular Biology Lab*

BIOL 119L, *Microbiology Lab*

BIOL 120L, *Developmental Biology Lab*

BIOL 128L, *Neural Genetics Lab*

BIOL 185, *Hughes Undergraduate Research Lab*

BIOL 186, *Undergraduate Research in MCD*

BIOL 189, *Health Sciences Internship*

- by completing a senior thesis. See the biological sciences undergraduate web site for more information, including deadline, at <http://www.biology.ucsc.edu/advising/graduation/thesis.html>;
- by achieving a graduate record examination (GRE) score at or above the 50th percentile on the biology subject test or the biochemistry, cell, and molecular biology subject test. Reports of GRE scores must be submitted to the biological sciences advising office before the last day of the graduating quarter;
- by obtaining a medical college admission test (MCAT) score at or above the 50th percentile on the biological sciences section. Reports of MCAT scores must be submitted to the biological sciences advising office before the last day of the graduating quarter.

Letter Grade Policy

For all students entering UCSC in fall 2001 and later, all courses used to satisfy any of the biological sciences majors must be taken for a letter grade.

Major Disqualification Policy

The biological sciences departments have adopted a major disqualification policy that is intended to encourage students to take their performance in the introductory requirements seriously and to make a strong effort to pass the introductory courses.

Students who receive more than one No Pass, D, and/or F in the following introductory major requirements will not be permitted to major in any of the biological sciences majors:

BIOL 20A, *Cell and Molecular Biology*

BIOE 20B, *Development and Physiology*

BIOE 20C, *Ecology and Evolution*

BIOL 20L, *Experimental Biology Lab*

Chemistry 1B, *General Chemistry*

Chemistry 1C, *General Chemistry*

Mathematics 11A, *Calculus with Applications*

Mathematics 11B, *Calculus with Applications*

Mathematics 19A, *Calculus for Science, Engineering, and Mathematics*

Mathematics 19B, *Calculus for Science, Engineering, and Mathematics*

Students will be assessed for disqualification after grades are submitted each quarter and at the end of each summer session.

Students may appeal their disqualification within the appeal period by writing a letter to the department chair. This appeal must be submitted to the advising office no later than 15 days from the date the disqualification notification was mailed, or the 10th day of classes in the quarter of their disqualification, whichever is later. The advising office will subsequently notify the student, the college, and the Office of the Registrar of the decision, no later than 15 days after the submission of the appeal.

A student who has been disqualified from the major may, no earlier than three months from the date of the disqualification, petition to be reinstated. This applica-

tion will be considered only if there is substantial new evidence that the student is capable of making normal progress in the major.

Academic Advising

Academic advising is available at the Biological Sciences Undergraduate Advising office. Students should take full advantage of this opportunity and should keep in frequent touch with the office to stay informed about late announcements of courses, changes in scheduling, and opportunities for special study.

The biological sciences undergraduate web site (<http://biosci.ucsc.edu>) serves as the program handbook containing advice and information pertinent to students' most frequently voiced questions. Each student in the major should review the information posted on the web site; for further assistance, contact the advising office.

Transfer Students

The faculty encourages applications from transfer students in the biological sciences. It is imperative transfer students complete science prerequisite courses before they transfer, especially a complete sequence of calculus, general chemistry, and introductory biology. Students should also take organic chemistry, if possible. Students who transfer without having completed the prerequisite coursework may have difficulty enrolling in courses and may require more than two years to complete a biological sciences degree. Prospective transfer students should review the transfer guidelines at <http://biosci.ucsc.edu/advising/preparation/transfer.html> or contact the undergraduate advising office for further information.

Medical and Professional School Admission

Medical and professional school admissions requirements vary; students should verify that their coursework will satisfy the admissions requirements of the programs to which they plan to apply.

Education Abroad Opportunities

The UC education abroad program (EAP) offers qualified students unique opportunities to broaden their educational horizons. The biological sciences departments encourage interested students to participate. Many programs are in English-speaking countries or use English for advanced courses. Many programs offer small classes, extensive laboratories, and/or field research experience.

There are excellent programs for biological science students in Costa Rica, Australia, New Zealand, the United Kingdom, Denmark, and Germany, among others. The Costa Rica Tropical Biology Program is of note to students interested in tropical biology and ecology. Held spring and fall quarters at the Monteverde research station, this program gives students experience with hands-on field research, offers a homestay program, and carries credit for two upper-division biology courses. The University of Queensland (Australia) offers an intensive, full-semester marine science program, which includes a stay at a research station on the Great Barrier Reef, near sheltered mangrove and seagrass habitats.

Students interested in study abroad need to get an early start on their basic science requirements, including chemistry, mathematics, and introductory biology and must declare their major prior to applying to go abroad. Visit the EAP office as soon as possible to begin

planning, and seek advice about your schedule from the biological sciences undergraduate adviser and/or faculty adviser.

General Biology Majors and Minor

The general biology majors permit flexibility, but demand careful attention to one's own interests and plans. Each student should select courses on the basis of up-to-date information in consultation with a biology faculty adviser whose interests reflect the student's interests.

General Biology B.A. Major Requirements

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Organic Chemistry: Chemistry 108A/L and 108B/M or 112A/L, 112B/M, and 112C/N

Calculus: Mathematics 11A-B or 19A-B

Physics: Physics 7A/L and 7B/M

Advanced Requirements

A total of eight upper-division biology courses, as follows:

Biochemistry: BIOL 100 or the series BIOC 100A, and 100B, and 100C

(Upon completion of the series, BIOC 100C may be used to satisfy one elective.)

Genetics: BIOL 105

Evolution: BIOE 109

Students must complete one upper-division biology course that includes regular laboratory or fieldwork. Students must fulfill the major distribution requirement, which includes one course from each of the following groups:

Cell/developmental biology:

BIOL 110, *Cell Biology*

BIOL 111, *Immunology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 120, *Developmental Biology*

Physiology:

BIOE 131/L, *Animal Physiology/Laboratory*

BIOE 133/L, *Exercise Physiology/Laboratory*

BIOE 135, *Plant Physiology*

BIOL 113, *Endocrinology*

BIOL 125, *Introduction to Neuroscience*

BIOL 130/L, *Human Physiology/Laboratory*

Ecology:

BIOE 107, *Ecology*

BIOE 108, *Marine Ecology*

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*

BIOE 122/L, *Invertebrate Zoology/Laboratory*

BIOE 125, *Marine Microbial Ecology*

BIOE 140, *Behavioral Ecology*

BIOE 141L, *Behavioral Ecology Field Course*

BIOE 145L, *Field Methods in Plant Ecology*

BIOE 145, *Plant Ecology*

BIOE 147, *Community Ecology*

BIOE 161, *Kelp Forest Ecology*

Students must complete two additional upper-division biology electives chosen from Biological Sciences-EEB 100-180 or Biological Sciences-MCDB courses numbered 100-187L.

General Biology B.A. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOL 20A gen ed gen ed	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N BIOL 20A gen ed
2nd (soph)	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed	BIOL 100 BIOL 105 gen ed

General Biology B.S. Major Requirements

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Organic Chemistry: Chemistry 108A/L and 108B/M or 112A/L, 112B/M, and 112C/N

Calculus: Mathematics 11A-B or 19A-B; and 22

Physics: Physics 6A/L, 6B/M, and 6C/N

Advanced Requirements

A total of nine upper-division biology courses, as follows:

Biochemistry: BIOL 100 or the series BIOC 100A, and 100B, and 100C

(Upon completion of the series, BIOC 100C may be used to satisfy one elective.)

Genetics: BIOL 105

Evolution: BIOE 109

Students must complete two upper-division biology courses that include regular laboratory or fieldwork

Students must fulfill the major distribution requirement, which includes one course from each of the following groups:

Cell/developmental biology:

BIOL 110, *Cell Biology*

BIOL 111, *Immunology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 120, *Developmental Biology*

Physiology:

BIOE 131/L, *Animal Physiology/Laboratory*

BIOE 133/L, *Exercise Physiology/Laboratory*

BIOE 135, *Plant Physiology*

BIOL 113, *Endocrinology*

BIOL 125, *Introduction to Neuroscience*

BIOL 130/L, *Human Physiology/Laboratory*

Ecology:

BIOE 107, *Ecology*

BIOE 108, *Marine Ecology*

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*

BIOE 122/L, *Invertebrate Zoology/Laboratory*

BIOE 125, *Marine Microbial Ecology*

BIOE 140, *Behavioral Ecology*

BIOE 141L, *Behavioral Ecology Field Course*

BIOE 145, *Plant Ecology*

BIOE 147, *Community Ecology*

BIOE 161, *Kelp Forest Ecology*

Students must complete three additional upper-division biology electives chosen from Biological Sciences-EEB courses numbered 100-180 or Biological Sciences-MCDB courses numbered 100-187L.

General Biology B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOL 20A Math 22 gen ed	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N Math 22 BIOL 20A
2nd (soph)	BIOL 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed	BIOL 100 BIOL 105 gen ed

General Biology Minor Requirements

In addition to the introductory biology, chemistry, mathematics, and physics (as listed above), students are required to take a total of five upper-division biology courses including courses BIOL 100, BIOL 105, and the three distribution requirement courses; one must include a laboratory. There is no senior comprehensive requirement for the minor. Please contact the Biological Sciences Undergraduate Advising office for further information.

Degree Programs Sponsored by Ecology and Evolutionary Biology

Ecology and Evolution Major

Program Description

The ecology and evolution major provides students with interdisciplinary skills necessary for understanding and solving complex problems in ecology, evolution, behavior, and physiology. While some of these disciplines focus on molecular or chemical mechanisms, they all address questions on larger spatial and temporal scales that can be applied to important environmental problems, including genetic and ecological aspects of conservation biology and biodiversity.

Students majoring in ecology and evolution will receive a B.S. degree based on an integrated series of courses providing breadth in fundamental areas of biology and allied sciences that enhance understanding of evolutionary and ecological processes. The capstone of this curriculum is a suite of field courses providing students unique opportunities to learn and conduct research in a host of ecological systems. Students are encouraged to take field courses in their areas of specialization. Other opportunities include participation in research projects with faculty sponsors and the intensive Education Abroad Programs in Costa Rica (tropical biology) and Australia (marine sciences).

Ecology and Evolution B.S. Major Requirements

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Calculus: Mathematics 11A-B or 19A-B

Biostatistics: Applied Mathematics and Statistics 7/L

Physics: Physics 7A/L and 7B/M

Advanced Requirements

A total of eleven upper-division courses; two must include laboratory or fieldwork.

Genetics: BIOL 105

Ecology: BIOE 107

Evolution: BIOE 109

One of the following physiology courses:

BIOE 131/L, *Animal Physiology/Laboratory*

BIOE 135, *Plant Physiology*

One of the following organism courses:

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*

BIOE 117/L, *Systematic Botany of Flowering Plants/Laboratory*

BIOL 119/L, *Microbiology/Laboratory*

BIOE 120/L, *Marine Botany/Laboratory*

BIOE 122/L, *Invertebrate Zoology/Laboratory*

Elective list for *Ecology and Evolution Major*

Three topical electives chosen from the following:

BIOE 108, *Marine Ecology*

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*

BIOE 112/L, *Ornithology/Laboratory*

BIOE 114/L, *Herpetology/Laboratory*

BIOE 117/L, *Systematic Botany/Laboratory*

BIOE 120/L, *Marine Botany/Laboratory*

BIOE 122/L, *Invertebrate Zoology/Laboratory*

BIOE 125, *Marine Microbial Ecology*

BIOE 127/L, *Ichthyology/Laboratory*

BIOE 129/L, *Biology of Marine Mammals/Laboratory*

BIOE 131/L, *Animal Physiology/Laboratory*

BIOE 133/L, *Exercise Physiology*

BIOE 135, *Plant Physiology*

BIOE 140, *Behavioral Ecology*

BIOE 141L, *Behavioral Ecology Field Course*

BIOE 145, *Plant Ecology*

BIOE 145L, *Field Methods in Plant Ecology*

BIOE 147, *Community Ecology*

BIOE 150, *Ecological Field Methods*

BIOE 150L, *Ecological Field Methods Laboratory*

BIOE 151ABCD, *Ecology and Conservation in Practice*

BIOE 155, *Freshwater Ecology*

BIOE 158L, *Marine Ecology Laboratory*

BIOE 159ABCD, *Marine Ecology Field Quarter*

BIOE 161, *Kelp Forest Ecology*

BIOE 161L, *Kelp Forest Ecology Laboratory*

BIOE 163, *Ecology of Reefs, Mangroves, and Sea Grasses*

BIOE 165, *Marine Conservation Biology*

BIOE 167, *Ocean Ecosystems*

BIOE 172/L, *Population Genetics/Laboratory*

BIOL 100, *Biochemistry*

BIOL 110, *Cell Biology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 119L, *Microbiology Laboratory*

BIOL 120, *Development*

BIOL 120L, *Development Laboratory*

Three general electives chosen from the following:

Biological Sciences-EEB

any BIOE course numbered 100-180

Biological Sciences-MCDB

BIOL 100, *Biochemistry*

BIOL 110, *Cell Biology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 119L, *Microbiology Laboratory*

BIOL 120, *Development*

BIOL 120L, *Development Laboratory*

Chemistry

CHEM 108A, *Organic Chemistry*

CHEM 108B, *Organic Chemistry*

Earth Sciences

EART 100/L, *Vertebrate Paleontology*

EART 102, *Marine Geology*

EART 105, *Coastal Geology*

EART 122, *Paleoceanography*

Environmental Studies

ENVS 104A, *Introduction to Environmental Field Methods*

ENVS 108/L, *General Entomology/Laboratory*

ENVS 115A/L, *GIS and Environmental Applications/Exercises in GIS*

ENVS 120, *Conservation Biology*

ENVS 122, *Tropical Ecology and Conservation*

ENVS 123, *Animal Ecology and Conservation*

ENVS 129, *Integrated Pest Management*

ENVS 130A/L, *Agroecology and Sustainable Agriculture/Laboratory*

ENVS 130B, *Principles of Sustainable Agriculture*

ENVS 131/L, *Insect Ecology/Laboratory*

ENVS 138/L, *Field Ethnobotany/Laboratory*

ENVS 160, *Restoration Ecology*

ENVS 161A/L, *Soils and Plant Nutrition/Laboratory*

ENVS 162, *Plant Physiological Ecology*

ENVS 163/L, *Plant Disease Ecology/Laboratory*

ENVS 167, *Freshwater and Wetland Ecology*

ENVS 168, *Biochemistry and the Global Environment*

Psychology

PSYC 123, *Behavioral Neuroscience*

One of the following may also be used as an upper-division elective:

Biological Sciences-EEB

BIOE 183L, *Undergraduate Research in EEB*

BIOE 188, *Supervised Teaching*

BIOE 195, *Senior Thesis*

BIOE 198, *Independent Field Study*

BIOE 199, *Tutorial*

Environmental Studies

ENVS 183, *Environmental Studies Internship*

Ecology and Evolution B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 BIOE 3	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOE 20C AMS 7/L gen ed	BIOL 20A Phys 7A/L gen ed	BIOE 20B Phys 7B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/L BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N BIOE 20C gen ed
2nd (soph)	BIOL 20A AMS 7/L gen ed	BIOE 20B Physics 7A/L gen ed	BIOL 105 Physics 7B/M gen ed

Marine Biology Major

Program Description

UCSC is situated within five miles of Monterey Bay and its great diversity of coastal marine ecosystems; nature reserves; state, federal, and private marine research institutions and resource management agencies. These resources, combined with on-campus computing and analytical facilities and the Long Marine Laboratory, make UCSC an exceptional campus for the study of marine biology and its application to coastal conservation and management. Descriptions of nearby environments, institutions, and facilities are available through the Ecology and Evolutionary Biology Department web site at <http://www.biology.ucsc.edu/eeb/index.html>.

The marine biology major is designed to introduce students to marine organisms and the biological and physical processes that affect these organisms, their populations, and their coastal and oceanic ecosystems. The emphasis is on basic principles that help us understand the processes that shape life in marine environments. The marine biology major is a demanding program that offers a B.S. degree and requires several more courses than the general biology B.A. major.

Marine Biology B.S. Major Requirements

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Calculus: Mathematics 11A-B or 19A-B

Biostatistics: Applied Mathematics and Statistics 7/L

Physics: Physics 7A/L and 7B/M

Advanced Requirements

A total of 11 upper-division courses; two must include laboratory or fieldwork.

Genetics: BIOL 105

Evolution: BIOE 109

One ecology course:

BIOE 107, *Ecology*

BIOE 108, *Marine Ecology*

One marine environment course:

BIOE 167, *Ocean Ecosystems*

BIOE 168, *Biological Oceanography*

Ocean Sciences 101, *Marine Environment*

One marine course:

BIOE 120/L, *Marine Botany/Laboratory*

BIOE 122/L, *Invertebrate Zoology/Laboratory*

BIOE 127/L, *Ichthyology/Laboratory*

BIOE 129/L, *Biology of Marine Mammals/Laboratory*

Elective list for Marine Biology Major

Three topical electives chosen from the following:

BIOE 108, *Marine Ecology*

BIOE 120/L, *Marine Botany/Laboratory*

BIOE 122/L, *Invertebrate Zoology/Laboratory*

BIOE 124/L, *Marine Plankton/Laboratory*

BIOE 125, *Marine Microbial Ecology*

BIOE 127/L, *Ichthyology/Laboratory*

BIOE 129/L, *Biology of Marine Mammals/Laboratory*

BIOE 155, *Freshwater Ecology*

BIOE 158L, *Marine Ecology Laboratory*

BIOE 159ABCD, *Marine Ecology Field Quarter*

BIOE 161, *Kelp Forest Ecology*

BIOE 161L, *Kelp Forest Ecology Laboratory*

BIOE 163, *Ecology of Reefs, Mangroves, and Sea Grasses*

BIOE 165, *Marine Conservation Biology*

BIOE 167, *Ocean Ecosystems*

BIOE 168, *Biological Oceanography*

EART 102, *Marine Geology*

EART 105, *Coastal Geology*

EART 122, *Paleoceanography*

Three general electives chosen from the following:

Biological Sciences-EEB

Any BIOE course numbered 100-180

Biological Sciences-MCDB

BIOL 100, *Biochemistry*

BIOL 110, *Cell Biology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 119L, *Microbiology Laboratory*

BIOL 120, *Development*

BIOL 120L, *Development Laboratory*

Chemistry

CHEM 108A, *Organic Chemistry*

CHEM 108B, *Organic Chemistry*

Earth Sciences

EART 100/L, *Vertebrate Paleontology*

EART 102, *Marine Geology*

EART 105, *Coastal Geology*

EART 122, *Paleoceanography*

Environmental Studies

ENVS 104A, *Introduction to Environmental Field Methods*

ENVS 108/L, *General Entomology/Laboratory*

ENVS 115A/L, *GIS and Environmental Applications/ Exercises in GIS*

ENVS 120, *Conservation Biology*

ENVS 122, *Tropical Ecology and Conservation*

ENVS 123, *Animal Ecology and Conservation*

ENVS 129, *Integrated Pest Management*

ENVS 130A/L, *Agroecology and Sustainable Agriculture/Laboratory*

ENVS 130B, *Principles of Sustainable Agriculture*

ENVS 131/L, *Insect Ecology/Laboratory*

ENVS 138/L, *Field Ethnobotany/Laboratory*

ENVS 160, *Restoration Ecology*

ENVS 161A/L, *Soils and Plant Nutrition/Laboratory*

ENVS 162, *Plant Physiological Ecology*

ENVS 163/L, *Plant Disease Ecology/Laboratory*

ENVS 167, *Freshwater and Wetland Ecology*

ENVS 168, *Biochemistry and the Global Environment*

Psychology

PSYC 123, *Behavioral Neuroscience*

One of the following may also be used as an upper-division elective:

Biological Sciences-EEB

BIOE 183L, *Undergraduate Research in EEB*

BIOE 188, *Supervised Teaching*

BIOE 195, *Senior Thesis*

BIOE 198, *Independent Field Study*

BIOE 199, *Tutorial*

Marine Biology B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOE 20C AMS 7/L gen ed	BIOL 20A Phys 7A/L gen ed	BIOE 20B Phys 7B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N BIOE 20C gen ed
2nd (soph)	BIOL 20A AMS 7/L gen ed	BIOE 20B Physics 7A/L gen ed	BIOL 105 Physics 7B/M gen ed

Plant Sciences Major

Program Description

UCSC has a strong program in the plant sciences (sometimes called botany). A fine natural environment, the campus Arboretum, the facilities under the Center for Agroecology and Sustainable Food Systems (especially the Farm and Garden), and an excellent greenhouse collection all enhance the resources that support our botanical programs.

The plant sciences major is designed for students with an interest in plant biology and its associated curricular fields such as plant ecology, plant physiology, plant pathology, plant molecular biology, soils, and applied plant sciences. After completion of the core courses, students can proceed in one of several directions depending on their interest. For example, a more in-depth study of physiology and molecular biology courses can serve as preparation for work in the biotechnology field or for graduate school; further studies in plant ecology, tropical ecology, or restoration ecology can lead to careers such as resource ecologist or naturalist or to the pursuit of related fields in graduate school; upper-division training in agroecology can lead to careers in agriculture or food systems. A special feature of this major is a one-quarter internship and/or independent research requirement. There are many opportunities for internships both on the UCSC campus and in the community at large.

Plant Sciences B.S. Major Requirements

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Calculus: Mathematics 11A-B or 19A-B

Biostatistics: Applied Mathematics and Statistics 7/L

Physics: Physics 7A/L and 7B/M

Advanced Requirements

A total of eleven upper-division courses; two of which must include laboratory or fieldwork.

Genetics: BIOL 105

Ecology: BIOE 107

Evolution: BIOE 109

One plant physiology course from the following:
BIOE 135, *Plant Physiology*

Environmental Studies 162, *Plant Physiological Ecology*

One botany course from the following:

BIOE 117/L, *Systematic Botany*

BIOE 120/L, *Marine Botany/Laboratory*

Elective list for Plant Sciences Major

Three topical electives chosen from the following:

Biological Sciences-EEB

BIOE 117/L, *Systematic Botany/Laboratory*

BIOE 120/L, *Marine Botany/Laboratory*

BIOE 135, *Plant Physiology*

BIOE 145, *Plant Ecology*

BIOE 145L, *Field Methods in Plant Ecology*

BIOE 151ABCD, *Ecology and Conservation in Practice*

Biological Sciences-MCDB

BIOL 110, *Cell Biology*

BIOL 115, *Eukaryotic Molecular Biology*

Environmental Studies

ENVS 104A, *Introduction to Environmental Field Methods*

ENVS 129, *Integrated Pest Management*

ENVS 130A/L, *Agroecology and Sustainable Agriculture/Laboratory*

ENVS 130B, *Principles of Sustainable Agriculture*

ENVS 131/L, *Insect Ecology/Laboratory*

ENVS 138/L, *Field Ethnobotany/Laboratory*

ENVS 160, *Restoration Ecology*

ENVS 161A/L, *Soils and Plant Nutrition/Laboratory*

ENVS 162, *Plant Physiological Ecology*

ENVS 163/L, *Plant Disease Ecology/Laboratory*

Three general electives chosen from the following:

Biological Sciences-EEB

Any BIOE course numbered 100-180

Biological Sciences-MCDB

BIOL 100, *Biochemistry*

BIOL 110, *Cell Biology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 119L, *Microbiology Laboratory*

BIOL 120, *Development*

BIOL 120L, *Development Laboratory*

Chemistry

CHEM 108A, *Organic Chemistry*

CHEM 108B, *Organic Chemistry*

Earth Sciences

EART 100/L, *Vertebrate Paleontology*

EART 102, *Marine Geology*

EART 105, *Coastal Geology*

EART 122, *Paleoceanography*

Environmental Studies

ENVS 104A, *Introduction to Environmental Field Methods*

ENVS 108/L, *General Entomology/Laboratory*

ENVS 115A/L, *GIS and Environmental Applications/ Exercises in GIS*

ENVS 120, *Conservation Biology*

ENVS 122, *Tropical Ecology and Conservation*

ENVS 123, *Animal Ecology and Conservation*

ENVS 129, *Integrated Pest Management*

ENVS 130A/L, *Agroecology and Sustainable Agriculture/Laboratory*

ENVS 130B, *Principles of Sustainable Agriculture*

ENVS 131/L, *Insect Ecology/Laboratory*

ENVS 138/L, *Field Ethnobotany/Laboratory*

ENVS 160, *Restoration Ecology*

ENVS 161A/L, *Soils and Plant Nutrition/Laboratory*

ENVS 162, *Plant Physiological Ecology*

ENVS 163/L, *Plant Disease Ecology/Laboratory*

ENVS 167, *Freshwater and Wetland Ecology*

ENVS 168, *Biochemistry and the Global Environment*

Psychology

PSYC 123, *Behavioral Neuroscience*

One of the following may also be used as an upper-division elective:

Biological Sciences-EEB

BIOE 183L, *Undergraduate Research in EEB*

BIOE 188, *Supervised Teaching*

BIOE 195, *Senior Thesis*

BIOE 198, *Independent Field Study*

BIOE 199, *Tutorial*

Environmental Studies

ENVS 183, *Environmental Studies Internship*

Plant Sciences B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOE 20C AMS 7/L gen ed	BIOL 20A Phys 7A/L gen ed	BIOE 20B Phys 7B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N BIOE 20C gen ed

Plan Two

2nd (soph)	BIOL 20A AMS 7/L gen ed	BIOE 20B Phys 7A/L gen ed	BIOL 105 Phys 7B/M gen ed
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Degree Programs Sponsored by Molecular, Cell, and Developmental Biology

Health Sciences Major

Program Description

The B.S. major in health sciences is designed for students interested in careers in medicine or biomedical research and satisfies the admission requirements for most U.S. medical schools. It is based on the existing B.S. degree in molecular, cell, and developmental biology, with similar course requirements in chemistry, physics, and mathematics. Students are required to take five courses directly relevant to human health in addition to genetics, biochemistry, and cell biology. Students in this program must also fulfill Spanish language and health care internship requirements.

Health Sciences B.S. Major Requirements*

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and BIOL 20L

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Organic Chemistry: Chemistry 108A/L and 108B/M, 108C recommended for pre-med students, or 112A/L, 112B/M, and 112C/N

Calculus: Mathematics 11A-B or 19A-B; and 22 (three quarters)

Physics: Physics 6A/L, 6B/M, and 6C/N

Advanced Requirements

A total of eight upper-division biology courses, as follows:

Four core courses:

Biochemistry: BIOL 100 or BIOC 100A, 100B, and 100C

Genetics: BIOL 105

Cell Biology: BIOL 110

Human Physiology with Lab: BIOL 130/L

Three of the following lecture courses:

BIOE 133/L, *Exercise Physiology/Laboratory*

BIOL 111, *Immunology*

BIOL 113, *Mammalian Endocrinology*

BIOL 114, *Cancer Cell Biology*

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 119, *Microbiology*

BIOL 120, *Development*

BIOL 125, *Neuroscience*

BIOL 126, *Cancer Cell Biology*

BIOL 127, *Neurodegenerative Disease*

BIOL 135/L, *Anatomy of the Human Body/Laboratory*

BIOL 178, *Stem Cell Biology*

BIOL 179, *Biotechnology and Drug Development*

Internship Requirement: BIOL189, *Health Science Internship*. The student must participate in a commu-

nity health care service activity approved by the health sciences internship coordinator. Credit may be earned over multiple quarters.

Language Requirement: Spanish 1–4 or the equivalent and one quarter of Spanish for health care workers (Spanish 5M).

* Medical and professional school admissions requirements vary; students should verify that their coursework will satisfy the admissions requirements of the programs to which they plan to apply.

Health Sciences B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOE 20A Math 22 gen ed	BIOE 20B Chem 108A/L gen ed	BIOE 105 Chemistry 108B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N Math 22 gen ed
2nd (soph)	BIOE 20A Chem 108A/L gen ed	BIOE 20B Chem 108B/M gen ed	BIOE 100 BIOE 105 gen ed

Molecular, Cell, and Developmental Biology Major

Program Description

The molecular, cell, and developmental (MCD) biology major is designed for students interested in medical or other professional graduate programs and those preparing for careers in biotechnology industries. This major is more structured than the general biology major and requires that students pay careful attention to the prerequisites required for upper-division biology courses.

Molecular, Cell, and Developmental Biology B.S. Major Requirements

Introductory Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Organic Chemistry: Chemistry 108A/L and 108B/M or 112A/L, 112B/M, and 112C/N

Calculus: Mathematics 11A-B or 19A-B; and 22

Physics: Physics 6A/L, 6B/M, and 6C/N

Advanced Requirements

A total of nine upper-division biology courses, as follows:

Four core courses:

Biochemistry: BIOL 100 or the series BIOC 100A, and 100B, and 100C

(Upon completion of the series, BIOC 100C may be used to satisfy one elective)

Genetics: BIOL 105

Cell Biology: BIOL 110

Eukaryotic Molecular Biology: BIOL 115

Three of the following lecture courses:

BIOL 111, *Immunology*

BIOL 113, *Mammalian Endocrinology*

BIOL 114, *Cancer Cell Biology*

BIOL 119, *Microbiology*

BIOL 120, *Development*

BIOL 125, *Neuroscience*

BIOL 126, *Advanced Neural Development*

BIOL 127, *Neurodegenerative Disease*

BIOL 130/L, *Human Physiology/Laboratory*

BIOL 178, *Stem Cell Biology*

BIOL 179, *Biotechnology and Drug Development*

BIOE 109, *Evolution*

BIOE 135, *Plant Physiology*

Two of the following laboratory courses:

BIOL 100L, *Biochemistry Laboratory*

BIOL 105L, *Eukaryotic Genetics Laboratory*

BIOL 105M, *Microbial Genetics Laboratory*

BIOL 109L, *Yeast Molecular Genetics Laboratory*

BIOL 110L, *Cell Biology Laboratory*

BIOL 111L, *Immunology Laboratory*

BIOL 115L, *Eukaryotic Molecular Biology Laboratory*

BIOL 119L, *Microbiology Laboratory*

BIOL 120L, *Development Laboratory*

BIOL 128L, *Neural Genetics Laboratory*

BIOL 130/L, *Human Physiology/Laboratory**

BIOL 180/L, *Research Programming for Biologists and Biochemists/Laboratory*

BIOL 181, *Computational Biology Tools*

BIOL 185L *Hughes Undergraduate Research Laboratory*

BIOL 186L *Undergraduate Research in MCD*

BIOL 187L, *Molecular Biotechnology Laboratory*

BIOC 110, *Biochemistry Laboratory*

*BIOL 130/L meets either one lecture or one laboratory requirement, but not both.

Molecular, Cell and Developmental Biology B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOE 20A Math 22 gen ed	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chemistry 108B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N Math 22 BIOL 20A

Plan Two

Year	Fall	Winter	Spring
2nd (soph)	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed	BIOL 100 BIOL 105 gen ed

Neuroscience and Behavior Majors

Program Description

Neuroscience, the study of the nervous system and behavior of animals, is a frontier area in biology, touching psychology on the one hand and computer science on the other. The neuroscience and behavior majors provide students with rigorous preparation for graduate studies and research in the fields of neuroscience and behavior. The brain and determinants of behavior are studied at all levels, from biological molecules to individual nerve cells to functioning organisms to social behavior. The majors emphasize the interrelationship between the two fields, building on a common core of general and biological science course work. Students select a pathway in either behavior or molecular neuroscience. Rigorous course work is supplemented by opportunities for hands-on laboratory and field courses and independent research.

Neuroscience and Behavior B.A. Major Requirements

Introductory Course Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Organic Chemistry: Chemistry 108A/L and 108B/M or 112A/L, 112B/M, and 112C/N

Calculus: Mathematics 11A-B or 19A-B

Biostatistics: Applied Mathematics and Statistics 7/L

Physics: Physics 7A/L and 7B/M

Advanced Course Requirements

Five upper-division core courses to include:

Biochemistry: BIOL 100 or the series BIOC 100A, and 100B, and 100C

(Upon completion of the series, BIOC 100C may be used to satisfy one elective)

Genetics: BIOL 105

Cell Biology: BIOL 110

Neuroscience: BIOL 125

Behavioral Ecology: BIOE 140

Plus additional elective courses chosen from one of two areas of concentration:

Molecular Neuroscience Pathway (four courses)

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 126, *Advanced Molecular Neuroscience*

One of the following physiology or psychology courses:

BIOL 130/L, *Human Physiology*

Psychology 121, *Perception*

Psychology 123, *Behavioral Neuroscience*

One of the following biology laboratory courses:

BIOL 100L, *Biochemistry Laboratory*

BIOL 105L, *Eukaryotic Genetics Laboratory*

BIOL 109L, *Yeast Molecular Genetics Laboratory*

BIOL 110L, *Cell Biology Laboratory*

BIOL 111L, *Immunology Laboratory*

BIOL 115L, *Eukaryotic Molecular Biology Laboratory*

BIOL 120L, *Development Laboratory*
 BIOL 128L, *Neural Genetics Laboratory*
 BIOL 130/L, *Human Physiology/Laboratory**
 BIOL 180/L, *Research Programming for Biologists and Biochemists/Laboratory*
 BIOL 181, *Computational Biology Tools*
 BIOL 185L, *Hughes Undergraduate Research Laboratory*
 BIOL 186L, *Undergraduate Research in MCD*
 BIOL 187L, *Molecular Biotechnology Laboratory*

Behavior Pathway (four courses)

BIOL 113, *Mammalian Endocrinology*

One of the following:

BIOE 112/L, *Ornithology/Laboratory*
 BIOE 114/L, *Herpetology/Laboratory*
 BIOE 129/L, *Marine Mammals/Laboratory*
 BIOE 141L, *Behavioral Ecology Field Course*
 BIOE 150, *Ecological Field Methods*
 One of the following physiology or psychology courses:
 BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*
 BIOE 122/L, *Invertebrate Zoology/Laboratory*
 BIOE 131/L, *Animal Physiology/Laboratory*
 BIOE 133/L, *Exercise Physiology/Laboratory*
 BIOL 120, *Development*

BIOL 127, *Neurodegenerative Disease*
 BIOL 130/L, *Human Physiology/Laboratory*

Psychology 121, *Perception*
 Psychology 123, *Behavioral Neuroscience*
 Psychology 133, *Psychology and Evolutionary Theory*

One of the following laboratory courses:

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*
 BIOE 122/L, *Invertebrate Zoology/Laboratory*
 BIOE 131/L, *Animal Physiology/Laboratory*
 BIOE 141L, *Behavioral Ecology Field Course*
 BIOE 150L, *Ecological Field Methods*
 BIOL 105L, *Eukaryotic Genetics Laboratory*
 BIOL 130/L, *Human Physiology Laboratory*
 BIOL 180/L, *Research Programming for Biologists and Biochemists/Laboratory*
 BIOL 181, *Computational Biology Tools*
 Computer Science 12A, *Introduction to Programming*
 Computer Science 12B, *Introduction to Data Structures*

*BIOL 130/L meets either a physiology or a laboratory requirement, but not both.

Neuroscience and Behavior B.A. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed

Plan One			
2nd (soph)	BIOL 20A AMS 7/L gen ed	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N BIOL 20A gen ed
2nd (soph)	BIOE 20B AMS 7/L gen ed	BIOE 20C Chem 108A/L gen ed	BIOL 105 Chem 108B/M gen ed

Neuroscience and Behavior B.S. Major Requirements

Introductory Course Requirements

Introductory Biology: BIOL 20A, BIOE 20B, and 20C

General Chemistry: Chemistry 1A, 1B/M and 1C/N

Organic Chemistry: Chemistry 108A/L and 108B/M or 112A/L, 112B/M, and 112C/N

Calculus: Mathematics 11A-B or 19A-B; and 22

Biostatistics: Applied Mathematics and Statistics 7/L

Physics: Physics 6A/L, 6B/M, and 6C/N

Advanced Course Requirements

Five upper-division core courses to include:

Biochemistry: BIOL 100 or the series BIOC 100A, and 100B, and 100C

(Upon completion of the series, BIOC 100C may be used to satisfy one elective)

Genetics: BIOL 105

Cell Biology: BIOL 110

Neuroscience: BIOL 125

Behavioral Ecology: BIOE 140

Plus additional elective courses chosen from one of two areas of concentration:

Molecular Neuroscience Pathway (five courses)

BIOL 115, *Eukaryotic Molecular Biology*

BIOL 126, *Advanced Molecular Neuroscience*

One of the following physiology or psychology courses:

BIOL 130/L, *Human Physiology*
 BIOL 127, *Neurodegenerative Disease*

Psychology 121, *Perception*

Psychology 123, *Behavioral Neuroscience*

Two of the following biology laboratory courses:

BIOL 100L, *Biochemistry Laboratory*
 BIOL 105L, *Eukaryotic Genetics Laboratory*
 BIOL 109L, *Yeast Molecular Genetics Laboratory*
 BIOL 110L, *Cell Biology Laboratory*
 BIOL 111L, *Immunology Laboratory*
 BIOL 115L, *Eukaryotic Molecular Biology Laboratory*
 BIOL 120L, *Development Laboratory*
 BIOL 128L, *Neural Genetics Laboratory*
 BIOL 130/L, *Human Physiology/Laboratory**

BIOL 180/L, *Research Programming for Biologists and Biochemists/Laboratory*

BIOL 181, *Computational Biology Tools*

BIOL 185L, *Hughes Undergraduate Research Laboratory*

BIOL 186L, *Undergraduate Research in MCD*

BIOL 187L, *Molecular Biotechnology Laboratory*

Behavior Pathway (four courses)

BIOL 113, *Mammalian Endocrinology*

One of the following:

BIOE 112/L, *Ornithology/Laboratory*
 BIOE 114/L, *Herpetology/Laboratory*
 BIOE 129/L, *Marine Mammals/Laboratory*
 BIOE 141L, *Behavioral Ecology Field Course*
 BIOE 150, *Ecological Field Methods*

One of the following physiology or psychology courses:

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*
 BIOE 122/L, *Invertebrate Zoology/Laboratory*
 BIOE 131/L, *Animal Physiology/Laboratory*
 BIOE 133/L, *Exercise Physiology/Laboratory*
 BIOL 120, *Development*
 BIOL 130/L, *Human Physiology/Laboratory*
 Psychology 121, *Perception*
 Psychology 123, *Behavioral Neuroscience*
 Psychology 133, *Psychology and Evolutionary Theory*

Two of the following laboratory courses:

BIOE 110/L, *Biology and Ecology of Vertebrates/Laboratory*
 BIOE 122/L, *Invertebrate Zoology/Laboratory*
 BIOE 131/L, *Animal Physiology/Laboratory*
 BIOE 141L, *Behavioral Ecology Field Course*
 BIOE 150L, *Ecological Field Methods*
 BIOL 105L, *Eukaryotic Genetics Laboratory*
 BIOL 130/L, *Human Physiology Laboratory*
 BIOL 180/L, *Research Programming for Biologists and Biochemists/Laboratory*
 BIOL 181, *Computational Biology Tools*

Computer Science 12A, *Introduction to Programming*
 Computer Science 12B, *Introduction to Data Structures*

*BIOL 130/L meets either a physiology or a laboratory requirement, but not both.

Neuroscience and Behavior B.S. Sample Planners

Plan One is for first-year students placing into Mathematics 3 and BIOE 3:

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 core	Chem 1B/M Math 11A BIOE 3	Chem 1C/N Math 11B gen ed
2nd (soph)	BIOL 20A Math 22 gen ed	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed

Plan Two is a more rigorous schedule for first-year students placing into Mathematics 11A and BIOE/BIOL 20:

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A core	Chem 1B/M Math 11B gen ed	Chem 1C/N Math 22 BIOL 20A
2nd (soph)	BIOE 20B Chem 108A/L gen ed	BIOE 20C Chem 108B/M gen ed	BIOL 100 BIOL 105 gen ed

Ecology and Evolutionary Biology

Ecology and Evolutionary Biology
A308 Earth and Marine Sciences
(831) 459-5358
<http://www.eeb.ucsc.edu/>

Faculty and Professional Interests

- GIACOMO BERNARDI
Fish biology, phylogenetics, evolution
- MARK H. CARR
Marine ecology, applied marine ecology
- DANIEL P. COSTA
Physiological ecology of marine mammals and birds
- DONALD CROLL
Foraging ecology of marine birds and mammals, island conservation/ecology
- LAUREL R. FOX
Terrestrial population and community ecology, plant-animal interactions
- LYNDA J. GOFF
Algal symbiosis, host-parasite relationships, molecular evolution
- KATHLEEN M. KAY
Plant evolutionary ecology
- A. MARM KILPATRICK
Ecology of infectious diseases and population biology
- BRUCE E. LYON
Behavioral ecology, evolutionary ecology, avian ecology
- JONATHAN MOORE
Ecology and conservation of freshwater ecosystems
- INGRID M. PARKER
Plant ecology, pollination, plant-pathogen interactions, biological invasions
- JARMILA PITTMANN
Plant physiology
- GRANT H. POGSON
Molecular population genetics, ecological genetics, marine invertebrates and fishes
- DONALD C. POTTS
Coral reef ecology, genetics, evolution, and geological history; marine biodiversity; tropical biology, global change, and remote sensing
- PETER T. RAIMONDI
Marine ecology, evolutionary ecology, experimental design, applied ecology
- BARRY SINERVO
Animal behavior, evolution, physiological ecology

JOHN N. THOMPSON
Coevolution, evolutionary ecology and genetics of species interactions, organization of biodiversity

TERRIE M. WILLIAMS
Vertebrate locomotor and thermoregulatory physiology; marine biodiversity; comparative vertebrate energetics, exercise physiology

Ecology and Evolutionary Biology Emeritus Faculty

- RALPH BERGER
WILLIAM JACKSON DAVIS
WILLIAM DOYLE
RALPH HINEGARDNER
JEAN LANGENHEIM
BURNEY LEBOEUF
CHARLES (LEO) ORTIZ
A. TODD NEWBERRY
JOHN PEARSE

Ecology and Evolutionary Biology Lecturers

- BALDO MARINOVIC
JILL THOMPSON



JAMES ESTES (Ecology and Evolutionary Biology and Ocean Sciences)
Marine sciences, community ecology

GREG GILBERT (Environmental Studies)
Disease ecology, conservation biology, tropical forest ecology, microbial ecology

DANIEL HARDER (Ecology and Evolutionary Biology)
Floristic inventory of Indochina and central Africa, biogeography, plant systematics

KAREN D. HOLL (Environmental Studies)
Restoration ecology, conservation biology, landscape ecology

PAUL L. KOCH (Earth Sciences)
Isotope biogeochemistry, vertebrate paleontology

RAPHAEL KUDELA (Ocean Sciences)
Ecological modeling and remote sensing, satellite oceanography, phytoplankton ecology and harmful algal blooms

R. BRUCE MAC FARLANE (Ecology and Evolutionary Biology)
Physiological ecology of marine, estuarine, and anadromous fishes

MARC S. MANGEL (Applied Mathematics and Statistics)
Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

MARY W. SILVER (Ocean Sciences)
Biological oceanography, marine plankton, midwater ecology

BERNIE TERSHY (Ecology and Evolutionary Biology)
Ecology and conservation of seabirds and island ecosystems

ROBERT VRIJENHOEK (Ecology and Evolutionary Biology)

KERSTIN WASSON (Ecology and Evolutionary Biology)
Evolutionary ecology, invasion biology, conservation science

JONATHAN ZEHR (Ocean Sciences)
Aquatic microbial ecology, biological oceanography

Graduate Program Description

The graduate program in ecology and evolutionary biology (EEB, courses BIOE) at UCSC is one of the premier programs in the country. This is due to the quality and commitment of the faculty, the long-standing tradition of the University of California, and the unique environment of the Santa Cruz campus. UCSC has been singularly blessed with varied and easily accessible marine and terrestrial resources for research. UCSC is ideal for marine research—having its own marine laboratory, a fleet of boats, and one of the most active scientific diving programs in the country. In close proximity to pinniped rookeries at the UC Reserve at Año Nuevo, the campus is located on Monterey Bay, which has the largest concentration of marine research programs in the country. In addition to state-of-the-art departmental laboratories, students have full access to the molecular ecology and evolutionary genetics (MEEG) facility and other analytical laboratories of the UCSC Institute of Marine Sciences.

Terrestrial biologists have access to all of California's natural environments through the University of California's natural reserve system; the diverse habitats on UCSC's 2,000-acre campus itself (mixed redwood forest, fossil sand dune associations, rolling pasture land, and chaparral) and on several adjacent preserves; the UCSC experimental farm and garden; extensive southern hemisphere plantings in the UCSC arboretum; and greenhouses and associated laboratory facilities. More than two-thirds of our faculty participate in field studies throughout the Pacific basin (from Alaska to Antarctica), in Pacific Rim nations (in Latin America, the Far East, and Australia), and beyond.

The program in ecology and evolutionary biology is comprised of four core tracks: (1) population and community ecology, (2) evolutionary biology, (3) physiology and behavior including marine and terrestrial animals, and (4) systematics and biodiversity.

Degree Requirements

Ph.D. Requirements

Students must take BIOE 200A and 200B in the first year. BIOE 279 must be taken fall quarter of the first year; BIOE 293 is required four quarters thereafter. BIOE 294 must be taken every quarter that the student is in residence. Each Ph.D. student must complete at least two quarters as a teaching assistant during their graduate career.

During fall of the second year, students take a comprehensive examination. This is a two-part exam, written and oral, the goal of which is to examine the student's breadth and depth of knowledge of evolution, ecology, physiology, behavior, organismal, and general biology. A committee is comprised of four examiners selected by each student and the student's supervisor. Each student's area of research, together with the stated goal of the exam, should guide the composition of the student's committee.

During the sixth term, the student submits a dissertation research proposal to their dissertation committee and must defend it in a three-hour oral examination before the dissertation committee. The student advances to candidacy only after completing all course work, passing the written and oral portions of the comprehensive examination, writing and defending a dissertation research proposal, and presenting a candidacy seminar on his/her proposed research.

The student must submit his/her doctoral dissertation to the dissertation committee for tentative approval at least 60 days before presenting a formal, public doctoral

research seminar. Also, the student must meet with the dissertation committee to defend the thesis at least one week prior to the public seminar. Before the dissertation is accepted for signature by the dissertation committee, at least one chapter must be submitted as a paper (not an abstract) to a refereed journal for publication.

M.A. Requirements

In addition to course work identified by the advisory committee or adviser, each student will be required to take BIOE 279, two quarters of BIOE 293, BIOE 294 and the appropriate lab course when in residence at the university (not in the field), and BIOE 297, as needed, to come up with 15 credits. BIOE 200A and 200B are recommended but not required.

The student must submit their thesis draft to the thesis committee for tentative approval at least 60 days before presenting a formal, public research seminar. Also, the student must meet with the thesis committee to defend the thesis at least one week prior to the public seminar. At that time, the committee may sign the cover page of the student's dissertation.

There is no requirement, but it is highly recommended, that at least one thesis chapter be submitted as a paper (not an abstract) to a refereed journal for publication.

Lower-Division Courses

3. Concepts in Biology. W

A non-survey course suitable for people who have not had biology. A historical and experimental approach covers five key biological concepts: homeostasis, the integration of structure and function, cell theory, the mechanism of heredity, and evolution. Students cannot receive credit for this course after receiving prior credit for BIOL 20A, BIOE 20B, or BIOE 20C. (Formerly Biology 3.) Prerequisite(s): completion of biology placement exam recommended. <http://biosci.ucsc.edu/bioplacex.html>. *B. Marinovic*

20B. Development and Physiology. F,W,S

Topics in morphology, physiology, development, genetics, and endocrinology selected to exemplify current issues and perspectives in organismic biology. (Formerly Biology 20B.) Prerequisite(s): BIOL 20A. *The Staff*

20C. Ecology and Evolution. F,W,S

Introduction to ecology and evolution covering principles of evolution at the molecular, organismal, and population levels. Evolutionary topics include genetic and phenotypic variation, natural selection, adaptation, speciation, and macroevolution. Also covers behavioral, population, and community ecology including applied ecological issues. Completion of biology placement exam recommended. <http://biosci.ucsc.edu/bioplacex.html>. (Formerly Biology 20C.) *The Staff*

75. Scientific Diving Certification (2 credits). F,S

Prerequisite for course 161/L, Kelp Forest Ecology, and all research diving performed under the auspices of UCSC or other academic institutions. Course work includes lectures and scuba diving. Topics include subtidal sampling techniques, navigation, low visibility diving, search and recovery, rescues, small boat use, oxygen administration for divers, technical blue water deep diving, physics, and physiology. Apply online at <http://www2.ucsc.edu/sci-diving>. Students are billed a course materials fee that covers costs for equipment use, materials, and transportation. Prerequisite(s): skill level equal to Advanced Scuba Diver Certification, pass scuba physical, provide own scuba

gear, be certified in CPR and First Aid; and interview: pass swim test and scuba skills test. (Formerly Biology 75.) Enrollment limited to 16. *The Staff*

80N. Biology of Human Health and Nutrition. W

An introduction to the biology of human nutrition and its effects on human health. The course explores how nutrient balance, exercise, and age interact in their effects on human health, fitness, and disease. (Formerly Biology 80N.) (General Education Code(s): T2-Natural Sciences.) *J. Thompson*

80P. Infectious Diseases and Human Populations. S

An overview of the biology of infectious diseases in human societies including why diseases vary in severity, how human bodies defend themselves, and how public health efforts cope with the problem of rapidly evolving pathogens. (Formerly Biology 80P.) (General Education Code(s): T2-Natural Sciences.) *J. Thompson*

99. Tutorial. F,W,S

Individual, directed study for undergraduates. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

107. Ecology. W,S

Focuses on physiological, behavioral, and population ecology, and on linking ecological processes to evolution. It includes basic principles, experimental approaches, concepts of modeling, and applications to ecological problems. (Formerly Biology 150.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. (W) *B. Lyon*, (S) *B. Marinovic*

108. Marine Ecology. W

Paradigms and designs in marine ecology. A review of the paradigms that have shaped our understanding of marine ecology; analysis and discussion of experiments with these paradigms. Students cannot receive credit for this course and course 208. (Formerly Biology 160.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; BIOE 107 or 140 recommended. *M. Carr*

109. Evolution. F,W

An examination of the history and mechanisms of evolutionary change. Topics include molecular evolution, natural and sexual selection, adaptation, speciation, biogeography, and macroevolution. (Formerly Biology 175.) Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C, and BIOL 105. (F) *G. Pogson*, (W) *The Staff*

112. Ornithology. *

Introduction to the evolution, ecology, behavior, and natural history of birds, using exemplary case histories to illustrate key concepts in evolution, ecology, and behavior. (Formerly Biology 144.) Prerequisite(s): BIOE 107, BIOE 109, BIOE 140, ENVS 24 or ENVS 105. Concurrent enrollment in BIOE 112L is required. Enrollment limited to 20. *The Staff*

112L. Ornithology Field Studies (2 credits). *

Field trips introduce students to field identification skills and field investigation of census, foraging behavior, migration, social behavior, and communication. Examination of specimens in the laboratory will be used to highlight the diversity and taxonomy of birds. Students are billed a materials fee. Some field trips may require students to provide their own transportation. (Formerly Biology 144L.) Prerequisite(s): BIOE 107, BIOE 109,

BIOE 140, or ENVS 24 or 105. Concurrent enrollment in BIOE 112 is required. Enrollment limited to 20. Offered in alternate academic years. *The Staff*

114. Herpetology. *

Lectures introduce students to evolution, development, physiology, behavior, ecology, and life history of reptiles and amphibians. The materials integrate with conceptual and theoretical issues of ecology, evolution, physiology, and behavior. (Formerly Biology 143.) Prerequisite(s): BIOE 107, BIOE 109, BIOE 110, BIOE 140 or ENVS 105. Concurrent enrollment in BIOE 114L required. Enrollment limited to 25. Offered in alternate academic years. *B. Sinervo*

114L. Field Methods in Herpetological Research (2 credits). *

Field trips introduce students to natural history, censusing techniques, physiological ecology, and behavioral analysis of reptiles and amphibians. Laboratories introduce students to techniques for analyzing behavior and physiology. Field studies culminate with a group project in a natural setting. Some field trips may be held on weekends due to weather considerations. Some field trips may require students to provide their own transportation, some transportation will be provided by UCSC. Students are billed a materials fee. (Formerly Biology 143L.) Prerequisite(s): BIOE 107, 109, 110, 140 or ENVS 105. Concurrent enrollment in BIOE 114 is required. Offered in alternate academic years. *B. Sinervo*

117. Systematic Botany of Flowering Plants. S

An examination of the taxonomy and evolution of flowering plants. Special topics include phylogenetics and cladistics, plant species concepts, and modern methods of systematic research. (Formerly Biology 168.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; or ENVS 24. Must be taken concurrently with BIOE 117L. *The Staff*

117L. Systematic Botany of Flowering Plants Laboratory (2 credits). S

Weekly laboratory concerned primarily with California flora and plant families. Several field trips. Students are billed a materials fee. (Formerly Biology 168L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; or ENVS 24. Must be taken concurrently with BIOE 117. *The Staff*

120. Marine Botany. S

An introduction to the biology of marine algae, fungi, and angiosperms with regard to form and function. Major boreal, temperate, and tropical marine plant communities. Lecture format. (Formerly Biology 170.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. Must be taken concurrently with BIOE 120L. *The Staff*

120L. Marine Botany Laboratory (2 credits). S

One laboratory weekly and several field trips. Focuses on marine algae, fungi, and angiosperms. Students are billed a materials fee. (Formerly Biology 170L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. Must be taken concurrently with BIOE 120. Enrollment limited to 20. *The Staff*

122. Invertebrate Zoology. W

An examination of invertebrates and their habitats. Lecture format. (Formerly Biology 136.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 122L must be taken concurrently. Enrollment limited to 96. *B. Marinovic*

122L. Invertebrate Zoology Laboratory (2 credits). W

An examination of invertebrates and their habitats. Weekly laboratories or field trips. Students are billed a materials fee. (Formerly Biology 136L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 122 must be taken concurrently. Enrollment limited to 96. *B. Marimovic*

124. Marine Plankton. S

Review of morphology, systematics, and natural history of major marine planktonic taxa and evaluation of local plankton forms. Two lecture/lab sessions of three and one-half hours each, and two field trips during the quarter. (Formerly Biology 156.) (Also offered as Ocean Sciences 156. Students cannot receive credit for both courses.) Concurrent enrollment in BIOE 124L is required; one of the following recommended as preparation: OCEA 118, 142, or 242; or BIOE 120 or 122. Recommended for upper-division and graduate students. *M. Silver*

124L. Marine Plankton Laboratory (2 credits). S

Two lab meetings weekly. Concerned primarily with evaluation of local plankton forms. (Formerly Biology 156L.) (Also offered as Ocean Sciences 156L. Students cannot receive credit for both courses.) Concurrent enrollment in BIOE 124 is required; one of the following recommended as preparation: OCEA 118, 142, or 242; or BIOE 120, or 122. *M. Silver*

125. Marine Microbial Ecology. *

The study of marine bacteria and their role in the marine ecosystem. Emphasis on biochemistry and physiology in relation to metabolic activity and elemental cycles, trophic interactions, and flows of material and energy in marine food webs. Exams and term paper required. Students cannot receive credit for this course and Ocean Sciences 218. (Also offered as Ocean Sciences 118. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C, and CHEM 1C. *J. Zehr*

127. Ichthyology. *

An introduction to the biology of jawless, cartilaginous, and bony fishes—their classification, evolution, form, physiology, and ecology. (Formerly Biology 137.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 127L must be taken concurrently. Offered in alternate academic years. *G. Bernardi*

127L. Ichthyology Laboratory (2 credits). *

One laboratory session a week and several field trips to study the biology of fish. Students are billed a materials fee. (Formerly Biology 137L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 127 must be taken concurrently. Offered in alternate academic years. *G. Bernardi*

129. Biology of Marine Mammals. S

A survey of cetaceans, pinnipeds, sirenians, and sea otters, including natural history, systematics, physiology, behavior, anatomy, and conservation. (Formerly Biology 139.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; BIOL 110 is recommended. *D. Costa*

129L. Biology of Marine Mammals Laboratory (2 credits). S

Covers the basics of marine mammal taxonomy, anatomy, and field methods with an emphasis on local field identification and understanding of local species. Will include field trips to Long Marine Lab, Año Nuevo, and Monterey Bay. Students are billed a materials fee. (Formerly Biology 139L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. Must be taken concurrently with BIOE 129. *D. Costa*

131. Animal Physiology. W

Principles and concepts underlying the function of tissues and organ systems in animals with emphasis on vertebrate systems. Students cannot receive credit for this course and BIOL 130. (Formerly Biology 131.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. *The Staff*

131L. Animal Physiology Laboratory (2 credits). W

Experiments conducted with primary focus on quantitative physiological principles of organ systems and intact organisms. Students cannot receive credit for this course and course 130L. Students are billed a materials fee. (Formerly Biology 131L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. Concurrent enrollment in BIOE 131 is required. Enrollment limited to 25. *The Staff*

133. Exercise Physiology. *

An advanced-level course concerning physiological and biochemical processes associated with human performance. Emphasis is on the integration of organ systems for exercise. Topics include metabolism and fuel utilization, cardiovascular and respiratory dynamics during activity, and the effects of training. Requires a good understanding of basic physiological function and anatomy. Students cannot receive credit for this course and course 233. By interview; permission of instructor required. Must be taken concurrently with BIOE 133L. BIOE 131 recommended as preparation. (Formerly Biology 133.) Enrollment limited to 20. Offered in alternate academic years. *T. Williams*

133L. Exercise Physiology Laboratory (2 credits). *

An introduction to basic measurement techniques used in assessing the physiological response of humans to exercise. Sessions cover oxygen consumption, respiratory rate, and heart rate monitoring during aerobic and anaerobic activity. By interview; permission of instructor required; BIOE 131 recommended as preparation. Must be taken concurrently with BIOE 133. (Formerly Biology 133L.) Enrollment limited to 20. Offered in alternate academic years. *T. Williams*

135. Plant Physiology. S

Cellular and organismal functions important in the life of green plants. (Formerly Biology 166.) Prerequisite(s): BIOL 20A and BIOE 20B; BIOL 100 and BIOL 110 are highly recommended as preparation. *L. Goff*

140. Behavioral Ecology. F

An introduction to social and reproductive behavior. Emphasis on studies of vertebrates in their natural habitat. Ideas concerning the evolution of social behavior, mating systems, and individual reproductive strategies. Case histories of well-studied animals that illustrate key principles in courtship and mating, parental behavior, and food-getting behavior. (Formerly Biology 140.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. *The Staff*

141L. Behavioral Ecology Field Course. W

A field-based course introducing students to concepts and methods for studying behavioral ecology in nature. Students will conduct observations and field experiments on various local model organisms including elephant seals, hummingbirds, sparrows, lizards, ants, bees, frogs, and salamanders. Students are billed a materials fee. (Formerly Biology 145L.) Prerequisite(s): BIOE 107 or BIOE 140 or ENVS 105; satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 25. Offered in alternate academic years. (General Education Code(s): W.) *B. Sinervo, B. Lyon*

145. Plant Ecology. F

An exploration of the ecology of plant form, function, distribution, abundance, and diversity. Topics include plant adaptations to environmental conditions, life history variation, competition, reproductive ecology, herbivory, and patterns of diversity. Lecture with discussions of original papers and independent field project. Students cannot receive credit for this course and course 245. (Formerly Biology 169.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; or ENVS 24. BIOE 107 is recommended. Enrollment limited to 30. *I. Parker*

145L. Field Methods in Plant Ecology. F

Hands-on exploration of the concepts and techniques of plant ecology. A combination of lab, greenhouse, and field-based exercises (irrespective of weather conditions). Statistical analysis and scientific writing. One required weekend field trip. Students cannot receive credit for this course and course 245L. Students are billed a materials fee. (Formerly Biology 169L.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; BIOL 20A, BIOE 20B, and BIOE 20C; or ENVS 24. Concurrent enrollment in BIOE 145 is required. BIOE 107 is recommended. Enrollment limited to 30. (General Education Code(s): W.) *I. Parker*

147. Community Ecology. S

Develops the major themes of community biology: structure, trophic dynamics, succession, complex interactions among species, herbivory, evolution and coevolution. Uses case histories of well-studied marine and terrestrial systems. Students cannot receive credit for this course and course 247. (Formerly Biology 152.) Prerequisite(s): BIOE 107 or ENVS 24. Enrollment limited to 50. *L. Fox*

150. Ecological Field Methods. S

Lectures and laboratory computer exercises designed to familiarize students with research methods, study design, statistical approaches, and analysis tools for ecological research. Students cannot receive credit for this course and Environmental Studies 104A. (Formerly Biology 141.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; concurrent enrollment in BIOE 150L is required. BIOE 107, 108, 140, or 147 recommended. Enrollment limited to 25. *D. Croll*

150L. Ecological Field Methods Laboratory. S

Field-oriented course in the study of animal ecology and behavior. Combines overview of methodologies and approaches to field research with practical field studies. Students are billed a materials fee. (Formerly Biology 141L.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; concurrent enrollment in BIOE 150 is required. BIOE 107, 108, 140, or 147 recommended. Enrollment limited to 25. (General Education Code(s): W.) *D. Croll*

151A. Ecology and Conservation in Practice Supercourse: Ecological Field Methods. *

An intensive, on-site learning experience in terrestrial field ecology and conservation, using the University of California Natural Reserves. Students study advance concepts in ecology, conservation, and field methods for four weeks, then experience total immersion in field research at the UC Natural Reserves. Lectures, field experiments, and computer exercises familiarize students with research methods, study design, statistical approaches, and analytical tools for ecological research. Enrollment by application. Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C or ENVS 23, 24, 100; and AMS 7 and 7L. Concurrent enrollment in BIOE 151B-C-D or ENVS 109B-C-D is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course

*Not offered in 2008–10

and BIOE 107, 107L, ENVS 104A or 196A. (Formerly Biology 165A.) (Also offered as Environmental Studies 109A. Students cannot receive credit for both courses.) Enrollment limited to 25. *D. Croll, E. Zavaleta*

151B. Ecology and Conservation in Practice
Supercourse: Ecological Field Methods
Laboratory. *

Field-oriented course in ecological research. Combines overview of methodologies and approaches to field research with practical field studies. Students complete field projects in ecology and also learn the natural history of the flora and fauna of California. Students are billed a materials fee. Enrollment by application. Prerequisite(s): Entry Level Writing and Composition requirements; BIOL 20A, BIOE 20B, BIOE 20C or ENVS 23, 24, 100; and AMS 7 and 7L. Concurrent enrollment in BIOE 151A-C-D or ENVS 109A-C-D is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and BIOE 150, 150L, ENVS 104A or 196A. (Formerly Biology 165B.) (Also offered as Environmental Studies 109B. Students cannot receive credit for both courses.) Enrollment limited to 25. (General Education Code(s): W.) *D. Croll, E. Zavaleta*

151C. Ecology and Conservation in Practice
Supercourse: Functions and Processes of
Terrestrial Ecosystems. *

From lectures and discussion of terrestrial community and ecosystem ecology, students work individually or in small groups to present an idea for a project, review relevant literature, develop a research question/hypothesis, design and perform an experiment, collect and analyze data, and write a report. The instructor evaluates the feasibility of each student's project before it begins. Enrollment by application. Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C or ENVS 23, 24, 100; and AMS 7 and 7L. Concurrent enrollment in BIOE 151A-B-D or ENVS 109A-B-D is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and BIOE 150, 150L, ENVS 104A or 196A. (Formerly Biology 165C.) (Also offered as Environmental Studies 109C. Students cannot receive credit for both courses.) Enrollment limited to 25. *D. Croll, E. Zavaleta*

151D. Ecology and Conservation in Practice
Supercourse: Conservation in Practice. *

Focuses on current issues in environmental and conservation biology and the emerging field methods used to address them. From field-oriented lectures about current issues in environmental and conservation biology, students pursue research project as individuals and small groups to develop hands-on experience with field skills in conservation research and resource management. Enrollment by application. Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C or ENVS 23, 24, 100; and AMS 7 and 7L. Concurrent enrollment in BIOE 151A-B-C or ENVS 109A-B-C is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and BIOE 150, 150L, ENVS 104A or 196A. (Formerly Biology 165D.) (Also offered as Environmental Studies 109D. Students cannot receive credit for both courses.) Enrollment limited to 25. *D. Croll, E. Zavaleta*

155. Freshwater Ecology. F

Provides an overview of the physical, chemical, and biological processes that characterize inland waters such as lakes, streams, rivers, and wetlands. Also addresses re-

lationships between humans and freshwater, and discusses these challenges in conservation. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. *J. Moore*

158L. Marine Ecology Laboratory. *

Supervised individual research projects in experimental marine biology. Students carry out a complete research project, including (1) the formation of hypotheses; (2) the design and implementation of experiments; (3) collection, analysis, and interpretation of data; and (4) write-up of an oral presentation. Students are billed a materials fee. (Formerly Biology 160L.) Prerequisite(s): BIOE 108; satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 20. Offered in alternate academic years. (General Education Code(s): W.) *M. Carr, P. Raimondi*

159A. Marine Ecology Field Quarter: Marine
Ecology with Laboratory. F

Total immersion in marine ecology for very motivated students. Students develop a research project during first five weeks on campus and then spend five weeks of immersion in directed research without distraction in isolated locations off campus (past locations include the Gulf of California in Mexico and Moorea in French Polynesia). Not available through University Extension. No other courses may be taken during this quarter. Students must sign a contract agreeing to standards of behavior outlined in the UCSC Rule Book and by the instructors. Students are billed a materials, transportation (not airfare), and room and board fee. Paradigms and designs in marine ecology. A review of the paradigms that have shaped our understanding of marine ecology and analysis and discussion of experiments with these paradigms. Students carry out a complete research project, including the formation of hypotheses; the design and implementation of experiments; the collection, analysis, and interpretation of data; and the write-up and oral presentation of results. Admission by interview during previous winter quarter. BIOE 159A, 159B, 159C, and 159D are equivalent to BIOE 127, 127L, 108, and 158L for major requirements. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; BIOE 159A, 159B, 159C, and 159D must be taken concurrently. (Formerly Biology 162A.) Enrollment limited to 26. Offered in alternate academic years. (General Education Code(s): W.) *P. Raimondi*

159B. Marine Ecology Field Quarter:
Ichthyology with Laboratory. F

An introduction to the biology of jawless, cartilaginous, and bony fishes—their classification, evolution, form, physiology, and ecology. Admission by interview during previous winter quarter. BIOE 159A, 159B, 159C, and 159D are equivalent to BIOE 127, 127L, 108, and 158L for major requirements. BIOE 159A, 159B, 159C, and 159D must be taken concurrently. (Formerly Biology 162B.) Enrollment limited to 26. Offered in alternate academic years. *G. Bernardi*

159C. Marine Ecology Field Quarter: Methods in
Field Ecology. F

Students learn quantitative methods for field experiments and surveys. Emphasis will be on marine environments, but there will also be exposure to terrestrial systems. This is the lecture component to course 159D. No text is required for this course; instead, readings from the current literature will be assigned. Students are evaluated on written independent field project proposals and class participation. Admission by interview during previous winter quarter. BIOE 159A, 159B, 159C, and 159D are equivalent to BIOE 127, 127L, 108, and 158L for major requirements. BIOE 159A, 159B, 159C, and 159D

must be taken concurrently. (Formerly Biology 162C.) Enrollment limited to 26. Offered in alternate academic years. *P. Raimondi*

159D. Marine Ecology Field Quarter: Methods
in Field Ecology Laboratory. F

This is laboratory portion of course 159C. Students carry out independent field projects under the supervision of course instructors. All work is done during the 5-6 week off-campus portion of course 159. Students are evaluated on field techniques, the final write-up of their independent field projects, and class participation. Admission by interview during previous winter quarter. BIOE 159A, 159B, 159C, and 159D are equivalent to BIOE 127, 127L, 108, and 158L for major requirements. BIOE 159A, 159B, 159C, and 159D must be taken concurrently. (Formerly Biology 162D.) Enrollment limited to 26. Offered in alternate academic years. *G. Bernardi*

161. Kelp Forest Ecology. *

Study of organization of kelp forests as models for examining biological communities. The physical and biotic factors responsible for community organization of kelp forests are explored using original literature and data collected in BIOE 161L. Class meets one full morning each week. Prerequisite(s): by interview only; BIOL 20A, BIOE 20B, and BIOE 20C are required. Students must pass the University Research Diving Certification (contact the diving safety officer, Institute of Marine Sciences, for further information). Enrollment restricted to seniors. BIOE 161L must be taken concurrently; BIOE 107, 120/L, 122/L are recommended. (Formerly Biology 161.) Enrollment limited to 24. Offered in alternate academic years. *M. Carr, P. Raimondi*

161L. Kelp Forest Ecology Laboratory. *

Fieldwork using SCUBA to quantitatively and qualitatively examine the abundance and distribution of organisms in kelp forests, with additional laboratory work. Culminates with a directed individual research project. Class meets one full morning each week. Students are billed a materials fee. Admission by interview. Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; satisfaction of the Entry Level Writing and Composition requirements; BIOE 161 must be taken concurrently; BIOE 107, 120/L, 122/L are recommended. Students must pass the University Research Diving Certification (contact the Diving Safety Officer, Institute of Marine Sciences, for further information). (Formerly Biology 161L.) Enrollment limited to 24. Offered in alternate academic years. (General Education Code(s): W.) *M. Carr, P. Raimondi*

163. Ecology of Reefs, Mangroves, and
Seagrasses. W

Integrated treatment of coral reefs, sea grasses, and mangroves emphasizing interactions and processes through time. Major topics: biological and geological history, biogeography, evolution and ecology of dominant organisms, biodiversity, community and ecosystem ecology, geology, biogeochemistry, global change, human impacts. (Also offered as Ocean Sciences 157. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. *D. Potts*

165. Marine Conservation Biology. F

Initially undertakes an in-depth comparison of the biology and conservation of marine versus terrestrial ecosystems. With this foundation, course examines marine biodiversity loss resulting from overexploitation, habitat loss, species introduction, and pollution, with particular emphasis on the resulting trophic cascades, biodiversity losses, and climate change. Students cannot receive credit

for this course and Environmental Studies 120. (Formerly Biology 163.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; OCEA 101 recommended. *D. Croll*

168. Biological Oceanography. S

Biological description of sea, with emphasis on processes and patterns. Topics include microbial dynamics, phytoplankton and zooplankton production, and ecology of marine food webs. Emphasis placed on understanding how physical, chemical, and geological environment shapes biology and ecology of oceans, including such topics as harmful algal blooms, global estimates of productivity, and effects of humans on environment. Students may not receive credit for this course and Ocean Sciences 230. (Formerly Biology 159.) (Also offered as Ocean Sciences 130. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C; previous course in ocean sciences recommended. Enrollment restricted to juniors (with instructor approval), seniors, graduate students. *R. Kudela*

170. Molecular Ecology and Evolution.

An introduction to evolution at the molecular level. Topics include neutral theory of evolution, natural selection, molecular clocks, molecular phylogenetics, and biogeography. (Formerly Biology 176.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. Must be taken concurrently with BIOE 170L. Enrollment limited to 75. Offered in alternate academic years. *G. Bernardi*

170L. Molecular Ecology and Evolution Laboratory (2 credits).

One laboratory section per week that applies the theory developed in course 170 to computer and laboratory experiments. Students are billed a materials fee. (Formerly Biology 176.) Prerequisite(s): BIOL 20A, BIOE 20B, and BIOE 20C. BIOE 170 must be taken concurrently. Enrollment limited to 75. Offered in alternate academic years. *G. Bernardi*

172. Population Genetics. W

Basic population genetics and selected topics will be covered, including genetics of speciation, tempo and mode of evolution, genetics of social behavior, natural selection in human populations, and the impact of molecular studies on evolutionary theory. Students cannot receive credit for this course and course 272. (Formerly Biology 107.) Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C, and BIOL 105. Concurrent enrollment in BIOE 172L is required. Offered in alternate academic years. *G. Pogson*

172L. Population Genetics Laboratory (2 credits). W

A companion course to 172, *Population Genetics*, that applies the theory developed in that course to related disciplines including conservation biology, ecology, agriculture, and population biology. Original scientific literature relating to the theory developed in course 172 is read, and applied problem sets are solved by the students. Students cannot receive credit for this course and course 272L. (Formerly Biology 107L.) Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C, and BIOL 105. Concurrent enrollment in BIOE 172 is required. Offered in alternate academic years. *G. Pogson*

183F. Undergraduate Research in Ecology and Evolutionary Biology (2 credits). F,W,S

Supervised undergraduate research on a project with an ecology and evolutionary biology faculty member for students considering a career based on biological research. Class reviews the philosophy of science, basic statistics, and library searches, and emphasizes how to input data, create graphs, and prepare results for publication, posters,

and talks. (Formerly Biology 183F) Enrollment restricted to junior and senior EEB majors conducting research project with EEB faculty member. *The Staff*

183L. Undergraduate Research in Ecology and Evolutionary Biology. F,W,S

Supervised undergraduate research on a project with an ecology and evolutionary biology faculty member for students considering a career based on biological research. Class reviews the philosophy of science, basic statistics, and library searches, and emphasizes how to input data, create graphs, and prepare results for publication, posters, and talks. (Formerly Biology 183L.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; enrollment restricted to junior and senior EEB majors conducting research project with EEB faculty member. (General Education Code(s): W.) *The Staff*

188. Supervised Teaching and Writing in Biology Courses. W,S

Teaching, writing, and the teaching of writing in associated survey level biology courses. Topics include teaching scientific writing, styles, techniques, research, analysis, and guiding peer reviews, in addition to evaluating, critiquing, and developing written assignments in conjunction with teaching responsibilities. Prerequisite(s): satisfaction of the Entry Level Writing requirement. Application required. Enrollment restricted to junior and senior upper-division qualified students meeting application requirements. (Formerly Biology 188A.) (General Education Code(s): W.) *J. Thompson*

195. Senior Thesis. F,W,S

An individually supervised course, with emphasis on independent research, to culminate in a senior thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Provides for individual programs of study (a) by means other than the usual supervision in person, or (b) when the student is doing all or most of the course work off campus. With permission of the department, may be repeated for credit, or two or three courses taken concurrently. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for two units of independent field study (a) by means other than the usual supervision in person, or (b) when the student is doing all or most of the course work off campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Reading, discussion, written reports, and laboratory research on selected biological topics, using facilities normally available on campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Two-unit Tutorial. Reading, discussion, written reports, and laboratory research on selected biological topics, using facilities normally available on campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200A. Scientific Skills. F

Exposes graduate students to teaching skills, understanding the scientific method, searching and organizing literature, grant proposal and scientific writing, data management and presentation, and scientific speaking. Stu-

dents are evaluated on their participation and the quality of a written research proposal. (Formerly Biology 250A.) Enrollment restricted to graduate students. *M. Carr*

200B. Advanced Organismal Biology. F

Consists of lectures focusing on pivotal topics in ecology and evolution. Relevant background material is developed followed by a critical analysis of readings from the primary literature. Designed to give graduate (and advanced undergraduate) students direct contact with the major areas of research that are currently at the forefront of organismal biology. (Formerly Biology 250B.) Enrollment restricted to graduate students. *The Staff*

208. Marine Ecology. W

Paradigms and designs in marine ecology. A review of the paradigms that have shaped our understanding of marine ecology; analysis and discussion of experiments with these paradigms. Students cannot receive credit for this course and course 108. (Formerly Biology 260.) Enrollment restricted to graduate students. *M. Carr*

233. Exercise Physiology. *

Physiological and biochemical processes associated with human performance. Students are expected to be familiar with basic organ physiology, biochemistry, and human anatomy. Focuses on bioenergetics and fuel utilization, cardiovascular and respiratory dynamics during activity, and the effects of training, age, and disease on exercise. Laboratory sessions incorporated into study sections. Students cannot receive credit for this course and course 133. Prerequisite(s): by interview; BIOE 131 or 132 recommended as preparation. Enrollment restricted to graduate students. (Formerly Biology 233.) Enrollment limited to 20. Offered in alternate academic years. *T. Williams*

245. Plant Ecology. F

An exploration of the ecology of plant form, function, distribution, abundance, and diversity. Topics include plant adaptations to environmental conditions, life history variation, competition, reproductive ecology, herbivory, and patterns of diversity. Lecture with discussions of original papers and independent field project. Students cannot receive credit for this course and course 145. (Formerly Biology 269.) Prerequisite(s): BIOE 107 or ENV5 24 or permission of instructor. Concurrent enrollment in BIOE 245L is required except by permission of instructor. Enrollment restricted to graduate students. *I. Parker*

245L. Field Methods in Plant Ecology Laboratory. F

Hands-on exploration of the concepts and techniques of plant ecology. A combination of lab, greenhouse, and field-based exercises (irrespective of weather conditions), statistical analysis, and scientific writing. One required weekend field trip. Students cannot receive credit for this course and course 145. (Formerly Biology 269L.) Concurrent enrollment in BIOE 245 is required. Enrollment restricted to graduate students. Enrollment limited to 2. *I. Parker*

247. Community Ecology. S

Develops the major themes of community ecology: structure, trophic dynamics, succession, complex interactions among species, herbivory, evolution, and coevolution. Uses case histories of well-studied marine and terrestrial systems. Students cannot receive credit for this course and course 147. (Formerly Biology 252.) Enrollment restricted to graduate students. *L. Fox*

258L. Experimental Marine Ecology. S

Supervised individual research projects in experimental marine biology. Students carry out a complete research project, including (1) the formation of hypotheses, (2) the design and implementation of experiments, (3) col-

*Not offered in 2008-10

lection, analysis, and interpretation of data, and (4) the write-up of an oral presentation. Prerequisite(s): BIOE 208; and interview to assess ability to carry out field project. (Formerly Biology 260L.) Enrollment limited to 20. Offered in alternate academic years. *M. Carr, P. Raimondi*

272. Population Genetics. *

Basic population genetics and selected topics are covered including genetics of speciation, tempo and mode of evolution, genetics of social behavior, natural selection in human populations, and the impact of molecular studies on evolutionary theory. Students cannot receive credit for this course and Biology 172. (Formerly Biology 207.) Concurrent enrollment in BIOE 272L is required. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Pogson*

272L. Population Genetics Laboratory (2 credits). *

A companion course to 272, Population Genetics, that applies the theory developed in that course to related disciplines including conservation biology, ecology, agriculture, and population biology. Original scientific literature relating to the theory developed in course 272 is read, and applied problem sets are solved by the students. Students cannot receive credit for this course and course 172L. (Formerly Biology 207L.) Must be taken concurrently with BIOE 272. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Pogson*

274. Evolutionary Game Theory. *

Reviews static equilibrium concepts, games of incomplete information, and the traditional theory of dynamic games in discrete time. Develops recent evolutionary game models, including replicator and best reply dynamics, and applications to economics, computer science, and biology. Prerequisite(s): upper-division math courses in probability theory are strongly recommended. (Formerly Biology 274.) (Also offered as Computer Science 272 and Economics 272. Students cannot receive credit for both courses.) *M. Warmuth, B. Sinervo, D. Friedman*

279. Evolutionary Ecology. W

Analysis of the ways in which ongoing evolution and coevolution shape the ecological structure and dynamics of populations, species, and species interactions across geographic landscapes. (Formerly Biology 279.) Enrollment restricted to graduate students. *J. Thompson*

281A. Topics in Basic and Applied Marine Ecology. F,W,S

Seminar focusing on concepts in basic and applied ecology. Structure rotates quarterly between graduate student research and readings of journal articles and textbooks. (Formerly Biology 281A.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. *M. Carr*

281B. Topics in Molecular Evolution (2 credits). F,W,S

A discussion of current research and literature review on the subject of molecular evolution. Primary focus on recent results on molecular phylogenetics and molecular population genetics. (Formerly Biology 281B.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *G. Bernardi*

281C. Topics in Physiological Ecology. F,W,S

An intensive seminar focusing on the interaction between physiological constraint and life history options and solutions employed by animals. Topics vary from comparative physiology to ecological theory. Participants are required

to present results of their own research or review papers of interest. (Formerly Biology 281C.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *D. Costa*

281F. Ecological Research Topics. F,W,S

Intensive research and discussions on plant-animal interactions. All students undertake a research project and meet weekly with the faculty sponsor to monitor progress. The group meets weekly to discuss experimental design and analysis, specific problems related to the students' research, relevant research papers, or manuscripts that the group members are writing. Each student gives a formal presentation of research plans or progress each quarter. (Formerly Biology 281F.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *L. Fox*

281J. Topics in Research on Biochemical Ecology. F,W,S

Seminar in which students give critically evaluated presentations regarding current research on selected topics in plant ecology with an emphasis on biochemical ecology. (Formerly Biology 281J.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 12. May be repeated for credit. *J. Langenheim*

281L. Topics in Behavioral and Evolutionary Ecology. F,W,S

An intensive seminar on selected topics in behavioral and evolutionary ecology. Students are expected to discuss the current literature and present literature reviews, research proposals, and preliminary results from their ongoing research. (Formerly Biology 281L.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. *B. Lyon*

281M. Freshwater Ecology (2 credits). W,S

Seminar focusing on the ecology of freshwaters. Discussion focuses on recent literature or on student presentations of their own research. (Formerly Biology 281M.) Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. May be repeated for credit. *J. Moore*

281N. Topics in Marine Vertebrate Ecology. F,W,S

Seminar on the ecology of marine vertebrates. Topics vary from the factors that explain the distribution of marine predators to island biogeography and the ecosystem effects of introduced vertebrates on islands. (Formerly Biology 281N.) Enrollment restricted to graduate students. Enrollment limited to 12. May be repeated for credit. *D. Croll*

281P. Topics in Plant Population Ecology. F,W,S

An intensive seminar on selected topics in plant ecology and population biology. Students present results from their own research and discuss recent advances from the literature. (Formerly Biology 281P.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission from instructor. Enrollment limited to 12. May be repeated for credit. *I. Parker*

281Q. Topics in Molecular Evolutionary Genetics. F,W,S

An intensive seminar on selected topics in molecular evolutionary genetics. Students are required to present results from their own research projects, present a critical review paper at least once during the quarter, and submit

a written research proposal. (Formerly Biology 281Q.) Enrollment restricted to graduate students; qualified undergraduate students may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *G. Pogson*

281R. Topics in Marine Ecology and Evolutionary Biology. F,W,S

An intensive seminar series focusing on fundamental concepts in marine ecology. Emphasis changes quarter to quarter. At least one quarter per year is devoted to discussion of graduate student research. Other quarters involve reading and evaluating current and classic literature on marine ecology and evolutionary biology. (Formerly Biology 281R.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *P. Raimondi*

281T. Species Interactions and Coevolution. F,W,S

The genetics and ecological structure of species interactions, and the role of coevolution between species in shaping biodiversity. (Formerly Biology 281T.) Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *J. Thompson*

281U. Topics in Invertebrate Biology. F,W,S

An intensive study about concepts, theory, and techniques for graduate students conducting research on the ecology, genetics, evolution, systematics, or biodiversity of marine invertebrates. (Formerly Biology 281U.) Enrollment restricted to graduate students; advanced undergraduates may enroll with permission of instructor. Enrollment limited to 15. May be repeated for credit. *D. Potts*

281V. Topics in Behavioral Ecology. F,W,S

A discussion of current topics and methods in behavioral ecology and life history evolution. (Formerly Biology 281V.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *B. Sinervo*

281W. Topics in Exercise and Environmental Physiology. F,W,S

A weekly seminar discussion on current research and techniques in mammalian exercise and environmental physiology. Areas covered include locomotor physiology, exercise testing and cardiovascular monitoring, and biomechanics. Oral presentation of ongoing research or current literature required from each student. (Formerly Biology 281W.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *T. Williams*

286. Experimental Design and Data Analysis. W

Focuses on problems and designs in ecology and population biology. Topics include basic experimental design; exploratory data analysis—from a graphical perspective; hands-on statistics; and graphical theory. Structured around a statistical analysis and graphics computer program to teach students to design their own surveys and experiments and analyze their data correctly. Students cannot receive credit for this course and course 186. (Formerly Biology 286.) Prerequisite(s): one course in statistics or by permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. *P. Raimondi*

286L. Experimental Design and Data Analysis Lab (2 credits). W

Required lab that accompanies Biology 286. Lab will focus on hands-on statistical problem solving, graphical presentations and experimental design issues. (Formerly

Biology 286.) Concurrent enrollment in course 286 is required. Enrollment restricted to graduate students. Enrollment limited to 20. *P. Raimondi*

293. Readings in Ecology and Evolution (2 credits). W,S

Weekly readings and discussions of recent research papers in ecology, evolution, and related topics from organismal biology. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

294. Ecology, Evolutionary Biology Seminar (no credit). F,W,S

Selected topics of current interest to ecologists and evolutionary biologists presented by weekly guest speakers. (Formerly Biology 294.) Enrollment restricted to graduate students. *The Staff*

295. Advanced Ecology and Evolutionary Biology Seminar (no credit). F,W,S

Course consists of extended weekly meetings organized around an advanced theme in theoretical or applied evolutionary biology, ecology, physiology, behavior, or other aspect of organismal biology. Course is targeted at students who already have reached a professional level of expertise in their field and advanced master students. (Formerly Biology 295.) Enrollment restricted to graduate students. Enrollment limited to 24. *The Staff*

297. Independent Study. F,W,S

Independent study for graduate students who have not yet settled on a research area for their thesis. Students submit petition to sponsoring agency. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. *The Staff*

Molecular, Cell, and Developmental Biology

Molecular, Cell, and Developmental Biology
225 Sinsheimer Laboratories
(831) 459-4986
<http://www.mcd.ucsc.edu/>

Faculty and Professional Interests

MANUEL ARES JR.

RNA processing, structure and function of RNA

NEEDHI BHALLA

Meiotic chromosome dynamics

HANNS H. BOEGER

Chromatin structure and the regulation of transcription

BARRY BOWMAN

Membrane biochemistry and genetics, biochemistry and molecular biology of membrane proteins

BIN CHEN

Mammalian brain development

DAVID FELDHEIM

Developmental neuroscience

GRANT HARTZOG

Biochemistry, genetics, chromatin and transcriptional regulation

LINDSAY HINCK

Neurobiology, cell biology, development

MELISSA JURICA

Structural analysis of ribonucleoprotein macromolecules

ROHINTON T. KAMAKAKA

Gene repression and insulators

DOUGLAS R. KELLOGG

Coordination of cell growth and cell division

ROBERT A. LUDWIG

Plant-microbe interactions, photorespiration, genetic recombination in plants

HARRY F. NOLLER

Ribosomes, RNA structure and function, RNA-protein interaction

MICHAEL REXACH

Structure and function of nuclear pore complex, nuclear transport

JEREMY SANFORD

Genomic Analysis of Protein-RNA interactions

WILLIAM M. SAXTON

Cytoskeletal motors and active transport processes

SUSAN STROME

*Chromatin and RNA regulation in *C. elegans**

WILLIAM T. SULLIVAN

*Genetics, cell biology, development of the *Drosophila* embryo*

JOHN W. TAMKUN

*Transcriptional regulation, molecular genetics of *Drosophila* development, regulation of gene expression*

ALAN M. ZAHLER

Molecular biology, splice site selection, and alternative pre-mRNA processing

MARTHA C. ZÚÑIGA

Molecular, cellular, and developmental biology of the immune system

YI ZUO

Glia-synapse interaction and synaptic plasticity in vivo

Molecular, Cell, and Developmental Biology Emeritus Faculty

CHARLES DANIEL

ROBERT EDGAR

JERRY F. FELDMAN

HENRY HILGARD

KIVIE MOLDAVE

CLIFTON A. POODRY

LINCOLN TAIZ

FRANK J. TALAMANTES

HOWARD H. WANG

Molecular, Cell, and Developmental Biology Lecturers

MICHAEL DALBEY

JEREMY LEE

LINDA OGREN

MARY ZAVANELLI



CAMILLA FORSBERG (Biomolecular Engineering)

DAVID HAUSSLER (Biomolecular Engineering)

SCOTT LOKEY (Chemistry and Biochemistry)

Organic chemistry; combinatorial synthesis, biotechnology, molecular cell biology

TODD M. LOWE (Biomolecular Engineering)

Experimental and computation genomics, ncRNA gene finders, DNA microarrays to study the biology of Archaea

KAREN OTTEMANN (Environmental Toxicology)

Environmental responses of pathogenic bacteria

SETH RUBIN (Chemistry and Biochemistry)

Biomolecular mechanisms of cell-cycle regulation and cancer; structural biology and biochemistry; macromolecular x-ray crystallography; nuclear magnetic resonance

WILLIAM G. SCOTT (Chemistry and Biochemistry)

Structure and function of RNA, proteins, and their complexes

FITNAT YILDIZ (Environmental Toxicology)

*Microbiology, molecular genetics, genomics; the mechanism of persistence of survival of *Vibrio cholerae**

Graduate Program Description

The program in molecular, cell, and developmental (MCD) biology (courses BIOL) leads to either the Ph.D. or the M.A. and is designed to prepare students for careers in research, teaching, and biotechnology. Current research in MCD biology focuses on such topics as the structure and function of RNA, gene expression, signaling, cell division, development, and pathogenesis. A unique focus of the department is the center for the molecular biology of RNA.

Degree Requirements

Ph.D. and master's students complete the graduate core courses, BIOL 200A, 200B, and 200C, in the first year. Additional undergraduate courses required to strengthen the student's background may be assigned by the advisory committee during the initial advising meeting. Typically, these courses are Biochemistry 100A and BIOL 115. Students are required to participate in lab research meetings and departmental seminar series every quarter.

First-year Ph.D. students complete three 10-week laboratory rotations. Students choose their rotation laboratories in consultation with the Graduate Advisory Committee. The lab rotations give students a chance to learn about the diverse fields and methods of inquiry and to interact with members of the department. At the end of each quarter, students present a short talk to the department on their rotation project. At the end of spring quarter, students consult with rotation faculty to identify a permanent thesis laboratory.

Second-year Ph.D. students are required to submit two proposals—one on their proposed thesis work and a second on an unrelated MCDB research topic. The Ph.D. qualifying exam, taken in spring quarter of the second year, is an oral examination before a committee comprised of three internal reviewers and one external reviewer.

Once the qualifying exam is passed, students, in conjunction with their faculty adviser, select a committee to consult with in the development of their thesis. This committee monitors the student's progress and ultimately approves the final draft of the student's dissertation. The student must meet with the thesis committee at least once a year after passing the qualifying exam.

Students are advanced to candidacy following presentation of their research to the department in a seminar. This takes place no later than spring of the third year. Graduate students must take two approved advanced graduate electives. Students who enter the Ph.D. program with a master's degree without doing rotations must complete an additional two approved graduate elective courses.

Ph.D. Requirements

- completion of the graduate core course
- completion of the *Practice of Science* course
- completion of an oral qualifying exam
- completion of an advancement to candidacy seminar
- completion of two advanced graduate elective courses
- yearly meetings with a thesis committee after the qualifying exam
- completion of two quarters of service as a teaching assistant
- completion of thesis research resulting in a dissertation of individual work
- presentation of thesis defense in departmental seminar

M.A. Requirements

- acceptance to the master's program requires a faculty sponsor. Interested applicants must contact faculty directly and procure sponsorship before beginning the application process.
- completion of the graduate core course
- completion of the *Practice of Science* course
- write a master's thesis based on original research
- presentation of thesis defense in departmental seminar

Lower-Division Courses**15. Undergraduate Research Reports (1 credit). F,W,S**

Undergraduate students who work in faculty research laboratories present the results of their projects. Organized by the Minority Undergraduate Research Program and the Minority Access to Research Careers Program. Designed for students with membership in the above-mentioned programs. Prerequisite(s): qualifications as determined by instructor at first class meeting. May be repeated for credit. (S) *A. Zahler*, (FW) *B. Bowman*

20A. Cell and Molecular Biology. F,W,S

Introduction to molecular biology, cell physiology, and genetics. Students cannot receive credit for this course and course 21A. Prerequisite(s): CHEM 1B; completion of biology placement exam recommended, <http://biosci.ucsc.edu/bioplacex.html>; enrollment restricted to first-year students, sophomores, and juniors. (General Education Code(s): IN.) *The Staff*

20L. Experimental Biology Laboratory (2 credits). F,W,S

Provides biology majors with the theory and practice of experimental biology. A wide range of concepts and techniques used in the modern laboratory are included in the exercises. Designed to satisfy the introductory biology lab requirement of many medical and professional schools. Students are billed a materials fee. Prerequisite(s): BIOL 20A and previous or concurrent enrollment in BIOE 20B. Enrollment restricted to health sciences and biochemistry and molecular biology majors; other majors by permission. Enrollment limited to 20. *The Staff*

21L. Environmental Phage Genomics Laboratory (2 credits). F,W,S

Introduction to hypothesis-driven laboratory research. Students isolate and characterize both the structure and genome of a unique bacteriophage. Students gain experi-

ence in basic sterile technique, solution, manipulation of DNA, and bioinformatic analysis of a new genome. Enrollment restricted to first-year students and sophomores. Enrollment by online application and permission of instructor. Enrollment limited to 14. May be repeated for credit. *G. Hartzog, M. Ares*

80A. Female Physiology and Gynecology. F,S

Biochemical, medical, social, and clinical aspects of the female body. Emphasis will be on biological-chemical interactions in the female organs. Topics include female anatomy, cell physiology, endocrine functions, sexuality and intimacy, sexually transmitted diseases, puberty, pregnancy, menopause, birth control, abortion, immunity, cancer. (General Education Code(s): T2-Natural Sciences.) *M. Zavanelli*

80E. Evolution. *

Introduction to Darwinian evolution including how the theory was devised and a discussion of other theories proposed at the time. Explores the facts and evidence of evolutionary processes and the insights they provide in biological diversity, consequences of extinction, and emergence of new diseases. Includes a discussion of evolution and spirituality. (General Education Code(s): T2-Natural Sciences.) *M. Zavanelli*

80H. The Human Genome. F,S

Course will focus on understanding human genes. Accessible to non-science majors. Will cover principles of human inheritance and techniques used in gene analysis. The evolutionary, social, ethical, and legal issues associated with knowledge of the human genome will be discussed. (Also offered as Biomolecular Engineering 80H. Students cannot receive credit for both courses.) (General Education Code(s): T2-Natural Sciences.) *The Staff, M. Ares, W. Rothwell*

80J. Biology of AIDS. W

An overview of the biology of the acquired immunodeficiency syndrome (AIDS) and the social and legal issues that surround it are explored in a series of lectures by biology faculty and experts in the field. (General Education Code(s): T2-Natural Sciences.) *M. Zavanelli*

80R. Introduction to Philosophy of Biology. *

Introduction to core philosophical issues in the biological sciences. Covers such conceptual issues as the nature of evolutionary theory; choosing the unit of selection; the relationship between evolution and development; whether all biological phenomena are reducible to genes; and the definition of adaptations, and how to identify them. (Also offered as Philosophy 80R. Students cannot receive credit for both courses.) (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *The Staff*

89. Clinical Health Care: Organization and Financing. F

Introduces students to the principles of health care organizations, including how they are paid for, and examines social constructions of health care in the U.S. Key concepts include access, quality of care, and cultural competence; also features hands-on research. Recommended for health science majors and community studies majors focusing on health. Cannot receive credit for this course and course 89W. (General Education Code(s): IS.) *A. Steiner*

89W. Clinical Health Care: Organization and Financing. *

Introduces students to the principles of health care organizations, including how they are paid for, and examines social constructions of health care in the U.S. Key concepts include access, quality of care, and cultural com-

petence; also features hands-on research. Recommended for health science majors and community studies majors focusing on health. Students cannot receive credit for this course and course 89. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; enrollment by permission of instructor at first class meeting. Enrollment limited to 25. (General Education Code(s): IS, W.) *A. Steiner*

Upper-Division Courses**100. Biochemistry. F,S**

An introduction to biochemistry including biochemical molecules, protein structure and function, membranes, bioenergetics, and regulation of biosynthesis. Provides students with basic essentials of modern biochemistry and the background needed for upper-division biology courses. Students who plan to do advanced work in biochemistry and molecular biology should take the Biochemistry and Molecular Biology 100 series directly. Students cannot receive credit for this course after they have completed any two courses from the Biochemistry and Molecular Biology 100A, 100B, and 100C sequence with grades of Pass, C, or better. Prerequisite(s): BIOL 20A and BIOE 20B; and CHEM 108A or 112A. (F) *B. Bowman*, (S) *M. Dalbey*

100L. Biochemistry Laboratory. F

Basic techniques and principles of laboratory biochemistry including isolation and characterization of a natural product, manipulation of proteins and nucleic acids to demonstrate basic physical and chemical properties; and characterization of enzyme substrate interactions. Students are billed a materials fee. Prerequisite(s): previous or concurrent enrollment in BIOL 100; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. Enrollment limited to 20. (General Education Code(s): W.) *The Staff*

105. Genetics. F,W,S

Mendelian and molecular genetics; mechanisms of heredity, mutation, recombination, and gene action. Prerequisite(s): BIOL 20A. (F) *R. Kamakaka*, (W) *M. Dalbey*, (S) *S. Strome*

105L. Eukaryotic Genetics Laboratory. F,W,S

Classical and newly developed molecular-genetic techniques used to explore genetic variation in wild populations of the fruit fly *Drosophila melanogaster*. Topics include Mendelian fundamentals, mapping, design of genetic screens, bio-informatic and database analysis, genetic enhancers, and population genetics. Students are billed a materials fee. Prerequisite(s): BIOL 105; BIOL 100 or BIOC 100A recommended; satisfaction of Entry Level Writing and Composition Requirements. Enrollment restricted to biological sciences and affiliated majors non-majors by permission of instructor. (General Education Code(s): W.) *J. Lee*

105M. Microbial Genetics Laboratory. *

Exploration of basic genetic processes such as replication, mutation, DNA repair, recombination, gene exchange, population genetics, and evolution using microbial model organisms; classic techniques in microbial genetics and contemporary molecular techniques presented. Students are billed a materials fee. Prerequisite: BIOL 105; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors; other majors by permission of instructor. Enrollment limited to 16. (General Education Code(s): W.) *M. Dalbey*

109L. Yeast Molecular Genetics Laboratory. F

The powerful genetic and molecular techniques available for yeast combined with the complete genomic DNA sequence offers opportunity for discovery of fundamental aspects of eukaryotic life. Lab providing practical experience in using yeast as an experimental system. Students are billed a materials fee. Prerequisite(s): BIOL 105; BIOL 115 strongly recommended; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. Enrollment limited to 15. (General Education Code(s): W.) *R. Kamakaka*

110. Cell Biology. F,S

Covers the structure, organization, and function of eukaryotic cells. Topics include biological membranes, organelles, protein and vesicular trafficking, cellular interactions, the cytoskeleton, and signal transduction. Requires a good understanding of basic biochemistry and molecular biology. Prerequisite(s): BIOL 100 or BIOC 100A. (F) *L. Hinck*, (S) *M. Rexach*

110L. Cell Biology Laboratory. W

Fundamental aspects of cell biology explored through experimentation in a modern laboratory setting. Research topics include the structure and function of biological membranes; intracellular transport and organelle biogenesis; the cell cycle; and the cytoskeleton. Students are billed a materials fee. Prerequisite(s): BIOL 100 or BIOC 100A; previous or concurrent enrollment in course 110; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission. Enrollment limited to 16. (General Education Code(s): W.) *M. Rexach*

111. Immunology. W

Immune systems—their manifestations and mechanisms of action. Prerequisite(s): BIOL 20A, BIOE 20B, BIOL 105, and BIOL 110. *M. Zuñiga*

111L. Immunology Laboratory. S

Techniques of current immunology applicable to both cellular and humoral mechanisms. (Formerly course 123L.) Students are billed a materials fee. Prerequisite(s): BIOL 111. Enrollment restricted to biological sciences and affiliated majors. *M. Zuñiga*

113. Mammalian Endocrinology. S

Introduction to the major endocrine organs, their hormones, and their receptors. Emphasis is on the following topics: structural analysis of the hormones and receptors at the protein and molecular level, regulation of expression of hormones and their receptors, and the biological functions of hormones. Prerequisite(s): BIOL 100 or BIOC 100A. *L. Ogren*

114. Cancer Cell Biology. S

Focuses on the molecular and cellular mechanisms behind cancer. Topics covered include oncogenes, tumor suppressor genes, cell growth genes, checkpoint genes, telomeres, and apoptosis. Students will gain experience in reading the primary scientific literature. Prerequisite(s): BIOL 110 or 115. *A. Zahler*

115. Eukaryotic Molecular Biology. W,S

Covers eukaryotic gene and genome organization; DNA, RNA, and protein synthesis; regulation of gene expression; chromosome structure and organization; and the application of recombinant DNA technology to the study of these topics. Prerequisite(s): BIOL 100 or BIOC 100A, and BIOL 105. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. (W) *M. Jurica*, (S) *H. Boeger*

115L. Eukaryotic Molecular Biology Laboratory. W,S

A laboratory designed to provide students with direct training in basic molecular techniques. Each laboratory is a separate module which together builds to allow cloning, isolation, and identification of a nucleic acid sequence from scratch. Students cannot receive credit for this course and course 187L or 287L. Students are billed a materials fee. Prerequisite(s): BIOL 100 or BIOC 100A; previous or concurrent enrollment in course 115; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission. Enrollment limited to 20. (General Education Code(s): W.) *M. Zavanelli*

118. Biology of Disease. W

Primary objective is to provide an understanding of disease processes in humans. Integrates normal physiology and pathophysiology with the molecular and physiological bases of diseases. Major emphasis on the physiological, molecular, and biochemical basis of diseases, with particular emphasis on the neuromuscular, cardiovascular, respiratory, renal, immune, and central nervous systems. Also addresses environmental risk factors in the etiology of diseases. Overviews provided, but covers selective topics considered most important in depth. (Also offered as Microbiology and Environmental Toxicology 138. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A and BIOE 20B or equivalent and BIOL 110. BIOL 130 is recommended. Offered in alternate academic years. *M. Camps*

119. Microbiology. F,W

Cell and molecular biology of bacteria and their viruses, including applications in medicine, public health, agriculture, and biotechnology. Prerequisite(s): BIOL 100 or BIOC 100A. (F) *C. Salnikov*, (W) *F. Yildiz*

119L. Microbiology Laboratory. F,W,S

An introduction to the principles and practices of laboratory microbiology, with a substantial presentation of optical microscopy. Students are billed a materials fee. Prerequisite(s): previous or concurrent enrollment in BIOL 119 is required; satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. (General Education Code(s): W.) *The Staff*

120. Development. W

A description and analysis of selected developmental events in the life cycle of animals. Experimental approaches to understanding mechanisms are emphasized. Prerequisite(s): BIOL 100 or BIOC 100A, and BIOL 105. *J. Lee*

120L. Development Laboratory. W

Experimental studies of animal development using a variety of locally obtainable organisms. Approximately eight hours weekly, but it will often be necessary to monitor continuing experiments throughout the week. Previous or concurrent enrollment in course 120 required. Students are billed a materials fee. Prerequisite(s): BIOL 100 or BIOC 100A and BIOL 110. Previous or concurrent enrollment in BIOL 120 required. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. *J. Lee*

122. Cellular and Organismal Toxicology. W

Emphases of biochemical, cellular, and organ system basis of intoxication, including dose-response relationships, biotransformation of toxicants, biochemical mechanisms underlying toxicity, factors influencing toxic action, and

biomarkers of exposure. Emphasizes effects of various classes of toxins, including heavy metals and persistent synthetic organics, with a focus on susceptible biochemical/cellular processes of the central nervous, immune, hepatic, and renal target organ systems. Designed for advanced undergraduates. Students cannot receive credit for this course and course 202. (Also offered as Microbiology and Environmental Toxicology 102. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A, BIOE 20B or equivalent; BIOL 100 and 110 are recommended. Enrollment restricted to juniors and seniors. *The Staff*

125. Introduction to Neuroscience. F

The structure and function of the nervous system. Topics include elementary electrical principles, biophysics and physiology of single nerve and muscle cells, signal transduction at synapses, development of the nervous system, and neural basis of behavior. Requires a good understanding of basic biochemistry, cell biology, and molecular biology. Prerequisite(s): BIOL 100. Concurrent enrollment in BIOL 105 or 110 is encouraged. *B. Chen*

126. Advanced Molecular Neuroscience. W

Explores in detail cellular and molecular events that underlay the function of the nervous system. Topics include neural development, axon guidance and regeneration, advanced electrical principles (synaptic transmission through a variety of receptors), synaptic plasticity, learning and memory, as well as several neural disorders. Prerequisite(s): BIOL 125. *Y. Zuo*

127. Mechanisms of Neurodegenerative Disease. S

Focuses on cellular and molecular processes that underlie neurodegenerative diseases. Includes lectures, student oral presentations, discussions, a term paper, and exams. Prerequisite(s): BIOL 105 and 125. *W. Saxton*

130. Human Physiology. F,W

Function, organization, and regulation of the major organ systems of humans, with emphasis on integration among systems. Students cannot receive credit for this course and course 131. Prerequisite(s): BIOL 20A, BIOE 20B, BIOL 100, and BIOL 110. *L. Ogren*

130L. Human Physiology Laboratory (2 credits). F,W

Examines fundamental principles of systemic physiology focusing on the human. Students cannot receive credit for this course and course 131L. Students are billed a materials fee. (General Education Code(s): W satisfied by taking this course and course 189.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; BIOL 20A, BIOE 20B, BIOL100, and BIOL 110. Previous or concurrent enrollment in BIOL130 is required. Enrollment restricted to biological sciences and affiliated majors. *L. Ogren*

135. Human Functional Anatomy. S

Study of structure and function of the human body through lectures with an evolutionary perspective including regional anatomy and body systems. Students cannot receive credit for this course and Anthropology 207. (Also offered as Anthropology 107. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A and BIOE 20B; or ANTH 1. Concurrent enrollment in BIOL 135L is required. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. *N. Dominy*

135L. Human Functional Anatomy Laboratory. S

Study of structure and function of the human body using dissection, comparative vertebrate anatomy, anatomical models, and computer-assisted instruction. Students are

billed a \$60.00 materials fee. Students cannot receive credit for this course and Anthropology 207L. (Also offered as Anthropology 107L. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A and BIOE 20B. Concurrent enrollment in BIOL 135 is required. Enrollment restricted to biological sciences and affiliated majors, non-majors by permission of instructor. Enrollment limited to 20. *N. Dominy*

178. Stem Cell Biology. W

Basic concepts, experimental approaches, and therapeutic potential are discussed. Students gain experience in reading the primary scientific literature. (Also offered as Biomolecular Engineering 178. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 110; BIOL 115 recommended. *C. Forsberg*

179. Biotechnology and Drug Development. W

Recommended for students interested in careers in the biopharmaceutical industry. Focuses on recombinant DNA technology and the drug-development process, including discovery research; preclinical testing; clinical trials; and regulatory review, as well as manufacturing and production considerations. Students may not receive credit for this course and Biomolecular Engineering 255. (Also offered as Biomolecular Engineering 155. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A and BIOL 100 or BIOC 100A. Enrollment limited to 15. *P. Berman*

180. Research Programming for Biologists and Biochemists. W

No programming experience required, but basic computer skills assumed. Students without prior programming experience taught basic proficiency in Perl, BioPerl, and other Perl libraries needed to analyze, transform, and publish biological data. Students required to solve a research problem as a final project. Lectures and labs are shared with Biomolecular Engineering 60. Students cannot receive credit for this course and Biomolecular Engineering 60. (Also offered as Biomolecular Engineering 160. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A or BIOL 21A. Concurrent enrollment in BIOL 180L is required. *J. Stuart*

180L. Research Programming for Biologists and Biochemists Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 160. One two-hour laboratory per week. Students cannot receive credit for this course and Biomolecular Engineering 60L. (Also offered as Biomolecular Engineering 160L. Students cannot receive credit for both courses.) Prerequisite(s): BIOL 20A or BIOL 21A. Concurrent enrollment in BIOL 180 is required. *J. Stuart*

181. Computational Biology Tools. W,S

Hands-on laboratory geared to teach basic tools used in computational biology (motif searching, primer selection, sequence comparison, multiple sequence alignment, genefinders, phylogenetics analysis, X-ray crystallography software). Web- and Unix-based tools/databases are used. Open to all science students; no prior Unix experience required. (Also offered as Biomolecular Engineering 110. Students cannot receive credit for both courses.) Prerequisite(s): BIOE 20B and CHEM 1C. Enrollment limited to 25. *D. Gerloff*

186F. Undergraduate Research in MCD Biology (2 credits). F,W,S

Supervised undergraduate research in laboratory of an MCD biology faculty member accompanied by weekly lectures on ethical and practical scientific issues. Topics include laboratory safety; the scientific method; the collection, treatment, and presentation of data; critical

evaluation of scientific literature; scientific misconduct; and peer review. Career issues, including how to apply for admission to graduate and professional schools, also discussed. Prerequisite(s): BIOL 20A and BIOE 20B; at least one of BIOL 100, BIOL 105, or BIOC 100A; and permission of instructor. May be repeated for credit. *The Staff*

186L. Undergraduate Research in MCD Biology. F,W,S

Supervised undergraduate research in laboratory of an MCD biology faculty member accompanied by weekly lectures on ethical and practical scientific issues. Topics include laboratory safety; the scientific method; the collection, treatment, and presentation of data; critical evaluation of scientific literature; scientific misconduct; and peer review. Career issues, including how to apply for admission to graduate and professional schools, also discussed. Prerequisite(s): satisfaction of the Entry-Level Writing and Composition requirements; courses BIOL 20A and BIOE 20B; at least one of BIOL 100, BIOL 105, or BIOC 100A; and permission of instructor. (General Education Code(s): W.) *The Staff*

187L. Molecular Biotechnology Laboratory. F

An intensive molecular biology laboratory that presents procedures used in molecular and biotechnology research. Topics and procedures include DNA/RNA isolation, cloning and library construction, southern and northern hybridization, DNA fingerprinting, PCR, manual and automated sequencing, and computer methods for analyzing molecular data. New procedures currently being developed in biotechnology industries are presented by industry representatives. Students cannot receive credit for this course and BIOL 116L or BIOL 287L. Students are billed a materials fee. Prerequisite(s): BIOL 20A, BIOE 20B, BIOE 20C, BIOL 100, and BIOL 110. Enrollment limited to 20. *M. Zavanelli*

189. Health Sciences Internship. F,W,S

Structured off-campus learning experience providing hands-on experience and pre-professional mentoring in a variety of health-related settings. Interns are trained and supervised by a professional at their placement and receive academic guidance from their faculty sponsor. Students spend 10–12 hours per week at their placement, participate in weekly discussion meetings on campus, keep a reflective journal, and submit a final paper. Prerequisite(s): BIOL 20L; satisfaction of the Entry Level Writing and Composition requirements; students interview with health sciences internship coordinator; applications are due one quarter in advance to the Health Sciences Internship Office. Enrollment restricted to health sciences majors. (General Education Code(s): W satisfied by taking this course and BIOL 130L.) (W) *M. Zuniga*, (FS) *G. Hartzog*

189F. Health Sciences Internship (2 credits). F,W,S

Structured off-campus learning experience providing hands-on experience and pre-professional mentoring in a variety of health-related settings. Interns are trained and supervised by a professional at their placement, and receive academic guidance from their faculty sponsor. Students spend six hours per week at their placement, keep a reflective journal, and submit a final paper. Prerequisite(s): BIOL 20L; students interview with health sciences internship coordinator. Applications due one quarter in advance to the Health Sciences Internship Office. May be repeated for credit. *J. Tamkun*, *G. Hartzog*

190. Senior Seminar (2 credits). S

Satisfies the senior exit requirement for all biological sciences majors. *The Staff*

191. Teaching College Biology. F,W,S

Course designed to provide undergraduates at the upper-division level with an opportunity to participate in planning and teaching college-level biology. May not be repeated for credit. *The Staff*

195. Senior Thesis Research. F,W,S

An individually supervised course, with emphasis on independent research, to culminate in a senior thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Provides for individual programs of study (a) by means other than the usual supervision in person, or (b) when the student is doing all or most of the course work off campus. With permission of the department, may be repeated for credit, or two or three courses taken concurrently. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for two units of independent field study (a) by means other than the usual supervision in person, or (b) when the student is doing all or most of the course work off campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Reading, discussion, written reports, and laboratory research on selected biological topics, using facilities normally available on campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Two-unit Tutorial. Reading, discussion, written reports, and laboratory research on selected biological topics, using facilities normally available on campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200A. Critical Analysis of Genetics and Molecular Biology. F

An analysis of selected topics in the primary research literature including conditional lethality, classical fine structure genetics, the coding problem, control of operon expression, phage lambda, and developmental genetics. Enrollment by permission of instructor. (Formerly *Advanced Genetics*) Enrollment restricted to graduate students. *W. Saxton*

200B. Advanced Molecular Biology. W

An in-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins. Discussion of the roles of macromolecules in the regulation of information in the cell. Prerequisite(s): BIOL 200A. Enrollment restricted to graduate students. *The Staff*

200C. Advanced Cell Biology. S

An in-depth coverage of topics in cellular and subcellular organization, structure, and function in plants and animals. Emphasis on current research problems. Prerequisite(s): BIOL 200B. Enrollment restricted to graduate students. *D. Kellogg*

201. RNA Processing. *

An advanced graduate-level course on biological aspects of RNA function and processing in eukaryotes. Lectures and discussions will be developed using the current literature. Prerequisite(s): BIOL 200B or permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Ares*

202. Cellular and Organismal Toxicology. *

Emphasizes biochemical, cellular, and organ system basis of intoxication, including dose-response relationships, biotransformation of toxicants, biochemical mechanisms underlying toxicity, factors influencing toxic action, and biomarkers of exposure. Emphasizes effects of various classes of toxins, including heavy metals and persistent synthetic organics, with a focus on susceptible biochemical/cellular processes of the central nervous, immune, hepatic, and renal target organ systems. Students cannot receive credit for this course and Microbiology and Environmental Toxicology 102 or BIOL 122. (Also offered as Environmental Toxicology 202. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *D. Smith*

203. Ribosomes and Translation. *

Covers the field of ribosome research in depth, including the structure and function of ribosomes and the molecular mechanisms of protein synthesis. Begins with historical review of the ribosome field and proceeds to the most recent findings. Focus is on central questions: (1) How is the accuracy of the aminoacyl-tRNA selection determined? (2) What is "accommodation"? (3) What is the mechanism of peptide bond formation (peptidyl transferase)? (4) What is the mechanism of translocation? (5) What are the mechanistic roles of the ribosome and translation factor EF-G in translocation? (6) To what extent is the mechanism of translation determined by RNA? (7) Why is RNA so well suited for the ribosome? (8) How did translation evolve from an RNA world? Prerequisite(s): BIOC 100A, BIOL 200B or permission of instructor. Enrollment restricted to graduate students. *H. Noller*

204. Chromatin. *

Eukaryotic DNA is complexed with histones to form chromatin. This course focuses on the ways in which chromatin influences and is manipulated to regulate gene expression. Prerequisite(s): BIOL 105 and BIOL 115; undergrads by permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 15. Offered in alternate academic years. *J. Tamkun, G. Hartzog*

205. Epigenetics. S

In-depth coverage of epigenetics focusing on how alterations in chromatin structure and DNA methylation establish and maintain heritable states of gene expression. Lectures are supplemented with critical discussion of recent publications. Prerequisite(s): BIOL 105 and BIOL 115, or permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. *S. Strome, J. Tamkun*

206. Introduction to Stem Cell Biology. *

Fundamental issues and experimental approaches of stem cell biology research. Course divides into three sections: basic principles, experimental approaches, and emerging areas of research. Topics covered include stem cell self-renewal and differentiation, the microenvironment, epigenetics, cell cycle regulation, as well as how basic research translates to medical therapeutics. Enrollment restricted to graduate students. *W. Sullivan*

206L. Current Protocols in Stem Cell Biology. S

Provides students with hands-on experience in embryonic stem cell culture methods. Enrollment restricted to graduate students; qualified undergraduates may enroll by permission of instructor. Enrollment limited to 10. *D. Feldheim*

208. Cellular Signaling Mechanisms. *

All eukaryotic cells utilize intricate signaling pathways to control such diverse events as cell-cell communication, cell division, and changes in cell morphology. This course covers the molecular basis of these cellular signaling pathways, focusing on the most current research. Prerequisite(s): BIOL 105, BIOL 110, and BIOL 115. Enrollment restricted to seniors and graduate students. Enrollment limited to 15. Offered in alternate academic years. *D. Kellogg*

210. Experimental Systems Biology. F

Topics include, but are not limited to, microarray production techniques, experimental strategies using microarrays, extraction and analysis of microarray data, DNA and protein arrays, SNP analysis, gene expression analysis, materials analysis, and advanced analysis of data using bioinformatic techniques. (Formerly *Application and Analysis of Microarrays*.) (Also offered as Biomolecular Engineering 210. Students cannot receive credit for both courses.) Enrollment limited to graduate students; undergraduates may enroll with permission of instructor. *The Staff*

214. Cancer Cell Biology. S

Focuses on molecular and cellular mechanisms behind cancer. Topics include oncogenes, tumor suppressor genes, cell growth genes, checkpoint genes, telomeres, and apoptosis. Students gain experience in understanding the cutting edge of cancer drug design and formulate their own proposals for applying molecular and cellular biological techniques toward cancer diagnosis and treatment. Enrollment restricted to graduate students. Enrollment limited to 10. *A. Zabler*

226. Advanced Molecular Neuroscience. S

Basis of neural behavior at the cellular, molecular and system levels. First half of course focuses on cellular, molecular, and developmental aspects of the nervous system and covers two sensory systems: olfaction and auditory. Last half of course concerns higher-level functions of the nervous system, such as processing and integrating information. Discusses human diseases and disorders. Enrollment restricted to graduate students. *Y. Zuo*

280A. Topics in Research on Molecular Genetics of Yeast (2 credits). F,W,S

Intensive research seminar on the structure and function of the gene expression machinery in the simple eukaryote *Saccharomyces cerevisiae* and its relationship to the human gene expression machinery. Enrollment restricted to graduate students; qualified undergraduates may enroll with approval of instructor. May be repeated for credit. *M. Ares*

280B. Chromatin Structure and Transcriptional Regulation (2 credits). F,W,S

Weekly seminar on structure and gene regulatory function of chromatin. Discusses research of participants and relevant scientific literature. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *H. Boeger*

280C. Mammalian Brain Development (2 credits). F,W,S

Seminar covers research into the development of the mammalian brain. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *B. Chen*

280D. RNA Processing (2 credits). F,W,S

A discussion of current research and literature concerning the regulation of precursor messenger RNA processing.

Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *A. Zabler*

280E. Meiotic Chromosome Dynamics (2 credits). F,W,S

Intensive course on the molecular mechanisms underlying homolog pairing, synapses, and recombination; and how they are regulated, coordinated, and monitored to ensure accurate meiotic chromosome segregation. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. May be repeated for credit. *N. Bhalla*

280F. Development of Vertebrate Neural Connections (2 credits). F,W,S

Intensive research seminar on molecular mechanisms by which neural connections are established during mouse development. Special focus on topographic maps and role of Eph receptors and ephrins in this process. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *D. Feldheim*

280H. Topics on Research into Chromatin and Transcription (2 credits). F,W,S

Seminar covering research into the effects of chromatin on transcription in yeast. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *G. Hartzog*

280I. Epigenetic Gene Silencing and Insulators (2 credits). F,W,S

Intensive course on molecular mechanisms by which insulator elements regulate epigenetic gene silencing. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *R. Kamakaka*

280J. Structures of Macromolecular Complexes (2 credits). F,W,S

Focuses on structure and function of the spliceosome using electron microscopy and x-ray crystallography. Participants present results from their own research and relevant journal articles. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit. *M. Jurica*

280K. Topics in Cell Cycle Research (2 credits). F,W,S

An intensive seminar focusing on current research on the molecular mechanisms that control cell division. Participants are required to present results of their own research or to review journal articles of interest. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. *D. Kellogg*

280L. Topics on Neural Development (2 credits). F,W,S

Seminar covering research into the development of the embryonic nervous system. Enrollment restricted to graduate students. Enrollment limited to 12. May be repeated for credit. *L. Hinck*

280N. Structure and Function of Ribosomes (2 credits). F,W,S

An intensive and advanced course focusing on the structure and function of ribosomes. Participants present research findings in an organized, critical fashion, in the context of current research literature in the ribosome field. Enrollment restricted to graduate students; quali-

fied undergraduate students may enroll with permission of the instructor. Enrollment limited to 20. May be repeated for credit. *H. Noller*

280O. Topics in Bacterial Pathogenesis (2 credits). F,W,S

Intensive seminar focusing on mechanisms of bacterial pathogenesis of the ulcer-causing bacterium *Helicobacter pylori*. Participants are required to present results from their own research and relevant journal articles. (Also offered as Microbiology and Environmental Toxicology 281O. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit. *K. Ottemann*

280Q. Cell Biology of Oocytes, Embryos, and Neurons (2 credits). F,W,S

Weekly seminar and round-table discussion about research problems and recent advances in molecular motor proteins, cytoskeletons, and the control of force-producing processes. Each participant reports recent advances in their field from current literature, their own primary research questions, current approaches to answering those questions, and their research progress. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *W. Saxton*

280R. Structure and Function of the Nuclear Pore Complex (2 credits). F,W,S

Intensive and advanced course focusing on structure and function of the nuclear pore complex. Participants present research findings in an organized critical fashion in the context of current research literature in the nucleocytoplasmic transport field. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *M. Rexach*

280S. Chromatin and RNA Regulation in *C. elegans* (2 credits). F,W,S

Intensive research seminar about regulators of chromatin organization; the composition and function of germ granules; and the roles of both levels of regulation in germline development in *C. elegans*. Participants present their research results and report on related journal articles. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *S. Strome*

280T. Molecular Biology of *Drosophila* Development (2 credits). F,W,S

An intensive seminar concerning the molecular genetics of *Drosophila*. Recent research is discussed weekly, with an emphasis on gene regulation and development. Students present their own research or critical reviews of recent articles at least once during the quarter. Enrollment restricted to graduate students. Qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *J. Tamkun*

280U. Discussions on the Development of the *Drosophila* Embryo (2 credits). F,W,S

Involves a two-hour weekly meeting in which the students discuss topics concerning the cell cycle, early embryonic development, and the cytoskeleton. These discussions critically evaluate ongoing research in this area. Material is drawn from student research and recently published journal articles. Students are also expected to meet individually with the instructor two hours weekly. In addition to a three-five page research proposal, each student gives two one-hour oral presentations. Enrollment restricted to

graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *W. Sullivan*

280W. Membrane Proteins (2 credits). F,W,S

Seminar on recent research on membrane proteins, with an emphasis on ion-pumping ATPase. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit. *B. Bowman*

280Y. Activity-Dependent Synaptic Plasticity (2 credits). F,W,S

Research seminar covering the regulation of synaptic plasticity in the mammalian nervous system, focusing on how the activity regulates the structural and functional dynamics of synapses. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *Y. Zuo*

288. Stem Cell Research: Scientific, Ethical, Social, and Legal Issues. *

Scientific, ethical, social, and legal dimensions of human embryonic stem-cell research, including the moral status of the embryo; the concept of respect for life; ethical constraints on oocyte procurement; creation of embryonic chimeras; federal policies; and political realities. (Also offered as Biomolecular Engineering 247. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *E. Suckiel*

289. Practice of Science. W

Examination of ethical and practical scientific issues, including the collection and treatment of data, attribution of credit, plagiarism, fraud, and peer review. Career issues, including how to apply for grants and positions in industry or academia, will be discussed. Prerequisite(s): BIOL 200A, BIOL 200B, and BIOL 200C or permission of instructor. Enrollment restricted to graduate students; undergraduates may enroll with permission of the instructor. Enrollment limited to 20. *The Staff*

291. Molecular, Cellular, and Developmental Biology Seminar (2 credits). F,W,S

Topics of current interest in molecular, cellular, and developmental biology are presented weekly by graduate students, faculty, and guest speakers. Enrollment restricted to graduate students. Enrollment limited to 60. May be repeated for credit. *The Staff*

292. MCD Seminar (no credit). F,W,S

Various topics by weekly guest speakers. Enrollment restricted to graduate students. *The Staff*

296. Laboratory Research in Molecular, Cell, and Developmental Biology. F,W,S

Independent laboratory research in molecular, cellular, and developmental biology. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Independent study for graduate students who have not yet settled on a research area for their thesis. Students submit petition to sponsoring agency. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. *The Staff*

British Literature

Students wishing to pursue a course of study in British literature should consult the English-language literatures concentration in national/transnational literatures under Literature, page 337.

Business Management Economics

Students wishing to pursue a course of study in business management economics should consult the business management economics major under Economics, page 186.

Chemistry and Biochemistry

230 Physical Sciences Building
(831) 459-4125
<http://chemistry.ucsc.edu>

Faculty and Professional Interests

Professor

ROGER W. ANDERSON

Experiments and theory for low temperature, light-activated chemical vapor deposition, achromatic focusing of molecules with external electric fields, discrete orthogonal polynomials in molecular collision theory, fractal geometry structural measures for large molecules

FRANK C. ANDREWS, Emeritus

ILAN BENJAMIN

Theoretical chemistry, molecular dynamics of chemical reactions in liquids and at interfaces

CLAUDE F. BERNASCONI

Kinetic studies of fast reactions, organic reaction mechanisms, acid-base catalysis, proton transfers, nucleophilic reactions, organometallic reactions, ab initio molecular orbital calculations

ROBERTO A. BOGOMOLNI

Biophysical chemistry, photobiology, light energy conversion and signal transduction in biological systems
Joseph F. Bunnett, Emeritus

PHILIP O. CREWS

Marine natural products chemistry, bioorganic chemistry, organic structural analysis by NMR, natural products of marine macro- and microorganisms

ÓLÖF EINARSDÓTTIR

Time-resolved spectroscopy, biophysics and bioenergetics, heme-copper oxidases, electron transfer, proton translocation

THEODORE R. HOLMAN

Biochemistry and bioinorganic chemistry; lipoxigenase enzymology, protein engineering, inhibitor discovery, computer inhibitor design, mass spectroscopy, electron paramagnetic resonance

DAVID S. KLIGER

Time-resolved laser spectroscopy, biophysics, studies of visual transduction, protein function, and protein folding

JOSEPH P. KONOPELSKI

Synthetic organic chemistry; heterocyclic chemistry, bioorganic chemistry

PRADIP MASCHARAK

Bioinorganic chemistry, design of antitumor drugs, modeling of active sites of metalloenzymes, design of catalysts for hydrocarbon oxidation, studies on intermediates in

non-heme oxygenase chemistry, design of NO-donors for photodynamic therapy

GLENN L. MILLHAUSER

Electron spin resonance; nuclear magnetic resonance, melanocortin receptor signaling, agouti proteins, prions, peptide synthesis

THOMAS W. SCHLEICH

Biomedical magnetic resonance spectroscopy, magnetic resonance imaging, nuclear magnetic resonance spectroscopy, biophysical chemistry

BAKTHAN SINGARAM

Organic synthesis, organoborane chemistry, heterocyclic chemistry, organometallic chemistry, asymmetric synthesis, biosensors, and natural products chemistry

EUGENE SWITKES

Quantum theory applied to problems in chemistry and biochemistry; visual information processing, spatial vision, color vision

STANLEY M. WILLIAMSON, Emeritus

W. TODD WIPKE, Emeritus

JIN Z. ZHANG

Design, synthesis, characterization, and application of nanomaterials, including semiconductor and metal nanoparticles; femtosecond laser spectroscopy; ultrafast dynamics on surfaces and at interfaces; cancer biomarker detection; surface-enhanced Raman spectroscopy

Associate Professor

REBECCA BRASLAU

Synthetic organic chemistry: new synthetic methodologies using free radicals; nitroxides, nitroxide mediated "living" polymerizations: design preparation and functionalization of tailored polymers for biomedical and general applications in nanotechnology

SHAOWEI CHEN

Synthesis, characterization, and manipulation of novel functional nanomaterials (metals and semiconductors); their long-range ordered assemblies and related nanoscale electron transfer; applications in fuel cells, photovoltaics, and electronic devices

SCOTT R. OLIVER

Inorganic materials: nanoporous crystal structures for environmental cleanup and catalysis; polymer templating of macroporous inorganics for solar cells and biomaterials; thin films for sensors and nanofabrication

WILLIAM G. SCOTT

Structure and function of RNA, proteins, and their complexes, origin of life

Assistant Professor

YAT LI

Experimental physical chemistry, materials chemistry, nanomaterials, nanoscale photonics and electronics, energy conversion

ROGER G. LININGTON

Marine natural products; drugs for neglected diseases; chemical biology; chemical probes

ROBERT S. LOKEY

Organic chemistry; combinatorial synthesis, biotechnology, molecular cell biology

SETH M. RUBIN

Biomolecular mechanisms of cell-cycle regulation and cancer; structural biology and biochemistry; macromolecular x-ray crystallography; nuclear magnetic resonance

MICHAEL STONE

Molecular basis of telomere length and telomerase-related diseases; biophysical characterization of nucleic acid-associated molecular motors; and development of novel approaches for imaging enzymes in cells

Lecturer

DANIEL PALLEROS

Affiliate

DAVID W. DEAMER, Professor Emeritus (recalled)



Professor

KENNETH W. BRULAND (Ocean Sciences)

Chemical oceanography, biogeochemistry of trace metals and radionuclides, aquatic chemistry, geochemistry

A. RUSSELL FLEGAL (Microbiology and Environmental Toxicology)

Anthropogenic perturbations of biogeochemical cycles, applications of isotopic tracers in anthropology and archaeology

DONALD R. SMITH (Microbiology and Environmental Toxicology)

Neurotoxicity, cellular and organismal responses to environmental toxins

Assistant Adjunct Professor

CAROL ROHL (Biomolecular Engineering)

Protein design, protein structure and function prediction; protein-protein interactions

Program Description

Chemistry is central to modern science and, ultimately, most phenomena in biology, medicine, geology, and the environmental sciences can be described in terms of the chemical and physical behavior of atoms and molecules. Because of the wide appeal and utility of chemistry, UCSC offers many lower-division courses, differing in emphasis and style, to meet diverse needs. Students should also note the numerous upper-division course offerings and select those most suitable to their academic interests. The curriculum in chemistry exposes the student to the principal areas of modern chemistry, including organic, inorganic, physical, analytical, and biochemistry. The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor of arts or bachelor of science degree, as well as those who wish to go on for an advanced degree. The UCSC chemistry B.A. or B.S. graduate is well prepared to pursue a career in chemistry or an allied field.

Research in chemistry at UCSC is closely interwoven with graduate and undergraduate education. The chemistry and biochemistry program is active at the graduate level, and faculty also encourage undergraduates to become involved in research. Research is done for academic credit in Chemistry 180A-B-C, *Senior Research*; or in Chemistry 199, *Tutorial*. There are also opportunities for interdisciplinary research spanning, for example, chemistry/physics, chemistry/geology, chemistry/oceanography, chemistry/biology, chemistry/computer science, and chemistry/microbiology and environmental toxicology. At UCSC, it is not uncommon for students to see their own original work published in research journals.

Chemistry and biochemistry faculty and approximately 100 graduate students and 30 postdoctoral fellows are housed in the Physical Sciences Building

near the Science Library. Standard and specialized spectrophotometric equipment, a number of instruments devoted to structural studies, instrumentation for specialized analytical purposes, and computer facilities used in studies of structure and reactivity are all available. The Science Library has an excellent collection of current journals, in print and electronic form, and reference works, as well as earlier volumes of all the major journals. Additional source material can be readily and rapidly obtained on interlibrary loan.

A degree in chemistry opens the door to a wide variety of academic careers. Some UCSC graduates are working as researchers in industry in areas such as electronic materials, biotechnology, medicinal chemistry, or laser technology. Others have entered government service, as research chemists in the Food and Drug Administration, the Environmental Protection Agency, or law enforcement crime laboratories. Fields such as patent law, commercial development, and scientific writing are open to graduates. Many chemistry majors go on to university graduate programs across the nation to prepare for careers in research, teaching, or a combination of the two. The degree in chemistry also provides a strong disciplinary background in preparation for a career in the important and much needed area of science teaching in high school. A major in chemistry is also an excellent beginning for one of the many opportunities in the health sciences.

The UCSC Chemistry and Biochemistry Department offers both B.S. and B.A. degree programs. The B.S. program has more requirements, and a student in this program earns a degree that meets the requirements of an American Chemical Society certified program. The B.S. degree should be the choice if a student is interested in getting a job in chemistry immediately after receiving their college degree. The B.S. program also provides a good background for graduate work in chemistry. The B.A. program has fewer requirements and should be considered by students who wish to take more science courses outside of chemistry to enter an interdisciplinary area. Examples might be chemical oceanography, geochemistry, chemical physics, environmental chemistry, and health sciences. The B.A. might also be a good choice for students who wish to become high school teachers. However, for either degree, the courses stress the fundamentals of chemistry and allow students to pursue independent research.

Opportunities for Nonmajors

In addition to its regular course offerings for majors, the Chemistry and Biochemistry Department offers courses for the nonmajor. These include 80H, *Introduction to Wines and Wine Chemistry*. These courses are taught by chemistry faculty and are designed to present various aspects of chemical science to the nonmajor. A minor in chemistry is also offered for those who wish to have a strong complementary program in chemistry while majoring in another course of study.

Requirements for the Chemistry B.A. Degree

The requirements for the bachelor of arts in chemistry have been kept to a minimum so that students may tailor their program to their own purposes, for example, to pursue a double major, to study areas of the humanities or social sciences, to complete major requirements late in their college career, or to concentrate study in a specific branch of chemistry. The minimum requirements (including prerequisites) constitute 54 percent of a student's total undergraduate program; consequently, there is ample time to explore and discover other inter-

ests within the university. To plan wisely, students are advised to refer to each course description for a detailed listing of prerequisites. Students who decide they want a professional career in chemistry are advised to meet with the chemistry undergraduate staff adviser.

Lower-Division Requirements

Chemistry 1A, 1B/M and 1C/N

Mathematics 11A-B and 22; or Mathematics 19A-B and 22

Physics 5A/L, 5B/M, and 5C/N; or 6A/L, 6B/M, and 6C/N

Upper-Division Requirements

Chemistry 108A/L and 108B/M; or 112A/L, 112B/M, and 112C/N

Chemistry 151A/L, 163A, 163B, 164A, 164B, and one of the following: 146A, 146B, 146C. (Students currently conducting senior thesis research are required to choose an advanced lab in the Chemistry 146 series that is outside their research area.)

Elective(s). At least two if 108A/L and 108B/M are taken; or at least one from the following list if 112A/L, 112B/M, and 112C/N are taken:

Chemistry 103 (can be used as elective only if Biochemistry and Molecular Biology 100A, 100B, and 100C are not taken as electives)

Chemistry 122, 143, 151B, 156C, 163C, and graduate-level lecture courses in chemistry

Biochemistry and Molecular Biology 100A, 100B, 100C

Computer Science 12A or 5C, or Biomolecular Engineering 60

Microbiology and Environmental Toxicology 101, or 102

Ocean Sciences 120 or 220

Physics 110A-B, 116A-B-C

Comprehensive Requirement. The Comprehensive Requirement is a part of all UCSC degrees. In the Department of Chemistry and Biochemistry, there are two options for satisfying this requirement:

- **Senior thesis.** A senior research project based on original experimental or theoretical research (Chemistry 180A-B-C). At the conclusion of the project, the student submits a satisfactory formal research paper to the faculty sponsor. Students arrange for a faculty sponsor by consulting with a relevant faculty member within the chemistry or the biochemistry and molecular biology major program. In some cases, faculty outside these major programs (for example, in biology, ocean sciences, microbiology and environmental toxicology, or Earth sciences) may be an appropriate sponsor. Students who select a sponsor outside the chemistry or the biochemistry and molecular biology major programs should have the title and description of the proposed thesis reviewed by the undergraduate adviser in the Department of Chemistry and Biochemistry. Students, usually working in the laboratory of the faculty sponsor, acquire experimental and/or theoretical research experience and skills in the laboratory as well as instruction in the writing of a research paper. Students are expected to make satisfactory academic progress and be in good academic standing while they take 180 courses. Students who achieve excellence in both research and thesis may be awarded honors in the Senior Comprehensive Requirement upon graduation.

- **Senior essay.** An essay based on literature research (Chemistry 199). After agreeing in advance on an appropriate topic of interest and a format, the student submits a satisfactory essay on the topic. Students arrange for a faculty sponsor by consulting with a relevant faculty member within the chemistry or the biochemistry and molecular biology major program. In some cases, faculty outside these major programs (for example, in biology, ocean sciences, microbiology and environmental toxicology, or Earth sciences) may be an appropriate sponsor. Students who select a sponsor outside the chemistry or the biochemistry and molecular biology major programs should have the title and description of the proposed essay reviewed by the undergraduate adviser in the Department of Chemistry and Biochemistry. Students acquire experience and skills in scientific literature research as well as in the writing of a research paper.

Chemistry Major B.A. Planner

The following is the recommended academic plan for students to complete for the B.A. degree.

Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A	Chem 1B/M Math 11B	Chem 1C/N Math 22
2nd (soph)	Chem 112A/L or Chem 108A/L Phys 6A/L	Chem 112B/M or Chem 108B/M or Chem 108A/L Phys 6B/M	Chem 112C/N 108B/M Phys 6C/N
3rd (jr)	Chem 163A Chem 164A	Chem 163B Chem 164B	Chem 151A/L Chem 146
4th (sr)	Chem 164A Chem elective*	Chem 164B Chem elective	

* Two electives required if 108 series taken; one elective required if 112 series taken

Requirements for the Chemistry B.S. Degree

The bachelor of science major program is designed for students who intend to pursue a professional career in chemistry. It is rigorous and broadly based, appropriate for that purpose. The course requirements for the B.S. major are as follows; please refer to each course description for a detailed listing of prerequisites.

Lower-Division Requirements

Chemistry 1A, 1B/M, and 1C/N

Mathematics 19A-B and Mathematics 22; or Mathematics 11A-B and Mathematics 22, and either Applied Mathematics and Statistics 27/L, or Mathematics 21, or Mathematics 24

Physics 5A/L, 5B/M, and 5C/N; or 6A/L, 6B/M, and 6C/N

Upper-Division Requirements

Chemistry 112A/L, 112B/M, and 112C/N; or 108A/L, 108B/M, and 143

Chemistry 103

Chemistry 151A/L, 163A, 163B, 163C, 164A, 164B, and one of the following: 146A, 146B, 146C. (Students currently conducting senior thesis research are required to choose an advanced lab in the Chemistry 146 series that is outside their research area.)

Electives. At least two from the following list (to receive certification from the American Chemical Society, you must complete Chemistry 122 as one of the two electives)

Chemistry 122, 143 (if not taken for the organic chemistry requirement), 151B, graduate-level lecture courses in chemistry (5 credits or two 3-credit lecture courses)

Biochemistry and Molecular Biology 100A, 100B, 100C (can substitute for Chemistry 103)

Microbiology and Environmental Toxicology 101 or 102

Ocean Sciences 120 or 220

Physics 110A-B, 116A-B-C

Comprehensive Requirement: Same as for the B.A. (see above)

B.S. Degree with Biochemistry Emphasis. The biochemistry pathway is designed for students who intend to pursue a career in biochemistry or in a related field such as biotechnology, and it provides an exceptionally rigorous chemistry emphasis.

Chemistry 1A, 1B/M and 1C/N

Mathematics 19A-B and 22; or Mathematics 11A-B and Mathematics 22, and either Applied Mathematics and Statistics 27/L or Mathematics 21 or Mathematics 24

Physics 5A/L, 5B/M, and 5C/N; or 6A/L, 6B/M, and 6C/N

Chemistry 112A/L, 112B/M, and 112C/N; or 108A/L, 108B/M, and 143

Chemistry 151A/L, 163A, 163B, 163C

Biochemistry and Molecular Biology 100A, 100B, 100C, 110

Biology: Ecology and Evolutionary 20B

Biology: Molecular, Cell, and Developmental 20A, 20L

Comprehensive Requirement: same as for the B.A. (see above)

Chemistry Major B.S. Planner

The following is the recommended academic plan for students to complete during their first two years as preparation for the B.S. degree.

Year	Fall	Winter	Spring
1st (frsh)	Math 19A Chem 1A	Math 19B Chem 1B/M	Math 22 Chem 1C/N
2nd (soph)	Chem 112A/L or Chem 108A/L Phys 6A/L	Chem 112B/M or Chem 108B/M or Chem 108A/L Phys 6B/M	Chem 112C/N Chem 108B/M Phys 6C/N
3rd (jr)	Chem 163A Chem 164A	Chem 163B Chem 164B	Chem 163C Chem 146 Chem 151A/L
4th (sr)	Chem elective	Chem elective	Chem 103

B.S. Degree with Environmental Chemistry Concentration

A concentration within the biology, chemistry and biochemistry, and Earth sciences degree programs, collectively identified as the environmental sciences program, is offered. Students will develop a core competence suitable for pursuing graduate work in the environmental chemistry area or in graduate environmental sciences programs.

Lower-Division Requirements

Biology: Molecular, Cell, and Developmental 20A

Biology: Ecology and Evolutionary 20B

Chemistry 1A, 1B/M and 1C/N
 Earth Sciences 20/L, 10/L, or 5/L
 Environmental Studies 25
 Mathematics 11A-B and 22; or 19A-B and 22
 Physics 5A/L, 5B/M, and 5C/N; or 6A/L, 6B/M, and 6C/N

Upper-Division Requirements

Microbiology and Environmental Toxicology 101, *Source of Pollutants* or 102, *Cellular and Organismal Toxicology*
 Chemistry 103, *Biochemical Structures, Reactions, and Energetics*
 Chemistry 108A/L, 108B/M, *Organic Chemistry*
 Chemistry 122, *Principles of Instrumental Analysis*
 Chemistry 151A/L, *Chemistry of Metals/Inorganic Lab*
 Chemistry 163A, *Quantum Mechanics and Basic Spectroscopy*; and 163B, *Thermodynamics and Kinetic Theory*; and 146A or 146B or 146C, *Advanced Laboratory*. (Students currently conducting senior thesis research are required to choose an advanced lab in the Chemistry 146 series that is outside their research area.)
 Chemistry 164A, *Physical Chemistry Laboratory I: Data Analysis*
 Chemistry 164B, *Physical Chemistry Laboratory II*
 Earth Sciences 110B/M, *Earth as a Chemical System/Laboratory*
 Ocean Sciences 120, *Aquatic Chemistry: Principles and Applications*; or 220, *Chemical Oceanography*
 Comprehensive Requirement (choose one of the following):

- Senior thesis: 180A, 180B, 180C, Senior Research
- Senior essay: 199, Tutorial

Environmental Chemistry Planner

The following is the recommended academic plan for students who wish to pursue the environmental chemistry concentration.

Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 11A or 19A college core	Chem 1B/M Math 11B or 19B	Chem 1C/N Math 22 Biol 20A
2nd (soph)	Chem 108A/L Phys 6A/L Biol 20B	Chem 108B/M Phys 6B/M Envs 25	Eart 10/L Phys 6C/N
3rd (jr)	Chem 163A Chem 122 gen ed	Eart 110B/M Chem 163B	Chem 151A/L gen ed
4th (sr)	Chem 164A Etox 101 gen ed	Chem 164B Ocea 220 gen ed	Chem 146B/C Chem 103 gen ed

Senior Research (Chemistry 180A-B-C) offers an opportunity to participate in the process whereby knowledge is discovered; it is recommended to students, regardless of their ultimate career interest. Students should note, however, that the time demands of *Senior Research* are greater than those of the usual course.

Requirements for the Minor

The course requirements for the minor, including electives, are the same as for the B.A. degree, with the exclusion of Chemistry 151A/151L, 164A, 164B, 146A, 146B, 146C. The minor has no senior comprehensive requirement.

Chemistry Major Disqualification Policy

The Chemistry Department's major disqualification policy is intended to encourage students to take their performance seriously and to make a strong effort to pass the lower-division and beginning upper-division courses.

Students who receive more than one No Pass, D, and/or F in any combination of the following requirements will not be permitted to pursue any of the chemistry degrees:

Chemistry 1A, *General Chemistry*
 Chemistry 1B, *General Chemistry*
 Chemistry 1C, *General Chemistry*
 Chemistry 108A, *Organic Chemistry*
 Chemistry 108B, *Organic Chemistry*
 Chemistry 112A, *Organic Chemistry*
 Chemistry 112B, *Organic Chemistry*
 Chemistry 112C, *Organic Chemistry*
 Chemistry 163A, *Physical Chemistry*
 Chemistry 163B, *Physical Chemistry*
 Mathematics 11A, *Calculus with Applications*
 Mathematics 11B, *Calculus with Applications*
 Mathematics 19A, *Calculus for Science, Engineering, and Mathematics*
 Mathematics 19B, *Calculus for Science, Engineering, and Mathematics*
 Mathematics 22, *Introduction to Calculus of Several Variables*
 Physics 5A, *Introduction to Physics*
 Physics 5B, *Introduction to Physics*
 Physics 5C, *Introduction to Physics*
 Physics 6A, *Introductory Physics*
 Physics 6B, *Introductory Physics*
 Physics 6C, *Introductory Physics*

Students may appeal their disqualification within the appeal period by writing a letter to the department chair. This appeal must be submitted to the advising office no later than 15 days from the date the disqualification notification was mailed, or the 10th day of classes in the quarter of their disqualification, whichever is later. The advising office will subsequently notify the student, the college, and the Office of the Registrar of the decision, no later than 15 days after the submission of the appeal.

A student who has been disqualified from the major may, no earlier than three months from the date of the disqualification, petition to be reinstated. This application will be considered only if there is substantial new evidence that the student is capable of making normal progress in the major.

Advising and Chemistry Curriculum Guide

The chemistry and biochemistry adviser provides counsel to undergraduate majors. Students are encouraged to pick up a declaration of major form at their college office and declare their major at an early date so that advising and planning can commence. To assist with this advising, the Chemistry and Biochemistry Department has prepared a curriculum guide. Copies are available at the office and online at http://www.chemistry.ucsc.edu/undergrad/chem_handbook.html.

Prerequisites

Students who wish to obtain permission to take a course without having completed the listed prerequisites must make prior arrangements with the instructor. Courses are designed for students who have met all the prerequisites; those who have not are at a disadvantage.

High School Preparation

Prospective chemistry majors are encouraged to get a solid foundation in high school mathematics; familiarity with algebra, logarithms, trigonometry, and analytic geometry is particularly recommended. Students who take chemistry at UCSC begin with Chemistry 1A which requires a reasonable background in high school chemistry, and is part of a rigorous sequence in which introductory college-level material is distributed among Chemistry 1A, 1B, and 1C. Students without a high school chemistry background may begin with Chemistry 1P, *Essentials of Chemistry*. Starting with Chemistry 1P does not cause impediment to progress in the major.

Transfer Students

The Chemistry and Biochemistry Department encourages the admission of students from community colleges. Students who intend to transfer from other institutions, particularly community colleges, are urged to develop a strong background in general chemistry, organic chemistry, calculus, and physics. If the institution offers a physics course based on calculus as well as a non-calculus-based course, the student should take the calculus-based course. Prospective transfer students should consult with a community college adviser regarding details of course transferability, and soon after arrival at UCSC, they should meet with a UCSC adviser to clarify their transfer credit status.

Program for Students of the Health Sciences

Students intending to enter medical, dental, or another health science professional school can satisfy entrance requirements with a major program in chemistry supplemented with further courses, especially in biology, as specified by the particular school. Students are urged to contact the Health Career Resource office. A brochure about preparing for careers in the health sciences is available from that office on request and online at <http://www2.ucsc.edu/careers/health/index.html>.

Biochemistry Program

See the biochemistry and molecular biology program description and major requirements.

American Chemical Society Certification

The American Chemical Society (ACS) recognizes certain undergraduate programs, including those of UCSC, to be of such quality as to entitle graduates to become ACS members immediately upon graduation. Graduates must be individually certified to the ACS by the Chemistry and Biochemistry Department chair if they have satisfactorily completed an approved program of study. ACS certification standards are rigorous; a graduate who has met them carries a distinction that is well recognized in the profession. Broadly speaking, ACS certification requirements are satisfied by completing a B.S. major in chemistry (not including concentrations in biochemistry or environmental chemistry) at UCSC, including Chemistry 122 as an elective. A year of study in a major modern foreign language (preferably German) is recommended. More information is available from the chemistry undergraduate adviser.

Graduate Programs

The Chemistry and Biochemistry Department offers three graduate degrees: the Ph.D., a thesis M.S., and a coursework M.S. The Ph.D. and thesis M.S. programs

are designed to help students develop into independent scholars while pursuing the excitement of scientific research in a personal, supportive environment. Both the Ph.D. and the research M.S. programs prepare students for careers in academia, industry, government laboratories, and other settings requiring an advanced education in chemistry and related disciplines. The coursework M.S. does not require research and is suited to teachers and others wishing to update or broaden their chemical expertise. Approximately 90 graduate students are currently enrolled in the graduate program.

Within the Ph.D. program students have the flexibility to design a course of study focused on personal research interests, and at the same time are expected to maintain the high intellectual standards associated with the doctoral degree. Research options include biochemistry, physical chemistry, biophysical chemistry, inorganic chemistry, bioinorganic chemistry, organic chemistry and bio-organic chemistry. Collaborative research efforts are encouraged, both intra- and inter-departmentally. The interdisciplinary Center for Biomolecular Science and Engineering emphasizes bioinformatics, nanotechnology, and computational approaches to chemistry. Biochemists join geneticists, computer scientists, and biologists in the Center for the Molecular Biology of RNA. Productive interactions have also developed between Chemistry and Biochemistry and Microbiology and Environmental Toxicology, Molecular Cell and Developmental Biology, and the School of Engineering.

Before beginning course work, Ph.D. students take attainment exams to confirm their level of preparation in four areas: organic, inorganic, physical, and biochemistry. First-year students take 292 and 296, and select an adviser and research committee in spring quarter. In the first two years, students enroll in core courses and electives related to their specialization. Core courses are 200A, B, and C for biochemistry and biophysical chemistry; 234 and 256A, B, or C for inorganic and bioinorganic chemistry; the 240 series for organic chemistry; and 261, 262, and 263 for physical chemistry. Organic studies students must pass four cumulative exams based on assigned reading in current research journals. The Ph.D. candidate's research committee meets formally with the student to evaluate research progress at least once a year. Students are expected to finish all Ph.D. requirements in five to six years.

M.S. students and Ph.D. students who have not advanced to candidacy attend a weekly seminar (291A, B, C, or D). Speakers from UCSC, other universities, and research labs expose students to advances at the frontiers of chemical research, offering the opportunity for personal contact with leading scientists.

Teaching assistantships provide both financial support and the opportunity to put into practice the required pedagogical training offered in 296 (presentation techniques, discussion strategies, lab teaching skills, lab safety procedures, time management). Advanced doctoral students can also be supported as graduate student researchers.

Ph.D. Requirements

1. Pass all four attainment exams and meet any deficiencies as directed by spring of first year.
2. Take 292 and 296 in fall of first year.
3. Take 291A, B, C, or D, *Research Seminar*, every quarter until advanced to candidacy.
4. Organic studies students must pass four out of 12 "cumulative exams" based on reading lists of current published organic research.

5. Select adviser and nominate research committee in spring of first year.
6. Present second-year seminar on a topic of current interest in published research outside own research area.
7. TA at least three quarters in the first two years, before attempting the Ph.D. oral qualifying exam.
8. Pass six lecture courses: at least four at 200 level, at least four in chemistry and biochemistry; on departmental approval, up to two courses may be at upper-division undergraduate level.
9. In the fall of the third year, pass the Ph.D. oral qualifying exam before an examining committee consisting of three research committee members plus one outside member approved by the graduate dean. Candidate presents (a) a summary of current research results and possible future direction, and (b) an original research proposal on a chemistry or biochemistry topic either related or unrelated to the candidate's current thesis research.
10. Nominate Dissertation Reading Committee (DRC).
11. Submit research prospectus (outline of dissertation chapters) in spring of fourth year and meet with DRC to review research progress.
12. Submit updated research prospectus (outline of dissertation chapters) to DRC in winter of fifth year.
13. Present dissertation seminar.

The average time to degree is five and one-quarter years. Ph.D. candidates are expected to complete research and write the dissertation within nine quarters after advancing to candidacy following a successful Ph.D. oral qualifying exam. Financial support is no longer available after 18 quarters in the graduate program.

For both Ph.D. and M.S. students, the standard course load is three courses per quarter, or a total of 15 units per quarter.

M.S. Requirements: Research Thesis Path

1. Pass all four attainment exams in the first year.
2. Take 292.
3. Take 296 if enrolled as teaching assistant at the time.
4. Take 291A, B, C, or D each quarter.
5. Select adviser and nominate Research Committee in the first year.
6. Pass at least five Chemistry and Biochemistry lecture courses, of which at least three must be graduate level (200).
7. Conduct original laboratory research.
8. Capstone requirement: write thesis based on original research.

M.S. Requirements: Coursework Path

1. Pass all four attainment exams in the first year.
2. Take 296 if enrolled as teaching assistant at any time.
3. Take 291A, B, C, or D each quarter.
4. Pass nine courses. Of these, seven must be lecture courses (at least four at 200 level) from three of the four sub-disciplines.
5. Capstone requirement: present seminar on a topic of current interest in published research.

Materials Fee

Chemistry students should be aware of the materials fee required for some courses. The fee is billed to the student's account for specific laboratory materials purchased by the Department of Chemistry and Biochemistry through the university. Fees generally range from \$15 to \$50 per course. Students may incur additional expense, purchasing individual supplies.

Lower-Division Courses

1A. General Chemistry. F,W

First term of an integrated study of general chemistry. Course 1A suitable for people who have a solid background in high school chemistry. Covers a range of topics including the atomic structure of matter; molecules; chemical reactions; acids and bases; gases; and equilibria in the gas and liquid phase. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Students expected to use algebra to solve problems. Prerequisite(s): high school level chemistry. (General Education Code(s): IN, Q.) (F) *T. Schleich*, (F) *G. Millhauser*, (W) *R. Roland*

1B. General Chemistry. W,S

Second term of an integrated study of general chemistry. Coverage includes quantum mechanics; the hydrogen atom; many-electron atoms and chemical periodicity; elementary covalent bonding; thermochemistry; and intermolecular forces and solutions, including colligative properties. Lecture: 3-1/2 hours, discussion: 1-1/4 hours. Prerequisite(s): course 1A or a grade of 5 on the AP chemistry examination. Concurrent enrollment in course 1M is required. Enrollment limited to 750. (General Education Code(s): IN, Q.) (W) *R. Anderson*, (W) *R. Bogomolni*, (S) *R. Roland*, (S) *E. Switkes*

1C. General Chemistry. F,S

Third term of an integrated study of general chemistry. Coverage includes thermodynamics; chemical kinetics; oxidation-reduction and electrochemistry; liquids and solids; transition metals; and nuclear chemistry. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Prerequisite(s): course 1B. Concurrent enrollment in course 1N is required. (General Education Code(s): IN, Q.) (F) *R. Roland*, (F) *R. Anderson*, (S) *R. Bogomolni*

1M. General Chemistry Laboratory (2 credits). W,S

Laboratory sequence illustrating topics covered in courses 1B and 1C and important experimental techniques. Laboratory: 3 hours; lecture: 1-1/4 hours. Students are billed a materials fee. Course 1M offered in winter 2008 and spring 2008; 1N offered in spring 2008 and fall 2008. Prerequisite(s): course 1A. Concurrent enrollment in course 1B is required. *R. Roland*

1N. General Chemistry Laboratory (2 credits). F,S

Laboratory sequence illustrating topics covered in courses 1B-1C, respectively, and important experimental techniques. Laboratory: 3 hours; lecture: 1-1/4 hours. Students are billed a materials fee. Course 1M offered in winter 2008 and spring 2008; 1N offered in spring 2008 and fall 2008. Prerequisite(s): course 1M. Concurrent enrollment in course 1C is required. *R. Roland*

1P. Chemistry Essentials (3 credits). F

Introduction to basic concepts required for the Chemistry 1 series. This course is for students who have little background in high school chemistry or equivalent. Covers elementary topics including units, conversions, the mole, chemical reactions, and balancing. Enrollment limited to 90. *R. Roland*

80H. Introduction to Wines and Wine Chemistry. S

Introduction to scientific aspects of winemaking and wine sensory evaluation. Overview of wines emphasizing chemical and biological principles appropriate for both non-science and science students. Aspects of wine presented including history, viticulture, fermentation, winery operations, and physiology of wine consumption. Students are billed a materials fee. (General Education Code(s): T2-Natural Sciences.) *P. Crews*

80L. Introduction to Chemistry of Wines and Musts (2 credits). *

An integrated course exploring elementary aspects of wine evaluation and modern winemaking. Topics: effects of grape varieties, vineyard locations, production techniques, aging practices on wine quality, and winemaking. Survey of commercial wine styles and lab methods of wine component analysis provide insights on how fine wines are made and analyzed. Students are billed a materials fee. Prerequisite(s): concurrent enrollment in or completion of course 80H. Enrollment limited to 32. *P. Crews*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***103. Biochemical Structures, Reactions, and Energetics. S**

Introduces biochemical molecules that compose all living organisms. Focus on structure and function relationships in chemical components of cells, primary enzyme-catalyzed reactions of metabolism. Chemical principles of cell function at molecular level; molecular structure of nucleic acids discussed. Prerequisite(s): courses 1B and 1C; 108A-B or 112A-B-C or 7. *T. Schleich*

108A. Organic Chemistry. F,W

An integrated study of fundamental organic chemistry, with emphasis on materials especially relevant to the biological sciences. Students with credit for course 112A cannot receive credit for course 108A; students with credit for 112B or 112C cannot receive credit for 108B. Lecture: 3-1/2 hours, discussion: 1-1/4 hours. Prerequisite(s): course 1C or 4B. *R. Lokey, C. Bernasconi*

108B. Organic Chemistry. W,S

An integrated study of fundamental organic chemistry, with emphasis on materials especially relevant to the biological sciences. Students with credit for course 112A cannot receive credit for course 108A; students with credit for 112B or 112C cannot receive credit for 108B. Lecture: 3-1/2 hours, discussion: 1-1/4 hours. Prerequisite(s): course 108A or 112A. *B. Singaram, P. Crews*

108C. Organic Chemistry (3 credits). S

Integrated study of fundamental organic chemistry, with emphasis on materials especially relevant to biological sciences. Students with credit for course 112A cannot receive credit for course 108A; students with credit for course 112B cannot receive credit for course 108B; students with credit for course 112C cannot receive credit for course 108C. Lecture: 2 hours, 20 minutes. Discussion: 1 hour. Prerequisite(s): course 108B or equivalent. *D. Palleros*

108L. Organic Chemistry Laboratory (2 credits). F,W

Laboratory experience in organic chemistry associated with courses 108A-108B, respectively. Designed to introduce the student to the many techniques associated with organic chemistry while affording an opportunity to explore the concepts discussed in the lecture material. Laboratory: 4 hours, lecture: 1-1/4 hours. Students are billed a materials fee. Prerequisite(s): courses 1C/N and 108A or concurrent enrollment. *D. Palleros*

108M. Organic Chemistry Laboratory (2 credits). W,S

Laboratory experience in organic chemistry associated with courses 108A-108B, respectively. Designed to introduce the student to the many techniques associated with organic chemistry while affording an opportunity to explore the concepts discussed in the lecture material. Laboratory: 4 hours, lecture: 1-1/4 hours. Students are billed a materials fee. Prerequisite(s): courses 108A/L and 108B or concurrent enrollment. *D. Palleros*

112A. Organic Chemistry. F

An integrated study of fundamental organic chemistry, including principles, descriptive chemistry, synthetic methods, reaction mechanisms, and compounds of biological interest. These courses are coordinated with 112L-M-N respectively and are to be taken concurrently with them. Students with credit in course 108A can receive credit for courses 112B and 112C but not for 112A; students with credit in 108B cannot receive credit for 112B or 112C. Lecture: 3-1/2 hours; optional discussion section: 1-1/4 hours. Prerequisite(s): course 1C or 4B; and course 1N. Concurrent enrollment in course 112L is required. Enrollment limited to 80. *J. Konopelski*

112B. Organic Chemistry. W

An integrated study of fundamental organic chemistry, including principles, descriptive chemistry, synthetic methods, reaction mechanisms, and compounds of biological interest. These courses are coordinated with 112L-M-N respectively and are to be taken concurrently with them. Students with credit in course 108A can receive credit for courses 112B and 112C but not for 112A; students with credit in 108B cannot receive credit for 112B or 112C. Lecture: 3-1/2 hours; optional discussion section: 1-1/4 hours. Prerequisite(s): course 112A/L. Concurrent enrollment in course 112M is required. Enrollment limited to 80. *R. Braslau*

112C. Organic Chemistry. S

An integrated study of fundamental organic chemistry, including principles, descriptive chemistry, synthetic methods, reaction mechanisms, and compounds of biological interest. These courses are coordinated with 112L-M-N respectively and are to be taken concurrently with them. Students with credit in course 108A can receive credit for courses 112B and 112C but not for 112A; students with credit in 108B cannot receive credit for 112B or 112C. Lecture: 3-1/2 hours; optional discussion section: 1-1/4 hours. Prerequisite(s): courses 112B/M. Students should be concurrently enrolled in course 112N. Enrollment limited to 80. *R. Livingston*

112L. Organic Chemistry Laboratory (2 credits). F

Laboratory experience in organic chemistry and associated principles. Experiments involve the preparation, purification, characterization, and identification of organic compounds and make use of modern as well as classical techniques. These courses are coordinated with 112A-B-C respectively, and are to be taken concurrently with them. For courses 112L and 112M: lecture: 1-1/2 hours and laboratory: 4 hours; for course 112N: lecture:

1-1/4 hours and laboratory: 8 hours. Students are billed a materials fee. Prerequisite(s): courses 1C/N. Students should be concurrently enrolled in course 112A. Enrollment limited to 80. *D. Palleros*

112M. Organic Chemistry Laboratory (2 credits). W

Laboratory experience in organic chemistry and associated principles. Experiments involve the preparation, purification, characterization, and identification of organic compounds and make use of modern as well as classical techniques. These courses are coordinated with 112A-B-C respectively, and are to be taken concurrently with them. For courses 112L and 112M: lecture: 1-1/2 hours and laboratory: 4 hours; for course 112N: lecture: 1-1/4 hours and laboratory: 8 hours. Students are billed a materials fee. Prerequisite(s): course 112A/L. Concurrent enrollment in course 112B is required. Enrollment limited to 80. *D. Palleros*

112N. Organic Chemistry Laboratory (2 credits). S

Laboratory experience in organic chemistry and associated principles. Experiments involve the preparation, purification, characterization, and identification of organic compounds and make use of modern as well as classical techniques. These courses are coordinated with 112A-B-C respectively, and are to be taken concurrently with them. For courses 112L and 112M: lecture: 1-1/2 hours and laboratory: 4 hours; for course 112N: lecture: 1-1/4 hours and laboratory: 8 hours. Students are billed a materials fee. Prerequisite(s): courses 112B/M. Students should be concurrently enrolled in course 112C. Enrollment limited to 80. *D. Palleros*

122. Principles of Instrumental Analysis. F

A laboratory course designed to develop familiarity with techniques and instrumentation used in analytical chemistry, emphasizing determination of trace inorganic species. Primary emphasis on applications utilizing the absorption or emission of electromagnetic radiation and on voltammetry. Topics include molecular UV-visible absorption and fluorescence spectrometry; atomic absorption, emission and fluorescence spectrometry; and various forms of voltammetry. Lecture: 2 hours; laboratory: 8 hours. Students are billed a materials fee. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 108B or 112C. (General Education Code(s): W.) *D. Smith*

143. Organic Chemical Structure and Reactions. F

Advanced topics such as the chemistry of terpenes, steroids, synthetic polymers, alkaloids, reactive intermediates, and reaction mechanisms are treated. Lecture: 4 hours. Prerequisite(s): course 108B or 112C. *B. Singaram*

146A. Advanced Laboratory in Organic Chemistry (2 credits). F

Designed to expose students to advanced laboratory techniques in organic chemistry. Experiments carry a research-like format and cover the areas of natural products and reaction chemistry. Modern methods of organic analysis are emphasized including chromatographic methods and organic structure determination by spectroscopy. Laboratory: 8 hours. Students billed a materials fee. Prerequisite(s): courses 108B/M or 112C/N. Enrollment limited to 16. *The Staff*

146B. Advanced Laboratory in Inorganic Chemistry (2 credits). S

Designed to expose students to advanced synthetic and spectroscopic techniques in inorganic chemistry. Examples include anaerobic manipulations, characterization

of inorganic materials through spectral assignments and synthesis of coordination and organometallic complexes. Lecture: 1-1/4 hours; laboratory: 8 hours. Students billed a materials fee. Prerequisite(s): courses 108B/M or 112C/N; 163A. *S. Oliver*

146C. Advanced Laboratory in Physical Chemistry (2 credits). S

Provides advanced and more open-ended laboratory experience in the areas of thermodynamics, kinetics, spectroscopy, and computer simulations. Lecture: 1-1/4 hours; laboratory: 4 hours. Students are billed a materials fee. Prerequisite(s): course 163B and 164B. Enrollment limited to 20. *Y. Li*

151A. Chemistry of Metals. S

Fundamental topics of inorganic chemistry are presented at the level of the standard texts of field. Special emphasis is given to maintain breadth in the areas of metallic, nonmetallic, and biological aspects of inorganic chemistry. Lecture: 3-1/2 hours; discussion: 1-1/4 hours. Prerequisite(s): courses 108B/M or 112C/N; 163A; students should be concurrently enrolled in course 151L. *S. Oliver*

151B. Chemistry of the Main Group Elements. W

Fundamental aspects of inorganic chemistry of main group elements are discussed. The emphasis is placed on the chemistry of nontransition elements including noble gases and halogens. In addition, students are exposed to the concepts of extended structures, new materials, and solid-state chemistry. Lecture: 3-3/4 hours. Prerequisite(s): courses 108B/M or 112C/N; and 163A. Recommended for chemistry majors. *P. Mascharak*

151L. Inorganic Chemistry Laboratory (2 credits). S

Laboratory experience in inorganic chemistry. Experiments involve the preparation, purification, and characterization of inorganic compounds. In addition, experiments are designed to illustrate fundamental principles in inorganic chemistry and are coordinated with lectures in course 151A. Laboratory: 4 hours per week. Students are billed a materials fee. Prerequisite(s): courses 108B/M or 112C/N; 163A; students should be concurrently enrolled in course 151A. *S. Oliver*

156C. Advanced Topics in Inorganic Chemistry. *

Advanced topics in inorganic chemistry and an introduction to solid state chemistry. Synthesis and structure of materials discussed as well as their influence on properties for modern devices and applications. Recent developments in area of material science also explored. Taught in conjunction with course 256C. Prerequisite(s): course 151A. Enrollment restricted to seniors. *S. Oliver*

163A. Quantum Mechanics and Basic Spectroscopy. F

A detailed introduction to quantum theory and the application of wave mechanics to problems of atomic structure, bonding in molecules, and fundamentals of spectroscopy. Prerequisite(s): course 1C or 4B, Physics 5A-B-C or 6A-B-C and Mathematics 11C or 22 or 23B. Physics 6C can be taken concurrently. *I. Benjamin*

163B. Thermodynamics and Kinetic Theory. W

Fundamentals of thermodynamics and applications to chemical and biochemical equilibria. Prerequisite(s): course 1C or 4B, Physics 6A or 5A, and Math 11C or 22. *E. Switkes*

163C. Kinetic Theory and Reaction Kinetics, Statistical Mechanics, Spectroscopic Applications. S

Introduction to statistical mechanics, kinetic theory, and reaction kinetics and topics in spectroscopy. Prerequisite(s): courses 163A and 163B. *R. Anderson*

164A. Physical Chemistry Laboratory I: Data Analysis (2 credits). F

Introduction to data analysis and statistical treatment of errors for physical chemistry experiments. Emphasizes the use of computers for problem solving and data analysis of one required laboratory report. Lecture: 1 hour; laboratory: 4 hours. Prerequisite(s): course 1C or 4B; Physics 6A-B-C or 5A-B-C; Mathematics 11C or 22. *S. Chen*

164B. Physical Chemistry Laboratory II (2 credits). W

Provides laboratory experience in the areas of thermodynamics, kinetics, and spectroscopy. Lecture: 1 hour; laboratory: 4 hours. Students are billed a materials fee. Prerequisite(s): course 164A. *S. Chen*

180A. Senior Research. F

An individually supervised course with emphasis on independent research. Multiple-term course extending over two or three quarters; the grade and evaluation submitted for the final quarter apply to all previous quarters. Students submit petition to sponsoring agency; may not be repeated for credit. *The Staff*

180B. Senior Research. F

An individually supervised course with emphasis on independent research. Multiple-term course extending over two or three quarters; the grade and evaluation submitted for the final quarter apply to all previous quarters. Students submit petition to sponsoring agency; may not be repeated for credit. *The Staff*

180C. Senior Research. F

An individually supervised course with emphasis on independent research. Multiple-term course extending over two or three quarters; the grade and evaluation submitted for the final quarter apply to all previous quarters. Students submit petition to sponsoring agency; may not be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200A. Advanced Biochemistry: Biophysical Methods. F

An introduction to the theory, principles, and practical application of biophysical methods to the study of biomolecules, especially proteins and nucleic acids. Emphasis on spectroscopic techniques. Topics include magnetic resonance, optical spectroscopy, fast reaction techniques, crystallography, and mass spectrometry. *S. Rubin*

200B. Advanced Biochemistry: Protein Structure and Function. W

A detailed discussion of protein chemistry, ranging from the structure, thermodynamics, and folding of proteins to the relationship between structure and function, and encompassing the methods used to determine such information. *The Staff*

200C. Advanced Biochemistry: Structure and Function of Nucleic Acids. S

A variety of contemporary problems in biochemistry and molecular biology are investigated in a detailed manner. Lecture: 3-1/2 hours. *W. Scott*

231. Enzyme Mechanisms and Kinetics. W

A study of enzyme kinetics, mechanisms, and factors involved in enzymic catalysis. Lecture: 3-1/2 hours. Offered in alternate academic years. *W. Scott*

234. Bioinorganic Chemistry. S

The role played by transition metals in biological systems is discussed through application of the principles of coordination chemistry and inorganic spectroscopy. Topics include metalloproteins involved in oxygen binding, iron storage, biological redox reactions, and nitrogen fixation, as well as metal complexes of nucleic acids. Lecture: 4 hours. Prerequisite(s): courses 151A/L, 163A; and Biochemistry and Molecular Biology 100A. *P. Mascharak*

238. Topics in Biophysical Chemistry. *

A discussion of the application of selected topics in biophysical chemistry to contemporary problems in biochemistry and molecular biology. Lecture: 3-1/2 hours. Offered in alternate academic years. *T. Schleich*

240A. Kinetics and Mechanisms of Organic Reactions (3 credits). F

Basic principles and methods of the kinetic study of reaction mechanisms are covered, including linear free energy relationships. Theories are examined concerning how reactions choose a mechanism. *C. Bernasconi*

240B. Combinatorial and High-Throughput Methods in Synthetic Chemistry (3 credits). *

Focuses on solid phase synthetic methods as applied to synthesis of compound libraries. Explores advances in laboratory automation, library synthesis, encoding and decoding schemes, and computational approaches to library design and virtual screening. Enrollment restricted to seniors and graduate students. *R. Lokey*

240C. Organic Structure Analysis from Spectra (3 credits). W

Determination of 2-D and 3-D structure and functionality of organic molecules from spectroscopic properties, including nuclear magnetic resonance, infrared, ultraviolet-visible and mass spectroscopy. *R. Lington*

240E. Modern Synthetic Methods (3 credits). F

An advanced study designed to provide the background and insight to enable the student to compare and contrast new reagents and reactions with existing methods. Prerequisite(s): course 143. *B. Singaram*

240F. Selectivity and Strategy in Organic Synthesis (3 credits). S

An advanced study on the use of chemoselectivity, regioselectivity, and stereoselectivity in organic transformations. Strategic planning in approaching the synthesis of complex molecules focuses primarily on retrosynthetic analysis and stereochemical control. Prerequisite(s): course 240E. *R. Braslau*

240G. Bioorganic Chemistry of Amino Acids and Peptides (3 credits). W

Chemistry of amino acids and secondary structure of amino acid polymers (peptides and proteins) discussed. Special emphasis placed on structure and function of the distinct amino acid side chain functionality as it contributes to structure and function. *J. Konopelski*

246. Advanced Topics in Organic Chemistry. *

A graduate course covering advanced topics in organic chemistry. Topics vary from year to year. *The Staff*

246A. Organic Reactions and Molecular Orbital Theory. *

Qualitative molecular orbital concepts, especially concerning aromaticity, orbital symmetry, and perturbation theory, and their application toward interpretation of reactivity and mechanism. Lecture: 3-1/2 hours. Prerequisite(s): courses 273 and 240A. Offered in alternate academic years. May be repeated for credit. *The Staff*

246B. Marine Organic Chemistry. *

A survey of organic natural products from marine sources. Organic chemical structural families unique to marine organisms are outlined. Pathways of their synthesis and interconversions; their role in the marine environment; approaches to their analysis; the distribution of organics in seawater. Lecture: 3-1/2 hours. Prerequisite(s): courses 108B/M or 112C/N. Offered in alternate academic years. May be repeated for credit. *P. Crews*

246C. Computers and Information Processing in Chemistry. *

An introduction to digital computers and their applications in chemistry. Includes Monte Carlo, artificial intelligence, pattern recognition, modeling, simulation, and optimization problem-solving methods. Applications to include structural analysis, spectroscopy, organic synthesis, and kinetics. Lecture: 3-1/2 hours; laboratory: 1-1/2 hours. Offered in alternate academic years. May be repeated for credit. *The Staff*

246F. Organoboranes in Organic Synthesis. *

An introduction to organoborane chemistry and its applications to synthetic organic chemistry, including principles, synthetic methods, reaction mechanisms, and asymmetric synthesis. A variety of topics including allylboration, boron-enolates, and asymmetric reductions are discussed. Enrollment restricted to seniors and graduate students. Offered in alternate academic years. May be repeated for credit. *B. Singaram*

246G. Heterocyclic Chemistry. *

Advanced study of synthesis and reactions of heterocyclic organic compounds; particular emphasis on structures with important medicinal value from natural products or pharmaceutical research. Prerequisite(s): course 143 or approval of instructor. *J. Konopelski*

246H. Organic Free Radical Chemistry. *

Covers a range of topics including radical stabilization, rates of fundamental radical reactions, methods of radical generation, synthetic applications of free radicals, persistent radicals, and some aspects of free radicals in biology. Prerequisite(s): course 143 or permission of instructor. *R. Braslaw*

246I. Advanced Mechanistic Chemistry and Solution Kinetics. *

Kinetic approach to selected topics in mechanistic chemistry with emphasis on structure-reactivity relationships in organic as well as inorganic and biochemical systems. Discussion of significance and treatment of kinetic data illustrated with examples from various branches of chemistry. Prerequisite(s): permission of instructor. *C. Bernasconi*

255. Biotechnology and Drug Development. W

Recommended for students interested in careers in the biopharmaceutical industry. Focuses on recombinant DNA technology and the drug-development process, including discovery research; preclinical testing; clinical trials; and regulatory review, as well as manufacturing and production considerations. Students may not receive

credit for this course and Biomolecular Engineering 155. (Also offered as Biomolecular Engineering 255. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 10. *P. Berman*

256A. Advanced Topics in Inorganic Chemistry. F

Advanced topics in inorganic chemistry are presented. Topics covered vary from year to year, and are announced in advance. Possible topics include A) organometallic chemistry; B) structural methods in inorganic chemistry; C) solid-state chemistry. Prerequisite(s): courses 151A/L and 146B or graduate standing. *The Staff*

256B. Advanced Topics in Inorganic Chemistry. *

Advanced topics in inorganic chemistry are presented. Topics covered vary from year to year, and are announced in advance. Possible topics include A) organometallic chemistry; B) structural methods in inorganic chemistry; C) solid-state chemistry. Prerequisite(s): courses 151A/L and 146B or graduate standing. *T. Holman*

256C. Advanced Topics in Inorganic Chemistry. *

Advanced topics in inorganic chemistry are presented. Topics covered vary from year to year, and are announced in advance. Possible topics include A) organometallic chemistry; B) structural methods in inorganic chemistry; C) solid-state chemistry. Prerequisite(s): courses 151A/L and 146B or graduate standing. *The Staff*

256D. X-ray Crystallography. *

Course in chemical crystallography focuses on the needs of small-molecule, single-crystal diffraction studies. Includes diffraction theory, space-group analysis, data collection, structure solution, and refinement. Practical component: use of diffraction equipment and solution/refinement software. Enrollment restricted to graduate students and seniors who have taken courses 151A, 151L, and 163A. *The Staff*

261. Foundations of Spectroscopy.

The basic theory of time dependent processes is covered at an advanced level. The interaction of electromagnetic radiation and matter is described using both semiclassical and quantum field formulations. A variety of modern spectroscopic techniques are discussed both in terms of the basic processes and their use in the elucidation of chemical structure and dynamics. Prerequisite(s): course 163A. Offered in alternate academic years. *J. Zhang*

262. Statistical Mechanics. W

Theory and concepts of statistical mechanics with applications to ideal gases, condensed systems, phase transition, and non-equilibrium thermodynamics. Lecture: 3-1/2 hours. Prerequisite(s): course 160B or 163A. Offered in alternate academic years. *I. Benjamin*

263. Quantum Mechanics. F

A rigorous introductory course: the Schrödinger equation, operator formalism, matrix mechanics, angular momentum, and spin. Perturbation and other approximate methods. Applications to atomic and molecular problems. Lecture: 3-1/2 hours. Prerequisite(s): courses 163A and Physics 114A-B. Offered in alternate academic years. *J. Zhang*

265. Computer Simulation in Statistical Mechanics. *

A detailed introduction of the use of computer simulation methods in physical and biophysical chemistry. Includes review of thermodynamics and statistical mechanics, molecular mechanics, molecular dynamics, and Monte-Carlo methods. Applications to liquid structure, reaction

dynamics, and protein dynamics. Offered in alternate academic years. *I. Benjamin*

266. Advanced Topics in Physical Chemistry. *

A graduate course covering advanced topics in physical chemistry. Topics vary from year to year. *The Staff*

266A. Lasers and Their Chemical Applications. *

Introduces the basic theoretical principles of lasers and laser light. Various types of lasers and selected applications to chemistry are discussed. The use of lasers in photochemistry, spectroscopy, chemical kinetics, and chemical analysis is considered. Lecture: 3-1/2 hours. Prerequisite(s): course 163A and Physics 114A-B. Offered in alternate academic years. May be repeated for credit. *The Staff*

266B. Gas Phase Kinetics. *

A discussion of rate processes in gases. Descriptions of experimental and theoretical work on unimolecular, bimolecular, and termolecular reactions and energy transfer processes. Lecture: 3-1/2 hours. Prerequisite(s): course 262. Offered in alternate academic years. May be repeated for credit. *The Staff*

268. Solid State and Materials Chemistry. W

Topics include synthesis of solid-state materials and their characterization using experimental techniques: XRD, TEM spectroscopy, NMR, and their applications in technologies. Emphasis on new materials, e.g., polymer, biopolymers, nanomaterials, organic/inorganic composites, ceramics, superconductors, electronic, magnetic, and opto-electronic materials. Prerequisite(s): courses 163A and 163B. Enrollment restricted to senior and graduate chemistry majors. *Y. Li*

269. Electrochemistry. F

Designed to introduce basic principles and applications of electrochemistry to students at upper undergraduate and lower graduate levels in various fields including analytical, physical, and materials chemistry. Enrollment restricted to seniors and graduate students. *S. Chen*

273. Applications of Symmetry and Quantum Mechanics. *

Group theory and quantum mechanics are applied to problems of the electronic structure and spectra of molecules. A variety of topics including molecular orbital theory, reactivity, electronic structure calculations, and spectroscopy are discussed. Lecture: 3-1/2 hours. Prerequisite(s): course 163A. Offered in alternate academic years. *E. Szwitek*

274. Proseminar in Synthetic and Polymer Chemistry. F,W,S

Weekly meetings devoted to study of synthetic organic chemistry and controlled polymer design for applications in nanotechnology. Topics drawn from current literature and research interests of participants. May be repeated for credit. *R. Braslaw*

275. Proseminar in Biological Inorganic Chemistry. F,W,S

Weekly meetings devoted to biological inorganic chemistry and biochemistry. Topics are drawn from current literature. Papers and reviews are discussed, and participants give short seminars on their research interests. May be repeated for credit. *T. Holman*

282. Proseminar: Synthetic Methods. F,W,S

Weekly meetings devoted to the study of asymmetric and/or enantio-selective synthesis of optically active organic compounds of biological and medicinal significance. Topics drawn from the current literature and the research interests of the participants. May be repeated for credit. *B. Singaram*

283. Proseminar in Physical Organic Chemistry. F,W,S

Weekly meetings devoted to the study of physical and mechanistic organic chemistry. Topics drawn from the current literature and the research experiences of the participants. May be repeated for credit. *C. Bernasconi*

284. Proseminar in Synthetic Organic Chemistry. F,W,S

Weekly meetings devoted to the study of synthetic organic chemistry. Topics drawn from the current literature and the research interests of the participants. May be repeated for credit. *J. Konopelski*

285. Proseminar: Photobiology and Photobiology. F,W,S

A detailed study of molecular mechanisms of light energy conversion and light-signal transduction processes in biological systems. Student participation in critical discussion of current literature examples are emphasized. Two-hour lecture and two-hour seminar weekly. Enrollment limited to 8. May be repeated for credit. *R. Bogomoloi*

286. Proseminar in Natural Products Chemistry. F,W,S

Weekly meetings devoted to the study of natural products. Topics drawn from the current literature and research interests of the participants. May be repeated for credit. *P. Crews*

288. Proseminar in Bioinorganic Chemistry. F,W,S

Weekly meetings devoted to inorganic and bioinorganic research. Topics are drawn from current literature. Papers and reviews are discussed. Participants also give short seminars on topics of their research interests. May be repeated for credit. *P. Mascharak*

289. Proseminar: Biophysical Chemistry. *

Weekly meetings devoted to a detailed study of the theory and applications of nuclear magnetic resonance spectroscopy and imaging and related spectroscopic techniques to problems in biophysical chemistry. Topics are drawn from the current research literature and the research experiences of the participants. Enrollment limited to 20. May be repeated for credit. *T. Schleich*

291A. Organic Chemistry Research Seminar. F,W,S

Open to chemistry graduate students interested in organic chemistry. Weekly meetings are held to hear both local and external speakers discuss their work. Enrollment restricted to graduate students. May be repeated for credit. *(F) J. Konopelski, (W) R. Linington, (S) C. Bernasconi*

291B. Biochemistry and Molecular Biology Research Seminar. F,W,S

A weekly seminar series covering topics on the frontiers of biochemistry and molecular biology. The speakers include experts in these fields from other institutions. Enrollment restricted to graduate students. May be repeated for credit. *G. Milbauer*

291C. Inorganic Chemistry Research Seminar. F,W,S

For those interested in following the recent developments in the various areas of inorganic chemistry. External speakers; weekly discussion based on personal research or recent literature, led by the inorganic chemistry faculty, postdoctoral fellows, and students. Enrollment restricted to graduate students. May be repeated for credit. *P. Mascharak, S. Oliver*

291D. Physical Chemistry Research Seminar. F,W,S

A weekly seminar series covering topics of current research in physical chemistry. Weekly meetings are held to hear both local and external speakers discuss their work. Enrollment restricted to graduate students. May be repeated for credit. *(F) S. Chen, (W) R. Anderson, (S) Y. Li*

292. Seminar (2 credits). F

Enrollment restrictions: graduate standing or approval of the graduate adviser. *The Staff*

296. Teaching Chemistry (3 credits). F

University-level pedagogy in chemistry; examines the role of preparation, assessment, and feedback in teaching chemistry discussion and laboratory sections. Effective classroom techniques and organizational strategies discussed; oral presentations analyzed critically. Required of entering chemistry graduate students. *R. Roland*

297. Independent Study. F,W,S

A topic will be studied with faculty tutorial assistance to satisfy a need for the student when a regular course is not available. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. *The Staff*

Chinese

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

*Faculty and Professional Interests***Professor**

CHRISTOPHER L. CONNERY, Chinese Literature
World literature and cultural studies, globalism and geographical thought, the 1960s, Marxism, pre-modern and modern Chinese cultural studies, cultural revolution

Lecturer

DAVID L. KEENAN
Chinese language, fiction, and history

Program Description

Students interested in acquiring proficiency in Chinese can enroll in language courses from beginning to advanced levels. Students may choose a major or minor in language studies, a minor in East Asian studies through the History Department, an individual major in East Asian studies through their college, or a global economics major.

The sequence of lower-division courses 1-6 is aimed at enabling students to gain proficiency in aural comprehension, speaking, reading, and writing skills. Instruction takes place mostly in Chinese from the second half of the first quarter.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Study Abroad

Students may apply to study intensive Chinese language at one of China's finest universities-in Taipei, Hong

Kong, or Beijing-for periods ranging from a summer up to a full year through the UC Education Abroad Program. Courses taken abroad can, with approval of an adviser, be applied to major requirements. For more information on the program, see UC Education Abroad Program, page 40. For information on credit applied to a major, please contact the appropriate department.

*Lower-Division Courses***1. Instruction in the Chinese (Mandarin)****Language. F**

Instruction in elementary spoken and written Chinese (Mandarin), beginning with the sounds of Chinese and their representation in the pinyin romanization system. Conversation, structural analysis, and an introduction to character texts. Elementary sequence (1-2-3) begins only in fall quarter. Students interested in learning Chinese who are uncertain about where they should enter the sequence should meet with the instructor, prior to the first class meeting. *The Staff*

2. Instruction in the Chinese (Mandarin)**Language. W**

Continuation of Chinese 1, which assumes that students are familiar both with the pinyin romanization system and approximately 150 basic characters. Prerequisite(s): course 1, or equivalent. *The Staff*

3. Instruction in the Chinese (Mandarin)**Language. S**

Continuation of Chinese 2, which assumes that students are familiar both with the pinyin romanization system and approximately 300 basic characters. Prerequisite(s): course 2, or equivalent. *The Staff*

4. Intermediate Chinese (Mandarin). F

Instruction in intermediate spoken and written Chinese (Mandarin). Conversation, composition, and the reading of modern texts. Intermediate sequence (4-5-6) begins only in fall quarter. Students interested in improving their Chinese who are uncertain about where they should enter the sequence should meet with the instructor, prior to the first class meeting. Prerequisite(s): course 3, or equivalent. (General Education Code(s): IH.) *The Staff*

5. Intermediate Chinese (Mandarin). W

Continuation of Chinese 4. Conversation, composition, and the reading of modern texts. Prerequisite(s): course 4, or equivalent. (General Education Code(s): IH.) *The Staff*

6. Intermediate Chinese (Mandarin). S

Continuation of Chinese 5. Conversation, composition, and the reading of modern texts. Prerequisite(s): course 5, or equivalent. (General Education Code(s): IH.) *The Staff*

50. Preadvanced Chinese. F

Places additional emphasis in the areas of specialized vocabulary, sentence structure, and translation as well as conversational and compositional skills in preparation for advanced courses. Offered fall quarter only. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 6, or placement by examination. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses**104. Advanced Chinese: Readings in Literature. ***

Covers a body of Chinese literature of recognized merit from the modern or classical tradition. Students are introduced to the basic critical concepts, in Chinese, relating to narrative and/or poetry, revealed by the works under discussion. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 6 or 50. May be repeated for credit. *The Staff*

105. Advanced Chinese: Readings in History. *

Offers an appreciation of some of the central issues in Chinese history as defined by Chinese historians of the 20th century. Through readings of graduated difficulty, the vocabulary, style, and form of modern Chinese historical writing are introduced. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 6 or 50. *The Staff*

107. Introduction to Classical Chinese. W

Introduces the grammar and lexicon of classical Chinese and the language of China's pre-modern canonical writings in philosophy, religion, history, music, visual art, and literature. Reading from the Han and pre-Han era is featured. Prerequisite(s): course 50 or equivalent. (General Education Code(s): IH.) *The Staff*

108. Introduction to Classical Chinese. S

Introduces the grammar and lexicon of classical Chinese and the language of China's pre-modern canonical writings in philosophy, religion, history, music, visual art, and literature. Reading from the Han and pre-Han era is featured. Prerequisite(s): course 107. (General Education Code(s): IH.) *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Classical Studies

Department of History
201 Humanities
(831) 459-2982
<http://history.ucsc.edu>

Faculty and Professional Interests

KAREN BASSI, Professor of Literature
Greek and Latin literatures, Greek drama, Hellenistic poetics, feminist interpretation, literary and cultural theory, pre- and early modern studies, historiography

MARIA EVANGELATOU, Assistant Professor, History of Art and Visual Culture

Medieval visual culture, with emphasis on Byzantium and its periphery; manuscript illumination, Marian cult and iconography; ancient Greek and Roman visual culture; Islamic visual culture; gender studies

MARY-KAY GAMEL, Professor of Literature
Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

GILDAS HAMEL, Lecturer
History of Judaism and Christianity; Hebrew and Greek Bible; classical languages

CHARLES W. HEDRICK JR., Professor of History
Greek and Roman history, epigraphy, historiography, political theory

JOHN P. LYNCH, Professor of Literature, Emeritus

GARY B. MILES, Professor of History, Emeritus

DANIEL L. SELDEN, Professor of Literature
Afroasiatic languages and literatures, Greek and Latin, Hellenistic culture, the classical tradition, history of criticism, literary theory

Program Faculty Advisers

KAREN BASSI, Professor of Literature, 2008-2009

MARY-KAY GAMEL, Professor of Literature

CHARLES W. HEDRICK JR., Professor of History

Program Description

"Classics" is a traditional designation for the study of the literature, history, and culture of ancient Greece and Rome. Classical studies at UCSC combines features of traditional programs, such as solid grounding in the ancient languages, with innovative, interdisciplinary approaches (literary theory, gender studies, performance, and film).

Classical studies is an interdisciplinary field. While the core of the major is focused on courses in the ancient Greek and Latin languages, the major also includes courses in history, history of art and visual culture, linguistics, literature, philosophy, politics, religious studies, and theater arts. Students are encouraged to study the literary and material artifacts of Greece and Rome within the larger context of ancient Mediterranean and Near Eastern cultures.

The classical studies major offers an opportunity to work in small classes with a dedicated teaching faculty and excellent fellow students. Over the years, classical studies has averaged six to ten majors per year. Classical studies is an excellent preparation for further study in a wide variety of graduate and professional programs including comparative literature, English, philosophy, law, and publishing.

The basic requirements for the classical studies major allow a variety of emphases and concentrations. For example, students with an interest in contemporary philosophy and political theory might want to concentrate in Greek, taking upper-division courses in Greek, history, philosophy, and politics. Students with an interest in European literature might want to concentrate in Latin, taking upper-division courses in Latin, history, and literature in translation. Students planning on pursuing a classics degree at the Ph.D. level should concentrate most of their course work in the Greek and Latin languages themselves.

Classical studies is administered by the History Department. For additional information on curriculum and advising, go to <http://history.ucsc.edu>.

Requirements for the Major

A prerequisite for the classical studies major is the lower-division sequence in elementary Greek or Latin language (Greek 1 and 2 or Latin 1 and 2). The major requires a total of ten courses plus a senior comprehensive exam and must include the following:

- one lower-division survey of ancient history or literature in translation;
- three upper-division courses in Greek or Latin;
- six additional approved upper-division courses (which may include courses in Greek or Latin language);
- one two-credit course, History 199F, to be taken in the same quarter in which the student completes the senior comprehensive exam. The preparatory course will be taken with the chair of the student's examination committee.

Requirements for the Minor

A minor in classical studies requires the lower-division sequence in elementary Greek or Latin language (Greek 1 and 2 or Latin 1 and 2) and Greek or Latin literature 100 plus any four of the upper-division courses listed as satisfying the classical studies major requirements.

College Eight

College Office
(831) 459-2361
<http://eight.ucsc.edu>

For college description and list of faculty, see page 91.

Lower-Division Courses**10. Academic Success (2 credits).**

An interactive course providing students with the opportunity to assess and revise methods of and purposes in studying. Critical, effective approaches to reading, writing, participating in lectures and sections, taking exams, balancing competing responsibilities, and utilizing campus resources are all explored. Prerequisite(s): permission of college adviser. Enrollment limited to 30. *The Staff*

20A. Pueblo Indian Conceptions of Nature (2 credits). *

Explores traditional and contemporary Pueblo Indian beliefs about and interactions with non-human nature, including fundamental assumptions about space, time, matter, and mind. Enrollment restricted to first-year and sophomore college members. Enrollment limited to 25. *J. Todd*

20B. International Affairs and Global Issues (2 credits). *

Examines inter-related global issues: Colonialism and post-colonialism, trade, poverty, globalization, geopolitics, human rights, and the environment. Students choose a particular region on which to focus. Enrollment restricted to first-year and sophomore college members. Enrollment limited to 25. *The Staff*

20C. The Water Environment: Literature of the Sea (2 credits). S

Students consider the representation of the sea in selected texts, noting how it becomes the focal point for the fears, hopes, and prejudices of Western civilization. Students write critical papers and their own narratives. Enrollment restricted to first-year and sophomore college members. Enrollment limited to 25. *C. Calsoyas*

20D. College Students' Lives (2 credits). F

Students understand their peers and themselves better through an exploration of issues that affect the daily life of college students. Topics include campus/student cultures, the academic system, and other critical issues. Overview of campus resources also provided. Enrollment restricted to first-year and sophomore College Eight members. *T. Douglas*

20F. Justice on Earth (3 credits). W

Examines issues of oppression, privilege, and social justice within a global and environmental context through self-reflective and group work. May include an optional service-learning component requiring travel during spring break. Enrollment limited to 20. *The Staff*

28. Peer Leadership in Higher Education (2 credits). S

Overview of theories of student development, critical student issues, and skills needed for appropriate peer leadership interventions. Utilizes a variety of learning modes including readings, discussions, case studies, lectures, and group projects. Interview only: approval of instructor; Resident Assistant (RA) pre-employment training course. Enrollment limited to 25. May be repeated for credit. *T. Douglas*

61. Education for Sustainable Living Program (2 credits). S

Analyzes sustainability and its application in daily life and on campus, involving collaboration between students, faculty, staff, administration, and the community. Guest lecturers, discussions, an optional UC-wide retreat, and essays allow engagement with aspects of ecological and social sustainability. *J. Borrego*

80A. Introduction to University Discourse: Environment and Society. F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Explores relationships between society, social justice and the environment, through environmental history and contemporary environmental studies. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T3-Social Sciences, C1.) *S. Rajan*

80B. Rhetoric and Inquiry: Environment and Society. F

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Explores relationships between society and social justice and the environment through environmental history and contemporary environmental studies. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T3-Social Sciences, C2.) *S. Rajan*

90. College Eight Garden Internship (1 credit). F,W,S

One-credit internship in the College Eight Garden. Offers students of College Eight an opportunity to become

involved in an experimental learning project focusing on application of concepts of sustainable agriculture. Enrollment restricted to members of College Eight. Enrollment limited to 10. May be repeated for credit. *S. Gliessman, C. Calsoyas*

93. Field Study. F,W,S

The Staff

99. Tutorial. F,W,S

May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Individual study for lower-division students directed by a faculty member affiliated with College Eight. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses**128. Advanced Peer Leadership Practicum (3 credits). S**

Advanced practicum for the application of skills and theoretical knowledge studied in course 28. Uses many learning modes including readings, discussions, case studies, lectures, and group projects. Prerequisite(s): course 28. Enrollment by permission of instructor. Enrollment limited to 25. May be repeated for credit. *T. Douglas*

161. Education for Sustainable Living Program. S

Analyzes sustainability and its application in daily life and on campus, involving collaboration between students, faculty, staff, administration, and the community. Guest lecturers, discussions, an optional UC-wide retreat, and essays allow engagement with aspects of ecological and social sustainability. Enrollment limited to 25. *J. Borrego*

170A. UC Sacramento Seminar. F,W,S

Seminar provides a systematic understanding of the public policy and political process in California and involves students in creating a research-based paper on some aspect of public policy and/or politics in California. Interview only: enrollment in UC Sacramento program is required. Enrollment restricted to sophomores, juniors, and seniors. May be repeated for credit. *The Staff*

170B. UC Sacramento Internship. F,W,S

Provides students with a challenging opportunity to engage in experiential learning. Interview only: enrollment in UC Sacramento program is required. Enrollment restricted to sophomores, juniors, and seniors. May be repeated for credit. *The Staff*

170C. Law and Politics in California: Fundamental Perspectives and Current Controversies. F,W,S

Investigates California's current crisis of governance—in what sense is our state's political process "broken," and how should it be "fixed"? Explores laws, legal issues, and the legal profession. Interview only: enrollment in UC Sacramento program is required. Enrollment restricted to sophomores, juniors, and seniors. Formerly *The Political Economy of California's Political Crisis.* *G. Dymski*

193. Field Study. F,W,S

The Staff

193F. Field Study (2 credits). F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Must be sponsored by College Eight faculty. Approval of the student's adviser and the academic preceptor is needed to enroll. May be repeated three times for credit. Students submit petition to sponsoring agency. *The Staff*

195. Senior Thesis. F,W,S

May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

The Staff

199. Tutorial. F,W,S

May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual study for upper-division students directed by a faculty member affiliated with College Eight. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

College Nine

College Office
(831) 459-5034
<http://collegenine.ucsc.edu>

For college description and list of faculty, see page 92.

Lower-Division Courses**80A. Introduction to University Discourse: International and Global Issues. F**

Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Topics address contemporary global issues including economic globalization, human rights, international and inter-ethnic conflicts, poverty, and immigration. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C1.) *The Staff*

80B. Rhetoric and Inquiry: International and Global Issues. F

Explores the intersection of investigation, interpretation, and persuasion and refines strategies for writing, research, and speaking. Topics address contemporary global issues including economic globalization, human rights, international and inter-ethnic conflicts, poverty, and immigration. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C2.) *The Staff*

85. Global Action (2 credits). W

Workshop facilitated by peer instructors. Students learn about current international and global issues through interactive exercises, small-group discussions, and faculty presentations. Students develop an "action plan" to raise awareness about one or more of these concerns and take practical steps to create positive change in the world. (Formerly *Global Leadership: A Model United Nations Workshop.*) Enrollment restricted to College Nine members. Enrollment limited to 20. *E. Ramsden*

86. College Leadership Development (2 credits). S

Students newly appointed into leadership positions at College Nine explore the concept of leadership relating to college's theme of International and Global Perspectives. Prerequisite(s): current College Nine student leader; permission of instructor. *The Staff*

91. Global Issues Colloquium (1 credit). F,W,S

Weekly colloquium on global issues with different topical focus each quarter. Presentations by UCSC faculty and invited speakers. Students must attend class, read an assigned article, and write a one-page synopsis. Co-sponsored by College Nine and The Center for Global, International, and Regional Studies. Enrollment limited to 50. May be repeated for credit. *R. Lipschutz*

*Upper-Division Courses***191. Teaching Global Action. F,W**

Undergraduates at upper-division level participate in teaching discussion groups for College Nine 80 (F) or College Nine 85 (W). Prerequisite(s): permission of instructor: essay describing interest in becoming course assistant, copies of evaluations, and letter of recommendation from faculty member and/or college staff member. Enrollment restricted to College Nine juniors or seniors. (Formerly *Teaching International and Global Issues.*) *The Staff*

199. Independent Study. F,W,S

Individual directed study for upper-division college members with college-affiliated faculty. Students must submit petition with one of the college academic advisers with accompanying letter from faculty adviser. Approval of provost required. Enrollment restricted to upper-division College Nine members. May be repeated for credit. *The Staff*

199F. Independent Study (2 credits). F,W,S

Individual directed study for upper-division college members with college-affiliated faculty. Students must submit petition with one of the college academic advisers with accompanying letter from faculty adviser. Approval of provost required. Enrollment restricted to upper-division College Nine members. May be repeated for credit. *The Staff*

College Ten

College Office
(831) 459-5034
<http://collegeten.ucsc.edu>

For college description and list of faculty, see page 95.

*Lower-Division Courses***80A. Introduction to University Discourse: Social Justice and Community. F**

Explores rhetorical principles and conventions of university discourse and provides intensive practice in analytical writing, critical reading, and speaking. Examines social justice issues; topics include racism, sexism, and other forms of prejudice and discrimination; poverty and welfare; civil liberties; and community involvement and citizenship. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C1.) *The Staff*

80B. Rhetoric and Inquiry: Social Justice and Community. F

Explores the intersection of investigation, interpretation, and persuasion and refines strategies for writing, research, and speaking. Examines social justice issues; topics include racism, sexism, and other forms of prejudice and discrimination; poverty and welfare; civil liberties; and community involvement and citizenship. Students

cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C2.) *The Staff*

85. Social Justice Issues Workshop (2 credits). W

Series of presentations, films, and workshops that address personal and cultural identity and examine social, cultural, political, environmental, and other justice concerns. Enrollment restricted to College Ten members. Enrollment limited to 20. *W. Baxter*

86. College Leadership Development (2 credits). S

Students newly appointed into leadership positions at College Ten explore the concept of leadership relating to program's theme of Social Justice and Community. Prerequisite(s): current College Ten student leader; permission of instructor. *The Staff*

91. Introduction to Nuclear Policy (1 credit). F

Introduces the key aspects of nuclear policy. Examines issues associated with nuclear weapons and civil nuclear power and the interplay between the two with regards to proliferation. Presentation will be given by guest speakers. Enrollment limited to 80. May be repeated for credit. *D. Hirsch*

*Upper-Division Courses***110. Service-Learning Field Study (Esprit de Corps). F,W,S**

Provides college members opportunity to apply their academic learning in a practical setting in the community. Students earn academic credit by volunteering in a non-profit agency or school for 10 hours per week. Students supervised by a professional on site. Students attend a weekly class, complete readings, listen to local leaders from the community, reflect upon their experiences with fellow students, and submit a final project related to their service-learning placement. Taught concurrently with course 110B. (Formerly course 193, *Field Study.*) Enrollment restricted to sophomore, junior, and senior College Nine and College Ten members. Enrollment limited to 22. May be repeated for credit. *A. Asher*

110B. Service-Learning Field Study (Esprit de Corps) (2 credits). F,W,S

Provides college members opportunity to apply their academic learning in a practical setting in the community. Students earn academic credit by volunteering in a non-profit agency or school for four hours per week. Students supervised by a professional on site. Students attend a weekly class, complete readings, listen to local leaders from the community, reflect upon their experiences with fellow students, and submit a final project related to their service-learning placement. Taught concurrently with course 110. (Formerly course 193F, *Field Study.*) Enrollment restricted to sophomore, junior, and senior College Nine and College Ten members. Enrollment limited to 22. May be repeated for credit. *The Staff*

121B. Dialogue Facilitation in Teaching and Community Building (2 credits). *

Designed to teach skills in a multicultural, social justice-oriented context. Students begin focused practice of effective intergroup facilitation skills including identifying and assessing multicultural group dynamics. Interview only. Prerequisite(s): College Nine 121A. Restricted to juniors and seniors. *The Staff*

191. Teaching Social Justice. F,W

Undergraduates at upper-division level participate in teaching discussion groups for College Ten 80 (F) or College Ten 85 (W). Prerequisite(s): permission of instructor: essay describing interest in becoming course assistant, copies of evaluations, and letter of recommendation from faculty member and/or college staff member. Enrollment restricted to College Ten juniors or seniors. *The Staff*

199. Independent Study. F,W,S

Individual directed study for upper-division college members with college-affiliated faculty. Students must submit petition with one of the college academic advisers with accompanying letter from faculty adviser. Approval of provost required. Enrollment restricted to upper-division College Ten members. May be repeated for credit. *The Staff*

199F. Independent Study (2 credits). F,W,S

Individual directed study for upper-division college members with college-affiliated faculty. Students must submit petition with one of the college academic advisers with accompanying letter from faculty adviser. Approval of provost required. Enrollment restricted to upper-division College Ten members. May be repeated for credit. *The Staff*

Communication and Rhetoric

Writing Program
166 Kresge College
(831) 459-2431
<http://writing.ucsc.edu>

Program Description

Admission to the minor in communication and rhetoric is suspended at present. The following conditions will apply if it is reinstated.

The Writing Program accepts students each quarter into the minor in communication and rhetoric. The minor consists of a series of courses that give students the opportunity to hone practical communication skills in a variety of contexts. It also provides a grounding in the analytical tools and critical theory that a rhetorical perspective provides.

A full description of the minor and forms for proposing a study plan and declaring the minor are available at the Writing Program office (166 Kresge).

Course Requirements

To earn a minor in communication and rhetoric, students must complete six courses after having satisfied the composition (C) requirement:

- either Writing 70, *Communication and Rhetoric: An Introduction*; or Writing 101, *An Introduction to the History, Theory, and Practice of Rhetoric*;
- a course that concentrates on editing: either Writing 120, *Editing English Prose*; or Writing 163, *Advanced Workshop in Expository Writing*;
- four electives, at least three of which must be chosen from among the following upper-division writing courses: 101, 102, 103, 104, 106, 107, 108, 109, 110A, 163, 167, 169, and 191A–D. No more than one elective may be chosen from a list of courses offered by other departments (list is available from the program office).

Community Studies

231 Oakes Academic Building
(831) 459-2371
<http://communitystudies.ucsc.edu>

Faculty and Professional Interests

Professor

DAVID BRUNDAGE
American working-class and immigration history, history of U.S. social movements, Irish history and politics
William H. Friedland, Emeritus

B. RUBY RICH
Documentary film and video, post-9/11 culture, new queer cinema, feminist film history, Latin American and Latinla cinema, U.S. independent film and video, the essay film, the politics of film festival proliferation and the marketing of foreign films in the U.S.

NANCY STOLLER, Emerita

DAVID T. WELLMAN
Working-class culture, American ethnic and racial diversity, social documentary studies, critical race theory, interrogations of whiteness, and qualitative research methods

CARTER WILSON, Emeritus

DEBORAH A. WOO, Emerita

Associate Professor

JULIE GUTHMAN
Sustainable agriculture and alternative food movements, international political economy of food and agriculture, politics of obesity, political ecology, race and food, critical human geography

PAUL ORTIZ
African American history, U.S. social and political history, social documentary, oral history, subaltern studies and theories of resistance, U.S. South, Latino studies, social movements, working-class history; history of farm labor, African diaspora

MARY BETH PUDUP
Regional studies, economic justice, public policy, historical geography of the U.S.

RENEE TAJIMA-PEÑA
Documentary film and video focusing on Asian American and immigrant communities, media, and social change

Assistant Professor

MARCIA OCHOA
Gender and sexuality, race and ethnicity, Latina/o studies, media and cultural studies, ethnography of media, feminism, queer theory, geography, multimedia production, graphic design, colonialism and modernity, Latin American studies—Colombia and Venezuela

Lecturer and Field Program Coordinator

MICHAEL ROTKIN
Marxist theory, capitalist system, community organizing, electoral politics, media, government and non-profit programs, community power structure, institutional analysis, and affirmative action

Lecturer

ANDREA STEINER
Health policy, critical public-health studies, gerontology (aging), ageing, women's health, critical analysis of civically engaged education

LARRY D. TRUJILLO
Chicano/a studies, ethnic studies, grassroots community organizations, prison-industrial complex, student development, Chicano music



Professor

JOHN G. BORREGO (Latin American and Latino Studies)
Global political economy, national development, urban and regional planning, community organizing, social change, ethnic minorities, Mexico and the Southwest

DANA FRANK (History)
U.S. social and economic history; women, labor, and working-class history; contemporary political economy

Program Description

Community studies is an interdisciplinary major that integrates scholarship and community engagement in both research and teaching. Since its founding in 1969, and across radically changing political landscapes, the department has maintained a focus on identifying, analyzing, and helping to construct sites for social change and cultural transformation. To this end, we address principles of social justice and the dynamics of racial and class inequity as well as explore constructions of community and their implications.

The range of the faculty's disciplines, research interests, and arenas of civic engagement permits the department to delve into cross-cutting contemporary approaches that color every aspect of social life. The major offers community studies students a lively choice of concentrations in which to specialize, including public health and health politics, political economy, agriculture and food justice, race and racism, historical and contemporary social movements, globalization, politics of culture, and systems of documentary representation. Pedagogically, community studies relies on developing a dynamic critical awareness of the relationship between the theoretical and practical issues involved in social change, and of the wider global contexts in which social justice is defined and achieved. The department's model of specific communities through residence and participation in (mostly) non-profit organizations with a social change mission. The undergraduate core curriculum focuses on the development of academic tools for social analysis and field observations/participation while deepening students' knowledge of specific histories and theoretical perspectives that are essential to the student of communities and transformation. Students complete the major by preparing a senior capstone project integrating academic course work, field study, and original research work. The major usually takes about two years to complete.

With the intellectual guidance of a faculty adviser and a field study coordinator, community studies students choose field placements related to one of the department's areas of focus. Placements have been with health centers, immigrant rights organizations, newspapers, minority media outlets, city planning departments, neighborhood organizations, civil rights groups, farm-to-school programs, battered women's shelters, legal clinics, programs for seniors, tenant unions, government agencies and the offices of elected officials, trade unions, and other organizations committed to and working for social justice in communities.

Facilities

The Community Studies Department maintains several unique resources for students. A media laboratory is

available for majors (and others in the social sciences) to learn the use of video, radio, film, and graphic media as research and presentation tools. Two field-study coordinators work with students to develop part- and full-time field studies, and a field study resource office is available to assist students in selecting an appropriate field study organization.

Major Program

The program for all students in the major includes preparatory courses, the field study itself, post-field-study course work, electives chosen to broaden knowledge for the individual's senior capstone requirement, and the capstone requirement itself. Students who wish to pursue a major in Community Studies are required to satisfactorily complete Community Studies 10, *Introduction to Community Activism*. It is recommended that students complete this course prior to beginning their path through the sequential core curriculum, i.e., before they enroll in Community Studies 100(A-Z). It is required that students satisfactorily complete *Introduction to Community Activism* prior to beginning Community Studies 198, the full-time field study.

It is important to emphasize community studies is a major with a sequential core curriculum. This means required courses must be taken in a specified order established by the quarter(s) when those courses are offered.

To begin the major and declaration process, a student must be enrolled in one of the Community Studies 100(A-Z), *Theory and Practice* seminars. These seminars are gateways into the community studies major. Students will learn about a distinct area of academic theory and social justice practice that will become the focus of their academic study plan, field study, and senior capstone requirement. Several sections of Community Studies 100(A-Z) are offered each fall and winter quarter. Theory and practice topics vary from year to year and may include economic justice; health care; race and ethnicity; immigration, social documentation, agriculture and food; Asian-American activism; resistance and social movements; and cultural work and social justice. Following the *Theory and Practice* seminars is Community Studies 102, *Preparation for Field Study*, offered only in spring quarter.

Students are expected to arrange the rest of their academic program of study around the two-quarter (six-month) full-time field study (15 units each quarter). Students must conduct their fieldwork in summer and fall quarters so that they can immediately follow up with Community Studies 194, *Analysis of Field Materials*, offered only in winter quarter.

Language competency must be demonstrated by students planning a field study in a non-English speaking country. Students must plan appropriate language study well in advance of the field study. In addition, students must demonstrate knowledge of the history, culture, and political economy of the place where they will be completing their field study—whether that place is a neighborhood in Santa Cruz, New York City, or a small village in Guatemala. Students may also find media production skills useful in their fieldwork and are encouraged to visit the Social Sciences Media Laboratory, located in 47 Social Sciences 2, early in their academic career.

Admission to the Major

A general background or course work in politics, sociology, anthropology, and/or community activism is suggested for students considering the community studies

major. Students are required to have enrolled in two community studies courses at the time they declare the major: one must be a Community Studies 100(A–Z) seminar and the other may be any of the lower- or upper-division courses except for the 42 series of student directed seminars or independent or field studies.

The process of declaring the community studies major properly begins when a student enrolls in a section of Community Studies 100(A–Z), the *Theory and Practice* seminar series. Prospective majors must choose a seminar that matches their own academic and social justice focus. Because of their small size, the Community Studies 100(A–Z) seminars are enrolled by “interview only.” Although they are open to all students, prospective community studies majors enjoy priority enrollment.

To fulfill the declaration of major process, prospective majors must prepare a three- to four-page essay outlining how their academic and social justice focus matches the emphasis of their theory and practice seminar. The essay should also describe their academic study plan, including relevant upper-division electives and their tentative field-study plans. Students then meet with the professor in charge of their Community Studies 100(A–Z) seminar to review and discuss the essay and other application materials. Occasionally, a student is not accepted into the major because the student’s social justice and field-study focus are poorly matched with the department’s theory and practice areas.

Instructions for Applying to the Major

- Attend a department orientation held at the beginning of each quarter (check the Schedule of Classes for date/time/location).
- Choose and enroll in the appropriate Community Studies 100(A–Z) seminar. If you are accepted into the class, a permission number will be given to you; you can then move on to the next step.
- Print out a Declaration of Major petition from your student portal (MyUCSC), and obtain the signature of your college adviser. Complete the Application for Admission to Community Studies (available in the Student Handbook, found on the department web site: communitystudies.ucsc.edu). Prepare an academic study plan (on a separate piece of paper) for completing all requirements for the major including field study and upper-division electives. (Be prepared to be flexible on your elective choices as your faculty adviser may make other recommendations during step 5.)
- Write a three- to four-page essay (typewritten) explaining:
 - Why you think that the community studies major is the best way for you to pursue your academic and social change interests. The department is interested in both the substance of your essay and your ability to express yourself in written form.
 - The social change or social justice organization with which you expect to work.
 - The classes you have taken and/or plan to take, in addition to Community Studies 100(A–Z), to prepare you to work with this organization.
 - Your social location, defined as the intersection of nationality, immigration, ethnicity, racial privilege, class, gender, age, and sexuality in your background and current social status.
 - The ways your social location may influence and be influenced by your six-month field placement.

- Meet with your Community Studies 100(A–Z) seminar professor to discuss your essay, field-study plans, electives, and other application materials. Obtain the faculty signature on the application form. Bring any evaluations or progress reports from currently enrolled courses to support your application to the major.
- Before the declaration of major deadline, bring your completed Declaration of Major petition, draft study plan, signed application form, and essay to the Community Studies Department office (231 Oakes College) for final approval and processing. You are not officially declared until step 6 is finalized.

Note: you cannot begin course 102 without completing step 6. Failure to do so will defer your progress in the major until the following year when the 102 course is again offered. CMMU 102 is offered only in spring quarter.

A student may be directed to another department of study on campus in those instances where his/her academic interests cannot be fulfilled by current department offerings.

Community Studies 100(A–Z) Enrollment Procedures

All Community Studies 100(A–Z) courses are “interview only.” Our goal is to provide access to these courses for those students who plan to become community studies majors. You must attend the first day of class. Each instructor will ask you to provide information from which they will decide who gets priority in the class. It is wise to meet with him or her to discuss your plans for the major prior to the beginning of course 100(A–Z) to make sure that Community Studies Department and the 100(A–Z) course you have chosen is appropriate for your needs.

Major Course Requirements

Summary of Core

Sequence	Requirements	Credits
10	<i>Introduction to Community Activism</i> (spring)	5
100(A–Z)	<i>Theory and Practice</i> (fall or winter)	5
102	<i>Preparation for Field Studies</i> (spring)	5
198	<i>Independent Field Study</i> (summer/fall)	30
194	<i>Analysis of Field Materials</i> (winter)	5
	Three upper-division electives (all quarters)	15

10, *Introduction to Community Activism*

Community Studies 10 seeks to make sense of our contemporary era when community activism would seem so alive and well, and yet a shocking and sad number of people continue to lead lives of material deprivation and social exclusion. A goal of the course is resolving this seeming paradox by making clear and necessary distinctions among charity, empowerment, grass roots organizing, and human rights—put simply, activism designed to help people and activism designed to eliminate the need for help.

The course explores different kinds of community activism (e.g., volunteering, faith-based activism, nonprofit-based service provision and advocacy,

community-based organizing) and critically appraises their strengths and shortcomings and their interconnectedness. The aim is learning how certain desirable societal outcomes (e.g., ending hunger, eliminating homelessness, improving on-the-job working conditions) are made more or less possible through different activism strategies. A central goal is developing a critical perspective on the contemporary political economy of charity and so-called empowerment. Toward this end, we consider how the brave new world of neoliberalism has set in motion a devolution of responsibility for collective well-being to the individual through the efficacy of localized private organizations that now constitute sites where political struggle takes place and citizens are formed.

100(A–Z), *Theory and Practice Seminars*

Each of these courses explores the relationship between theory, practice, and social justice within a particular subject area. The Community Studies 100(A–Z) seminars are designed to raise questions about the relationships between different theoretical perspectives and social justice. For example, do social psychological, historical, or literary theories vary in their usefulness in helping us understand social justice work around race and racism? What is the relationship between activism and theory? How do social justice activists select, develop, and, sometimes, even seem to reject their own theoretical perspectives?

The primary course objective is demonstrating how current issues and problems can be researched by better understanding the relationship between theory and practice—how theory gives rise to certain kinds of issues and actions and, in turn, how practice can introduce new ways of thinking about the world. The goal is to expose students to different ways of perceiving and understanding the world and to engage them in an ongoing dialogue about the “practical implications of theory” and the “theoretical implications of practice.”

102, *Preparation for Field Study*

This course immerses community studies majors who are planning full-time field study in the practical and theoretical work of field study with a focus on activist research—that is, study conducted by and with activists so as to participate in and learn from their work. A required part-time field study with a local community-based social justice organization is a central component of the course; this activity should ideally approximate the kind of work students intend for their full-time field study. Other course components for 102 are organized around the part-time field study for this course.

Community Studies 102 engages students in a range of issues common to all field studies and focuses on the relationship between theory, field methods, and on-the-ground fieldwork. It gives students the opportunity to develop interpersonal and organizational skills and to learn how to relate issues in the fieldwork within a community/region to those within the global society. Assignments are designed to rigorously prepare students for activist research in a social justice organization by fostering specific research and organizing skills.

198, *Full-Time Independent Field Study*

A distinguishing feature of the community studies major is the six-month, full-time field study, an arrangement facilitated by the student’s Community Studies 100(A–Z) instructor and the field study coordinators. During the field study, students are enrolled at UCSC and receive full-time university credit. Students in the 100(A–Z) courses are presented with recommended organizations from which to select their placements. The Field Study office provides full placement informa-

tion and guidelines for setting up placements, along with logistical and academic support during the field study.

194. *Analysis of Field Materials*

This course is designed for community studies seniors returning from their full-time field study. The course has two related goals: (1) to help students, both individually and collectively, analyze and gain perspective on their field experiences; and (2) to move students through the process of completing the senior capstone requirement. A central question addressed in the course is how the student's theory and practice of social justice has been affected by his or her field experience. Each student has a unique field-study experience; and, collectively, students have been involved with widely varying types of organizations with little or no relation to each other. Yet there is common ground, and students have much to learn from each other. Thus, a related objective of this course is to discover and travel the common ground. For students completing the major with a senior essay, the essay is completed in course 194. For students doing a senior thesis, project, or student-directed seminar, the student completes at least three major pieces of writing; some or all of which will be incorporated into the completed thesis, project, or student-directed seminar.

Upper-Division Electives

Each student in the major must complete three upper-division electives. The purpose of the elective requirement is to ensure that students have the necessary intellectual background for their field studies and senior capstone requirement. At least one of these courses must be from the Community Studies Department, but the other two may be from another campus program as long as the substantive content of the courses is related to the full-time field study and academic plan. Senior thesis and independent studies do not fulfill the elective requirement. At least two of the three electives must be completed prior to the full-time field study. Electives must be approved by the student's 100(A-Z) seminar professor.

Senior Capstone Requirement

Each student must fulfill a senior capstone requirement, either through the senior essay, a senior thesis, a senior project, or a student-directed seminar. For a thesis, project, or student-directed seminar, the student must choose a faculty member to serve as his or her adviser.

Senior Essay: Students complete a senior essay that analyzes local, global, and theoretical contextualizations of field study; the essay should incorporate essays completed in other courses, including course 100(A-Z) and field study, along with essays written in course 194. The minimum length is 25 pages, plus bibliography. The senior essay is completed entirely in course 194, *Analysis of Field Materials*.

Senior Thesis: Some students may choose to complete a senior thesis, which is comprised of linked essays combining local and global contextualizations of field study and theoretical and historical analysis of social justice issues at the heart of the field study. The thesis can incorporate essays from other courses (including course 194), but must involve significant post-field study research using primary source materials; typical length is 35–50 pages, including bibliography. Students begin the senior thesis during course 194 and generally complete it in the following quarter(s).

Senior Project: Students may choose to complete a senior project in other genres of social documentation

including film and video production, photography, sound production, creative writing, and other formats such as grant proposals and organizing pamphlets. The senior project also requires a significant analytical essay of 20 pages, plus bibliography, describing the project conceptualization, rationale, methodology, and evaluation. Students begin the senior project during course 194 and complete it the following quarter(s).

Student-Directed Seminar (SDS): The SDS capstone option is reserved for exceptional students. Under the direction of a faculty adviser, the student develops and teaches a Community Studies 42 course that relates to the student's field study and social justice focus, accompanied by a seminar completion report.

The department selects only a limited number of student-directed seminars each year. Selection is based on the excellence of the SDS proposal, the relevance of the subject matter to the major, the student's background preparation, and the total number of proposals submitted each quarter. The Committee on Educational Policy gives the final approval.

For students interested in teaching a student-directed seminar, it is recommended that they meet with their adviser early on—prior to the full-time field study—to begin the process of obtaining course approval. A short written work providing the theoretical basis for the project, giving a brief analysis of the connection between the student's field work and the project itself, a course syllabus, a bibliography, and copies of their evaluations are required, along with a letter from the sponsoring faculty.

Students must also take course 199, *Tutorial*, the quarter prior to teaching the SDS, to give them time to prepare the course material. A student-directed seminar guide, giving detailed information about preparing for and teaching an SDS, is available in the department office.

Honors in the Major

Honors in the community studies major are awarded to graduating seniors whose academic performance in their major coursework is judged to be consistently excellent to outstanding. Students must also do excellent work on their senior capstone requirement; an honors-eligible senior essay must be particularly outstanding. The senior capstone must have intellectual merit, a genuine social change/social justice focus, and demonstrate that the student gained insight into processes of social change.

Lower-Division Courses

10. Introduction to Community Activism. S

Surveys different strategies of community activism including charity, volunteering, labor and community organizing, and recently emerging global activism with goal of demonstrating how certain strategies challenge existing social relations and arrangements while others typically (and often by design) reproduce them. (General Education Code(s): IS.) *M. Pudup*

20. Youth and Social Movements. *

Examines roles young people have played and still play in social movements locally and internationally. Guiding questions are "Under what conditions do youth enter social movements?" and "What models do they create or adopt?" (General Education Code(s): E.) *The Staff*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division or graduate students under faculty supervision. (See course 192.) *The Staff*

70. Video Laboratory (2 credits). F,W

Trains students in the techniques of documentary film making. Through lectures, demonstrations, hands-on instruction, and review of students' work in progress, students learn the fundamentals of film/video pre-production, production, and post-production skills. Concurrent enrollment in course 80L required. Enrollment limited to 25. *The Staff*

71. Basic Photography Laboratory (2 credits). F,W

Provides students with photography skills. Through lecture, demonstration, hands-on experience, and field sessions, students acquire technical and aesthetic training in basic darkroom skills, methods of photographing people, an introduction to alternative processes, and presentation of finished photographs. Concurrent enrollment in course 80L required. Enrollment limited to 20. *The Staff*

72. Audio Laboratory (2 credits). F,W

Trains students in the fundamental techniques of documentary audio production. Through lectures, documentary examples, demonstrations, hands-on instruction, and consultation with students regarding their work in progress, students gain the skills they need to produce their own audio documentaries. Concurrent enrollment in course 80L required. Enrollment limited to 20. *The Staff*

73. Digital Photo Lab (2 credits). F,W

Provides introduction to digital photography and social documentary photographic techniques. Through lecture, demonstration, hands-on experience and field sessions, students learn camera operation, how to photograph people, photographic aesthetics, Adobe Photoshop, and arranging photos in essay form. Concurrent enrollment in CMMU 80L is required. Enrollment limited to 15. *The Staff*

75. Introduction to Peer Education (2 credits). S

Weekly interactive lecture/discussions and practicum participation develop student knowledge and skills or peer education theory and practice including advocacy, ethics, harm reduction, and environmental strategies. UCSC-related health issues such as substance use, sexual health, and social justice are discussed. Enrollment by interview to determine ability to handle confidentiality and other peer counseling issues. Enrollment limited to 25. *The Staff*

80A. Chicanos and Social Change. W

Introduction to study of Chicano political experience with selected U.S. institutions, e.g., education and health, beginning with historical overview and ending with consideration of Chicanos' political future in the 1990s. Weekly guest lecturers. (General Education Code(s): T3-Social Sciences, E.) *L. Trujillo*

80B. Civil Rights Movement: Grassroots Change and American Society. F

The civil rights movement of the 1950s–60s was one of the most important grassroots social movements in American history. Course examines this movement, focusing especially on the experiences of rank-and-file participants and on its effects on American society. (General Education Code(s): T3-Social Sciences, E.) *D. Brundage*

80H. Social Change and Asian Americans. *

Introduction to the study of social change and Asian Americans, with an emphasis on community and activist perspectives. Weekly film or guest lecturers. (General Education Code(s): T3-Social Sciences, E.) *The Staff*

80L. Social Documentation. F,W

Examines works from various media recognized as being drawn from "real life." Through film, photography, oral history, and other examples, develops critical understanding of social documentation as a process with implicit theories and conventions. Students create beginning documentaries in production collectives. (General Education Code(s): T3-Social Sciences.) *The Staff*

93. Field Study. F,W,S

Supervised research for lower-division students, conducted off campus within regular commuting distance of the campus. Petitions may be obtained in the Community Studies Office. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

93F. Field Study (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

93G. Field Study (3 credits). F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. For lower-division students doing part-time off-campus study. Petition must be obtained from the Community Studies Department. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Individual directed study for lower-division undergraduates. Petitions may be obtained in the Community Studies Office. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***100. Theory and Practice.**

Introduces students to different ways of perceiving and understanding social phenomena in an ongoing dialogue about practical implications of theory and theoretical implications of practice. Faculty introduce and discuss their own work in these terms. Topics vary from quarter to quarter. Enrollment priority given to proposed community studies majors. Permission of instructor required; see enrollment conditions in the *Schedule of Classes*.

100B. Media and Social Change. †

Uses case study approach to analyze use of films and videos in relation to social change movements. Students produce a video as final project. Interview only; admission determined at first class meeting. Enrollment restricted to sophomores and juniors. Concurrent enrollment in course 170 is required. Course 80L is recommended. Enrollment limited to 25. (General Education Code(s): IS.) *R. Tajima*

100E. Theory and Practice of Economic Justice. *

Examines how markets operate within the political economy of contemporary capitalism to generate myriad and often chronic forms of economic and social inequality in the United States. Explores different approaches to addressing inequality within the multi-faceted economic justice movement. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS, E.) *M. Pudup*

100J. Immigration and Social Justice. F

Introduction to contemporary U.S. immigration patterns and policies, to major problems facing immigrant communities, and to theory and practice of immigrants and their allies in confronting these problems and working for social justice. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS, E.) *D. Brundage*

100K. Culture and Health. *

Explores the role of culture in health or health practice. Critiques the Western medical model, including its individual bias, and encourages a broader perspective on prevention that includes the role of social, economic, environmental, and cultural factors. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS.) *The Staff*

100M. Health Care Inequalities. F

Examines system and non-system that is American health care with special attention to inequalities in access, financing, and quality of care. Covers concepts such as equality, fairness, and need as well as community organizing and community building for health. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS.) *A. Steiner*

100P. Resistance and Social Movements. W

Where do ideas for democratic social change come from? How are new social movements formed? Emphasis will be placed on subaltern groups including slaves, peasants, workers, utopians, and "second-class citizens" of the global economy from 1492 to the present. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS, E.) *The Staff*

100S. Social Documentation. †

Provides advanced understanding of history of social documentation and corresponding theories and practices of social documentation. Students also required to advance skills in a practical aspect of social documentation (i.e., video, photography, audio, oral history). Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS.) *D. Wellman*

100T. Agriculture, Food, and Social Justice. W

Examines the primary ways in which activists are attempting to resist, provide alternatives to, and/or transform aspects of the food system using social and environmental justice frameworks to evaluate such activism. Topics explored include organic farming, food charity, fair trade, relocalization, and farmworker organizing. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS.) *J. Gutman*

100V. Politics of Culture. W

Examination and analysis of structures and strategies governing the cultural sector, including but not limited to film exhibition and distribution, "entertainment" journalism, and the art world. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS.) *B. Rich*

100X. Sex, Gender, and Sexuality. W

How do people produce and politicize sex, gender, and sexuality on their bodies? How are these represented and disciplined? Topics include transgender, sex work, feminist and queer realities. Materials include testimonials, films, ethnography, social theory, and clinical texts. Interview only; admission determined at first class meeting. Enrollment limited to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS.) *M. Ochoa*

102. Preparation for Field Studies. S

A practicum to prepare students for field study. Course must be successfully completed prior to the six-month field study. Prerequisite(s): course 10; submission of signed Goals and Objectives form and completion of admissions process to the major; signed approval of full-time field study. Enrollment limited to community studies majors. *M. Ochoa*

103. Field Study Practicum (2 credits). S

A practicum in social change work in which the students works for a social change organization on a part-time basis. Concurrent enrollment in course 102 required. *M. Ochoa*

104. Class in the United States. †

Explores politics and culture of class in contemporary U.S. from interdisciplinary perspective, drawing on social theory, political economy, and cultural forms (film, music, and literature) with special emphasis on race, ethnicity, and gender. *D. Frank*

110. Public Health. *

Examination of community activism to address health issues: examples are drawn from a range of concerns, e.g., environmental racism, prison conditions, feminist health matters, the AIDS epidemic, violence, and alcoholism. Special attention is given to the social frameworks of health and to the utilization of social and political strategies for improving community well-being. (Formerly course 100E) *The Staff*

111. Ageism and Activism. S

Introduces students to gerontology, the study of aging. Taking a multidisciplinary approach, critically examines the theories, stereotypes, and realities of worldwide demographic transition and considers the many interesting implications for organizing social and personal life. Enrollment limited to 25. *A. Steiner*

112. In the Eye of 9/11: Film Culture and National Catastrophe. †

Explore national/international history through selected screenings/readings, attempting to understand how representation intersects with history and governance. Learn about earlier times of national panic or confusion to understand the antecedents/aftereffects of 9/11. *B. Rich*

114. Whiteness, Racism, and Anti-Racism. F

Examines the social, cultural, institutional, and personal ways that white privilege and racial domination are constructed, maintained, and reproduced in U.S. society. Goal is to reveal the "hidden" quality of whiteness and illuminate effective strategies for anti-racist activism. Enrollment limited to 25. (General Education Code(s): E.) *D. Wellman*

118. Broadcast Journalism (2 credits). *

Focuses on writing radio news. Through lectures, hands-on instruction, and written assignments, students acquire technical and aesthetic training in broadcast news reporting, writing, and audio production. Enrollment restricted to first-year students, sophomores, and juniors. Enrollment limited to 25. *The Staff*

119. Banana Slug News (2 credits). F,W,S

Introduction to television news production in which students become familiar with the tools of the medium and the process involved in the creation of a completed television news program through basic studio exercises and Electronic News Gathering (ENG). Enrollment limited to 15. May be repeated for credit. *The Staff*

122. Experiments in Community: Utopia and Communalism in Post-War California. F

Traces history and flowering of urban and rural communal experiments in postwar California. Critically examines the counterculture—both alternative and revolutionary wings—and its legacy of, for example, sexual politics, childrearing, art and culture, foodways, environmentalism, architecture, and anticapitalism. (Formerly *Experiments in Community: History of Communes in California*.) *I. Boal*

123. Wal-Mart Nation. *

Examines origins and growth of Wal-Mart stores as powerful guides to understanding dynamics of contemporary global political economy and, relatedly, the changing fortunes of global social classes. *M. Pudup*

125. Documentary and Technology: Objectivity, Subjectivity, and Truth. †

Intended to provide a solid grounding in the documentary (largely film/video), its approaches over time, changes in thinking about the role that the machine has played in the nature of the medium, and an opportunity to think critically about practice, community, use, and reception. Enrollment limited to 25. (General Education Code(s): A.) *B. Rich*

127. Alternative Approaches to Documentary Film. *

Examines selected alternative documentary movements and their corresponding social politics, including the British Documentary movement, Cinéma Vérité American Direct Cinema, feminist counter cinema, and the contemporary self-reflexive documentary explosion. (General Education Code(s): A.) *The Staff*

130. Juvenile Justice. F

Students are placed in a community-based program, at Juvenile Hall or with a deputy probation officer, to intern 8-10 hours each week. Includes a weekly seminar to discuss readings and presentations on the juvenile-justice system and internship experiences. Background checks and fingerprinting are required to participate in this course. A two-quarter commitment is preferred. (Formerly *New Vistas in Juvenile Justice*.) Enrollment limited to 20. May be repeated for credit. *The Staff*

132. Mediating Desire. *

Considers the ways Third World voices and bodies are understood, performed, embraced, commodified, exploited, and rejected through representations. Uses representations of, by, and for the margins to engage theories of communication, identity, and representation. Creative final projects encouraged. (General Education Code(s): E.) *M. Ochoa*

142. Introduction to Marxism. W

A close study of original texts by Marx and Engels and contemporary Marxists, focusing on the basic tenets of Marxism and their applicability to current community problems. An interdisciplinary course for students with little previous experience in Marxist method. *M. Rotkin*

145. Politics of Obesity. F

Critically examines the construction and representation of the so-called epidemic of obesity, the major explana-

tions for the rise in obesity and the interventions they beget, and the implications of naming obesity as a problem. *J. Guthman*

147. The Rise and Fall of the New Queer Cinema. †

Documents/interprets the phenomenon "New Queer Cinema." Seeks to understand its precedents, preconditions (social, political, medical) leading to its explosive growth, and forces (economic, aesthetic, medical) spelling the end of the artistic movement, though its influence seemed simultaneously to spill into every televisual medium. (General Education Code(s): A.) *B. Rich*

148. Women's Health Activism. W

Examines concrete aspects of women's health in social and political contexts, including such factors as environmental and occupational health, the role of race and nationality, diverse sexualities and health, American medical care systems, and international comparisons and organizing approaches. *A. Steiner*

149. Political Economy of Food and Agriculture. *

Intensive reading course, focusing on key concepts in agrarian political economy and historical development of world food system. *J. Guthman*

152. Gender and Sexuality in Latin America. †

Advanced topics in gender and sexuality in Latin America and Latina/o studies. Analyzes role of power, race, coloniality, national and transnational processes in the production and analysis of genders and sexualities. Materials include memoir, fiction, ethnography, social documentary and history. Prerequisite(s): Latin American and Latino Studies 80S or equivalent. (General Education Code(s): E.) *M. Ochoa*

160. Communities, Problems and Interventions. †

Prepares students to develop and design responses to problems affecting communities. Informed by the history of community interventions in Chicana/o, feminist, labor, civil rights, HIV/AIDS, and GLBT/queer movements, students research, design, and propose a community-level intervention. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 25. (General Education Code(s): W.) *M. Ochoa*

162. Introduction to Grant Writing. †

Introduces students to non-profit organizations and grant writing. Through hands-on grant-writing experiences, students learn how to write a successful grant. Please bring a potential fundable project idea to the first class. (Formerly *Introduction to Non-Profit Organizations and Grantwriting*.) *The Staff*

163. American Cities and Social Change. †

Examines the historical development of and contemporary conditions within U.S. cities by focusing on social and economic restructurings of cities, cultural and political transformations, and spatial reorganizations of the urban landscape. Goal is understanding the changing nature of urban experience. Students must also enroll in course 164. *M. Pudup*

164. Urban Field Study (2 credits). †

Examines multifaceted processes of urban growth and restructuring during two all-day field trips in the greater San Francisco Bay Area. Goal is making urban theory and history come to life. Must be taken concurrently with course 163. Enrollment limited to 15. *M. Pudup*

166. Northern Ireland: Communities in Conflict. S

Introduction to the so-called "troubles" in Northern Ireland, from the 1960s to the present. Examination of

the historical background to the conflict, the patterns of conflict in the 1970s and 1980s, and the emergence of a peace process in the 1990s. *D. Brundage*

168. Globalization and Its Discontents. S

Provides an overview of the origins and existing character of major institutions, structures, and dynamics of the global political economy. Examines some social consequences of neoliberalism as well as political responses to it. *J. Guthman*

170. Video Laboratory (2 credits). *

Trains students in the techniques of documentary film making. Through lectures, demonstrations, hands-on instruction, and review of work in progress, students learn the fundamentals of film-video pre-production, production, and post-production skills. Prerequisite(s): concurrent enrollment in course 100S. *D. Wellman*

171. Photography Laboratory (2 credits). *

Provides students with photography skills. Through lecture, demonstration, hands-on experience, and field sessions, students acquire technical and aesthetic training, darkroom skills, methods of photographing people, introduction to alternative processes, and learn to present finished photographs. Prerequisite(s): concurrent enrollment in course 100S. *D. Wellman*

172. Audio Laboratory (2 credits). *

Trains students in techniques of documentary audio production. Through lectures, documentary examples, demonstrations, hands-on instruction, and in consultation regarding work in progress, students gain skills required to produce their own audio documentaries. Prerequisite(s): concurrent enrollment in course 100S. *D. Wellman*

189. Methods of Teaching Community Studies. F,W,S

Each student serves as a facilitator for small discussion groups in connection with core community studies courses. Facilitators complete course readings and meet with instructor as a group to discuss the teaching process. May not be counted toward upper-division major requirements. Prerequisite(s): prior course work in the major. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar, course 42, under faculty supervision. Students submit petition to sponsoring agency. Approval by the Committee on Educational Policy the prior quarter. *The Staff*

193. Field Study. F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. To be used primarily by upper-division students doing part-time off-campus study. Petitions may be obtained in the Community Studies Department office. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. For upper-division students doing part-time off-campus study. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193G. Field Study (3 credits). F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. For upper-division students doing part-time off-campus

study. Petition must be obtained from the Community Studies Department. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Analysis of Field Materials. W

A seminar for students who have completed a full-time field study. Devoted to the systematic analysis of field materials, integrating appropriate concepts and relevant literature, as well as utilizing the experience of other students. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 198. Enrollment restricted to community studies majors. (General Education Code(s): W.) *D. Wellman, A. Steiner, I. Boal, D. Brundage, J. Guthman*

195A. Senior Thesis. F,W,S

Individual study with a faculty member to complete the senior thesis. Petitions may be obtained in the Community Studies Department office. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Thesis. F,W,S

Individual study with a faculty member to complete the senior thesis. Petitions may be obtained in the Community Studies Department office. Students submit petition to sponsoring agency. *The Staff*

195C. Senior Thesis. F,W,S

Individual study with a faculty member to complete the senior thesis. Petitions may be obtained in the Community Studies Department office. Students submit petition to sponsoring agency. *The Staff*

198. Independent Field Study. F

Provides for department-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Community studies majors are required to take 30 credits of field study. Students engaging in full-time field study must complete all application procedures as described in the Community Studies handbook. Students submit petition to sponsoring agency. Prerequisite(s): course 102 must be successfully completed before enrollment in this course. May be repeated for credit. *M. Rotkin, The Staff*

199. Tutorial. F,W,S

Advanced directed reading and research for the serious student. May be repeated for credit with consent of instructor. Petitions may be obtained in the Community Studies Department office. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Advanced directed reading and research for the serious student. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

209. Ethnographic Writing.

Fleashes out social analysis. Prepares students entering or returning from fieldwork to represent people, places, and social processes in writing. Employs writing exercises, in-class workshop, and review of ethnographic literature. Enrollment restricted to graduate students. Enrollment limited to 30. *M. Ochoa*

297. Independent Study. F,W,S

Either study related to a course being taken or a totally independent study. Designed for graduate students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Computer Engineering

See Engineering, page 224.

Computer Science

See Engineering, page 234.

Cowell College

College Office
(831) 459-2253
<http://www2.ucsc.edu/cowell>

For college description and list of faculty, see page 79.

Lower-Division Courses

10. Becoming a Successful Student (2 credits). W

An interactive course providing the opportunity to assess and revise methods of, and purposes in, studying. Critical, effective approaches to reading, writing, participating in lectures and sections, taking exams, balancing competing responsibilities, and utilizing campus resources are explored. Enrollment by permission of college adviser. Enrollment limited to 20. *The Staff*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

50. Library Skills for the Digital Age (2 credits). W

Intended to enhance students' skills in using the most powerful learning tool in any university: the library. Topics: organization of the library; how to begin researching; search engine and database use; judging the quality of sources; using sources responsibly. Disciplinary focus changes from quarter to quarter. Enrollment restricted to college members. Enrollment limited to 22. *W. Martyna*

60. Social Justice and Diversity (2 credits). W

Perspectives and case studies on diversity, communication, and social recognition. Discusses instances of social "isms" and "phobias" (racism, sexism, homophobia, xenophobia), and raises issues of religious tolerance and inter-faith dialogue. Includes current events and diversity topics in university life. Enrollment restricted to college members. Admission by written application. Enrollment limited to 22. *T. Miller*

61. Critical Journeys (2 credits). W

For publication in a Cowell literary journal, students substantively revise one of their fall quarter essays by studying a major work that influences, acknowledges, or further clarifies a required reading of the Cowell core course. Prerequisite(s): course 80A or 80B; enrollment restricted to members of Cowell College. Enrollment limited to 20. *C. Carlstroem, J. Wilson*

64. Social Justice: Issues and Debates (2 credits). W

Focused followup on social justice topics and readings introduced in the Cowell core course. Allows first-year students to pursue social justice themes in greater depth. Students must have previously taken a Cowell core course (or equivalent). Enrollment restricted to first-year students. Enrollment limited to 20. *J. Christianson*

70A. Bookbinding. F

Students learn techniques of bookbinding, construction, and design, and fundamentals of letterpress printing. Students are billed a materials fee. May not be used to fulfill art major requirements. (Also offered as Art 70A. Students cannot receive credit for both courses.) Enrollment limited to 12. (General Education Code(s): A.) *The Staff*

70B. Printing I: Elements of Printing. W

Learn fundamental skills in fine letterpress printing, including hand typesetting and instruction in the operation of printing presses. Basic typography explored as students design and print a small edition of a selected text. Students are billed a materials fee. May not be used to fulfill art major requirements. (Also offered as Art 70B. Students cannot receive credit for both courses.) Prerequisite(s): course 70A. Enrollment limited to 12. (General Education Code(s): A.) *The Staff*

70C. Printing II: Typography and Book Design. S

Students learn fundamental skills in fine letterpress printing, including hand typesetting and instruction in the operation of printing presses. Basic typography explored as students design and print a small edition of a selected text. Students are billed a materials fee. May not be used to fulfill art major requirements. (Also offered as Art 70C. Students cannot receive credit for both courses.) Prerequisite(s): course 70B or by instructor permission. Enrollment limited to 12. May be repeated for credit. (General Education Code(s): A.) *The Staff*

80A. Introduction to University Discourse: Imagining Justice Past and Present. F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Focuses on conceptions of justice, historic and contemporary, and considers how literary and artistic media may transmit, question, or revise notions of the just. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T4-Humanities and Arts, C1.) *D. Shemek*

80B. Rhetoric and Inquiry: Imagining Justice Past and Present. F

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Focuses on conceptions of justice, historic and contemporary, and considers how literary and artistic media may transmit, question, or revise notions of the just. Incorporates independent research. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T4-Humanities and Arts, C2.) *D. Shemek*

85. Introduction to Chinese Writing Systems. *

Gateway course illuminating the operation of the writing systems of greater China. Intended for students who are curious about the world's longest continually used symbol set as well as for those who may be considering a serious commitment to learning the language. *D. Keenan*

93. Field Study. F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

93F. Field Study (2 credits). F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

94. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a faculty instructor. Students submit petition to sponsoring agency. Enrollment limited to 10. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***118B. Words & Music: Poetry, Musical Theater, Opera. W**

Study of significant texts enhanced by music for performance. Topics vary annually. Course compares original texts in English translation with their adaptation to musical theater (*My Fair Lady*, *Oklahoma*, etc.) and opera (*Carmen*, etc.) May be repeated for credit. (General Education Code(s): IH.) *M. Ellis*

154. On Friendship. W

A consideration of friendship in Western culture from antiquity to the present. Texts range from Plato to Derrida, and from Shakespeare to *Sex and the City*. Each week, students interrogate friendship as a mobile, transforming ideal and activity, taking form in specific historical contexts. Enrollment restricted to juniors and seniors; Cowell College members given preference. Enrollment limited to 15. *M. Ursell*

164. Making Prometheus Speak: Myth and Torture (2 credits). W

A close reading of Aeschylus' *Prometheus Bound* together with legal and historical documents relating to the "torture debate" in the U.S. This ancient text is the basis for thinking about the political, legal, and moral justifications that inform the current debate. Enrollment limited to 15. *K. Bassi*

184A. Leadership and Institution Building (2 credits). F

Through lectures by senior administrators and student consensus-and-recommendation teams, students learn how leaders work with constituent groups, build cooperation, and develop implementation plans in an institution such as the University of California, specifically, UC Santa Cruz. Enrollment restricted to undergraduates accepted in the Chancellor's Undergraduate Internship Program. Enrollment limited to 40. *W. Ladusaw*

184B. Leadership and Institution Building (2 credits). W

Through lectures by senior administrators and student consensus-and-recommendation teams, students learn how leaders work with constituent groups, build cooperation, and develop implementation plans in an institution such as the University of California, specifically, UC

Santa Cruz. Enrollment restricted to undergraduates accepted in the Chancellor's Undergraduate Internship Program. Enrollment limited to 40. *W. Ladusaw*

184C. Leadership and Institution Building (2 credits). S

Through lectures by senior administrators and student consensus-and-recommendation teams, students learn how leaders work with constituent groups, build cooperation, and develop implementation plans in an institution such as the University of California, specifically, UC Santa Cruz. Enrollment restricted to undergraduates accepted in the Chancellor's Undergraduate Internship Program. Enrollment limited to 40. *W. Ladusaw*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Upper-division standing required and a proposal supported by a faculty member willing to supervise. *The Staff*

193. Field Study. F,W,S

Program of study arranged between a group of students and an instructor, which may involve work with an off-campus or non-departmental agency (e.g., internship or field work). Interview only; prior arrangement with instructor. Enrollment restricted to juniors and seniors. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Program of study arranged between a group of students and an instructor, which may involve work with an off-campus or non-departmental agency (e.g., internship or field work). Interview only; prior arrangement with instructor. Enrollment restricted to juniors and seniors. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and an instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and an instructor. Students submit petition to sponsoring agency. Enrollment restricted to juniors and seniors. May be repeated for credit. *The Staff*

195. Senior Thesis. F,W,S

Students submit petition to sponsoring agency. *The Staff*

198. Independent Field Study. F,W,S

Provides for college-sponsored individual study programs off campus, for which faculty supervision is not in person (e.g., supervision is by correspondence.) Up to three such courses may be taken for credit in any one quarter. Approval of student's adviser, certification of adequate preparation, and approval by provost required. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Various topics to be arranged. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Crown College

College Office

(831) 459-2665

<http://www2.ucsc.edu/crown>

For college description and list of faculty, see page 83.

*Lower-Division Courses***10. Becoming a Successful Student (2 credits). W,S**

An interactive course providing students with the opportunity to assess and revise methods of and purpose in studying. Critical, effective approaches to reading, writing, participating in lectures and sections, taking exams, balancing competing responsibilities, and utilizing campus resources are all explored. Permission of college adviser required. Enrollment limited to 24. *F. Ferguson*

28. Crown Student Leadership Development Seminar (2 credits). W

Explore leadership as it relates to student development at Crown College. Examine how values, ethics, involvement, identity, and theory affect leadership in a variety of content areas. Evaluate student's leadership strengths to determine objectives for improvement. *The Staff*

31. Crown College Student Leadership in Action Seminar (2 credits). S

Focuses on developing and establishing leadership skills and styles for new leaders at Crown College. Explores communication styles, group dynamics, community development, programming, moral development and conflict resolution concepts and strategies. Applies theory to action. Enrollment limited to college members and by permission of instructor. *The Staff*

80A. Intro to University Discourse: Ethical Issues in Emerging Technologies: Transgenics, Clones, Cyborgs. F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Examines ethical challenges resulting from the constant changes caused by rapidly accelerating pace of change brought on by science and technology. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T4-Humanities and Arts, C1.) *F. Ferguson*

80B. Rhetoric and Inquiry: Ethical Issues in Emerging Technologies: Transgenics, Clones, Cyborgs. F

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Examines ethical challenges resulting from constant changes caused by rapidly accelerating pace of change brought on by science and technology. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T4-Humanities and Arts, C2.) *F. Ferguson*

80C. Cosmology and Culture. *

Introduction to scientific cosmology. Examination of cultural roles of creation myths and cosmologies; examples include Zunian, Mayan, and ancient, medieval, and modern Judeo-Christian cosmologies. Possible cultural and religious repercussions of Big Bang, Gaia, and other

modern origin stories. (Also offered as Physics 80C. Students cannot receive credit for both courses.) (General Education Code(s): T7-Natural Sciences or Social Sciences.) *J. Primack*

80F. Science Fiction/Science Fact. W

Examines the link between science fiction and "real" science. Does conflict exist between the confident optimism of scientists and the dystopic scenarios of sci-fi writers? Explores how science fiction influences actual technological possibilities and affects cultural attitudes. Enrollment restricted to college members or by permission of instructor. Enrollment limited to 20. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *A. Rava*

80G. Ethics and the New Eugenics. W

A reading/writing/seminar discussion that compares the intellectual premises and social/cultural context of the early 20th-century American eugenics movement to the new eugenics currently emerging from the science of human bioengineering. Enrollment limited to 25. (General Education Code(s): T3-Social Sciences.) *E. Cummins*

80J. Cyborg Society: Myths, Realities, Choices. S

Examines content and methodologies of the emerging field of cyborgology. Includes social studies of science, anthropology, sociology, philosophy, politics, art, biology, and informatics. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *C. Gray*

80K. Science, Technology, and Human Biology on Exhibition. W

Presents innovative museum exhibitions and artists whose work is geared toward educating the public about science, technology, and human biology. Field trips may include The Tech Museum of Innovation and The Exploratorium. Prerequisite(s): satisfaction of the C1 requirement; enrollment restricted to college members or by permission of instructor. Enrollment limited to 20. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *T. Wong*

80S. Undergraduate Seminar in Science, Technology, and Society. S

An honors seminar for first year students on selected topics that examine the relationship between science, technology, and society. Precise focus of each seminar varies and is announced by the college. Preference given to Crown College students. Enrollment restricted to first-year and sophomore students. Enrollment limited to 20. (General Education Code(s): T2-Natural Sciences.) *The Staff*

93. Field Study. F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Students should review plans with an appropriate fellow of the college. A proposal should be presented to the college academic preceptor no later than the seventh week of the preceding quarter. Credit is granted by the sponsor upon approval of the work performed. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

93F. Field Study (2 credits). F,W,S

Provides for individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Individual study for lower-division students directed by a fellow of Crown College. Students submit petition to sponsoring agency. Enrollment restricted to college members. *The Staff*

Upper-Division Courses

123. Science and Human Values. S

Study of how we acquire the values by which we make choices, and of the impact of science and science-based technology on our values. A writing-intensive, primarily lecture course. In daily writings students respond to what happened that day in class. Weekly writing assignments are introspective. They are designed for students to explore and better understand their own values and decision making. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; permission of instructor after written application and personal interview during the preceding winter quarter. Enrollment limited to 40. (General Education Code(s): W.) *F. Andrews*

170A. Leadership and Teamwork in the Workplace A (2 credits). W

Supports students in reflecting on and enhancing experiential learning in a profession training program (PTP) internship matching their career goals. Subjects include techniques for maximizing the internship experience with a focus on preparing for leadership in the workplace. Enrollment by interview only. Enrollment limited to 20. *B. Silverthorne*

170B. Leadership and Teamwork in the Workplace B (2 credits). S

Supports students in reflecting on and enhancing experiential learning in a profession training program (PTP) internship matching their career goals. Subjects include techniques for maximizing the internship experience with a focus on preparing for leadership in the workplace. Prerequisite(s): course 170A and permission of instructor. Enrollment limited to 20. *B. Silverthorne*

185. Profession Training Program: Internship Preparation (2 credits). F

For all students preparing for an internship; exploration of career objectives, tools and resources to assist in finding and securing the ideal internship, and techniques for maximizing the benefits of the internship experience. Enrollment by consent of instructor. Enrollment limited to 40. *B. Silverthorne*

198. Independent Field Study. F,W,S

Provides for college-sponsored individual study programs off campus. Approval of student's faculty sponsor and college academic provost required. *The Staff*

199. Tutorial. F,W,S

Individual study for upper-division students directed by a fellow of Crown College. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual study for upper-division students directed by a fellow of Crown College. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Digital Arts and New Media

Porter D-121
(831) 459-1554
<http://digitalarts.usc.edu>

Faculty and Professional Interests

RALPH H. ABRAHAM, Professor Emeritus, Mathematics

ELLIOT W. ANDERSON, Assistant Professor, Art
Electronic art, digital arts/new media

LAWRENCE ANDREWS, Associate Professor, Film and Digital Media
Film, video, installation and media art

TANDY BEAL, Lecturer, Theater Arts (Dance)
Choreography, improvisation, technique, performance skills, collaborations with classical and jazz composers, circus, theater and video, children's productions

JAMES H. BIERMAN, Professor, Theater Arts (Drama)
Playwriting, theater history and literature, classical and Renaissance drama, Chicano theater, digital media

BENJAMIN L. CARSON, Assistant Professor, Music
Theories of consciousness and cognition, rhythm perception, Schoenberg, history of compositional method, subjectivity and identity

DAVID H. COPE, Professor Emeritus, Music

DAVID W. CRANE, Assistant Professor, Film and Digital Media
Film and media theory, discourses on technology, digital culture, experimental media, critical and psychoanalytic theory

DAVID L. CUTHBERT, Assistant Professor, Theater Arts
Lighting design, CADD, projection design, scenic design

SHARON A. DANIEL, Associate Professor, Film and Digital Media
Community-based public art in information and communications environments, social and political aspects of information technology, community networks, participatory culture, digital inclusion, net art, human-computer interface design

JAMES E. DAVIS, Assistant Professor, Computer Science
Computer graphics and computer vision, methods for acquiring and manipulating complex graphical models from the real world

PETER Q. ELSEA, Lecturer, Music
Electronic music and music technology

SHELLY E. ERRINGTON, Professor, Anthropology
Globalization of folk art, visual and social semiotics, photography, film, the Internet and digital media, Southeast Asia, and Latin America

MARY K. FOLEY, Professor, Theater Arts (Drama)
Asian theater, Southeast Asian studies, performance studies, maskwork, puppetry, multicultural theater

MARK FRANKO, Professor, Theater Arts (Dance)
Dance history and theory, choreography, technique, performance studies, theatrical theory in historical and critical perspective

PATTY GALLAGHER, Assistant Professor, Theater Arts (Dance)

Movement training for actors, circus and clown traditions, and Indonesian dance/performance

JENNIFER A. GONZÁLEZ, Associate Professor, History of Art and Visual Culture

Contemporary theories of visual culture, semiotics, critical museum studies, photography, public and activist art in the U.S.

ELI E. HOLLANDER, Professor, Film and Digital Media

Film and video directing; ethnographic documentary directory, editing, cinematography, and videography; digital image generation; screenwriting

DONNA M. HUNTER, Associate Professor, History of Art and Visual Culture

European painting (especially French) from 1600 to the 1960s; German art and visual culture between the two world wars; art as social practice, portraiture

DAVID E. JONES, Professor, Music; Provost, Porter College

Composition and analysis, chamber opera, Balkan music, language and music, timbre and orchestration

NORMAN LOCKS, Professor, Art

Photography

SURESH K. LODHA, Professor, Computer Science

Geo-spatial visualization, scientific visualization, sensor and computer vision, data mining

CHARLES L. LORD, Professor, Film and Digital Media

Film and video directing and editing, video theory and history, video installation, screenwriting, documentary production

DOMINIC W. MASSARO, Professor, Psychology

Understanding language, speech perception and reading, language learning and speech technology, pattern recognition, psychology of interactive media, psychology of art and new media, human-machine interface

MICHAEL J. MATEAS, Assistant Professor, Computer Science

Artificial Intelligence (AI) for art and entertainment, game AI, AI and creativity, AI-based interactive storytelling, autonomous characters

CHARLES E. MCDOWELL, Professor, Computer Science

Programming languages, parallel computing, and computer science education

MARGARET E. MORSE, Professor, Film and Digital Media

Digital and electronic media theory and criticism, media art, media history, technology and culture, film history and theory, German cinema, documentary, science fiction, and silent comedy

SORAYA MURRAY, Lecturer, History of Art and Visual Culture

Contemporary art with emphasis in new media art and theory; African diaspora and globalization

PAUL NAUERT, Associate Professor, Music

Theory, composition; rhythm and meter; music cognition; mathematical and computer models of the compositional process

DARD A. NEUMAN, Assistant Professor, Music; Kamil and Talat Hasan Endowed Chair in Classical Indian Music

Ethnomusicology; Hindustani music; colonialism, nationalism, technology and performance; sitar

MARCIA OCHOA, Acting Assistant Professor, Community Studies

Gender and sexuality, race and ethnicity, Latino/a studies, media and cultural studies, ethnography of media, feminism, queer theory, geography, multimedia production, graphic design, colonialism and modernity, Latin American studies—Colombia and Venezuela

ALEX PANG, Professor, Computer Science

Uncertainty visualization, tensor visualization, scientific visualization, collaboration software, virtual reality interfaces

ISABEL REICHERT, Lecturer, Film and Digital Media

Video, conceptual art, and new genres

WARREN SACK, Assistant Professor, Film and Digital Media

Software design and media theory

DANIEL SCHEIE, Professor, Theater Arts (Drama)

Acting, directing, dramatic literature, theater history, Shakespeare, Wagner, gay studies

BARRY R. SINERVO, Professor, Ecology and Evolutionary Biology

Animal behavior, evolution, physiological ecology

CATHERINE M. SOUSSLOFF, Professor, History of Art and Visual Culture (UC Presidential Chair)

European cultural theory, aesthetics, and the historiography of art; performance studies; early modern Italian art; media history including film; Jewish identity and representation

ELIZABETH STEPHENS, Associate Professor, Art

Intermedia, electronic art, sculpture, and performance art

RENEE TAJIMA-PEÑA, Associate Professor of Community Studies

Documentary film and video focusing on Asian American and immigrant communities, media, and social change

HAI TAO, Assistant Professor, Computer Engineering

Image and video processing, computer vision, vision-based graphics, and human-computer interaction

GUSTAVO VAZQUEZ, Assistant Professor, Film and Digital Media

Film and video production, directing drama, documentary and experimental cross-cultural experiences in film, film curator

EDWARD C. WARBURTON, Assistant Professor, Theater Arts

Development of dance thought in action, creative processes, and technology in theater arts; dance technique, movement research and composition, and applied dance practices

LEWIS G. WATTS, Associate Professor, Art

Photography

EMMET J. WHITEHEAD, Associate Professor, Computer Science

Software engineering, software configuration management, web, hypertext, collaborative authoring, hypertext versioning, Internet information systems

Program Description

New technologies have profoundly changed contemporary culture and inevitably altered the role of the arts in society. The Digital Arts and New Media MFA Program serves as a center for the development and study of digital media and the cultures that they have helped create. Faculty and students are drawn from a variety of backgrounds, such as the arts, computer engineering, humanities, the sciences, and social sciences, to pursue interdisciplinary artistic and scholarly research and pro-

duction in the context of a broad examination of digital arts and cultures.

The Digital and New Media MFA Program (DANM) is a two-year program. The requirements of the program are being revised. Review the program requirements at <http://danm.ucsc.edu> for the most current information. Students take courses in each of these interdependent and equally important program areas:

New Praxis—The term “Praxis” has many meanings, which include “translating ideas into action” and “action and reflection upon the world in order to change it.” New Praxis in DANM is comprised of “critique” and “practicum” which provide students with both the practical training and critical dialogue necessary to pursue their own individual goals as artists and cultural practitioners.

Studies—DANM “Studies” include required core seminars that allow students first, to explore an array of recent methods and approaches in Digital Arts and Culture, and then pursue the construction of specific genealogies and theories with a sustained focus on a particular topic, before beginning to develop a thesis project and paper by engaging in various dialogues at the intersection of theory and practice.

Collaborative Research—Faculty lead students in major collaborative research projects that will result in publications and exhibitions. The following are descriptions of three current areas of DANM faculty research: participatory culture, performative technologies, and mechatronics. We ask that prospective students identify their working relationships with one or more of these areas in their application and statement of purpose. As new research emphases arise, other categories for potential project groups will be formed.

Participatory Culture

DANM’s participatory culture studies and research explore the role of information and communication technologies in what has sometimes been described as the shift from “top-down” culture to a “lateral” or “heterarchical” culture of participation and social engagement. In many social domains and practices, the human/computer interface acts as both a boundary and a bridge. Participatory culture research in DANM may encompass a range of projects in social computing, community-media activism and other modes of engagement that involve the design of new technologies and/or technologies that address social issues and help to democratize participation in culture and politics.

Performative Technologies

Research in performative technologies explores new methods for combining media and technology to create the visual, aural and connective material of performance. DANM performance research generates new public and performative spaces where digital media, communication networks, and interactive systems may be fused with lighting, movement, stage and sound design to create mixes of real-time/recorded shared multimedia experiences shared by audiences and performers at both local and remote locations. Ongoing projects in this area may include work in telematics, performance-driven real-time graphics, algorithmic composition of sound and image, computer vision and motion capture, and studies of ritual, performativity, embodiment, interactivity, and subjectivity.

Mechatronics

Mechatronics is the functional integration of mechanical, electronic, and information technologies. In DANM this framework may be employed for the

development and production of physical, systems-based artwork that incorporates elements of robotics, motion control, software engineering, and hardware design. DANM mechatronics research involves the use of a variety of media that may include video, performance, and sculpture, for the creation of complex, kinetic, audio-visual systems for the exploration of temporality, materiality, experience, perception, as well as relations between biological/life-like forms and environmental worlds.

Pedagogy—DANM trains future arts academics through practical experience. Students are awarded teaching assistantships as part of their overall support package as well as opportunities to assist faculty in workshops.

Thesis Requirement

Students are required to complete a thesis project and written paper under the supervision of their thesis committee. The thesis will be an arts project with digital documentation accompanied by a written paper. Thesis projects may be individual or collaborative and are expected to grow out of the research pursued in the project groups during the three quarters prior as well as work developed in new praxis courses. Each student will be expected to complete a 20- to 30-page paper discussing the student's preparatory research as well as the theoretical significance of the project. In the case of collaborative projects each student will be required to submit his or her own paper. During the thesis year, students will make at least two progress presentations to their thesis committee. The chair and at least one other member of the three-person committee will be senate faculty and members of the DANM program faculty. A completed thesis project and paper must be submitted to and approved by the thesis committee before the degree can be awarded.

Applications

Prospective students in the Digital Arts and New Media program will have a foundation in the arts with some demonstrated interest in technology or a foundation in technology with demonstrated background in the arts. Many, but not all, entering students will have completed a Bachelor of Arts program in one or more of the arts disciplines (art or art history, film, multimedia, music, theater, video, etc.) or a Bachelor of Science program in computer science or computer or electrical engineering. Other successful applicants will have a BA or BS in another field but will be able to show substantial achievement in the arts, in technology or in digital arts.

In certain cases, students who demonstrate excellent potential for the program but lack proficiency in a "cross discipline" will be admitted to the program with the understanding that they will take courses during their first two quarters of study to make up that deficiency. An arts student lacking sufficient programming experience, for example, will be expected to take one or two programming courses in their first two quarters in addition to the DANM program requirements.

Students will apply online through the Division of Graduate Studies web site between October and February for the following fall quarter. In addition to submitting an on-line application, students will be expected to submit a non-returnable representative sample of their work, i.e., a portfolio, on a CD, CD-ROM or DVD. Further information can be found at: <http://graddiv.ucsc.edu>.

Graduate Courses

201. Recent Methods and Approaches to Digital Arts and Culture. F

Students examine methods and approaches to research and writing in Digital Media Art and Culture, and explore key theories concerning digital media and cultures. The course may focus on the interaction between digital technologies and socio/cultural formations. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. *S. Murray*

202. Genealogies and Theories of Digital Arts and Culture. F

Provides examination of a particular theoretical and/or historical premise related to issues of media, art, and mediation, as a means of teaching a common approach to the construction of genealogies within digital art and culture. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 18. *Christina McPhee*

203. Dialogues and Questions in Digital Arts and Culture. S

Students engage in dialogues at the intersection of theory and practice with the goal of producing a pre-thesis proposal and essay. Readings and seminar discussions inform the development of project proposals and essays, which theoretically contextualize students' work. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 18. *D. Crane*

210. Project Design Studio. F

Students work on the design of individual projects by developing project proposals, budgets, "proof of concept" design documents and/or prototypes and exploring tools, technologies, programming languages, hardware, software, and electronics techniques relevant to their projects. Enrollment restricted to graduate students. Enrollment limited to 18. *The Staff*

211. Critique. S

First-year digital arts and new media graduate students are required to present work-in-progress based on the projects developed in earlier courses and during the current quarter in individual studio critiques with the instructor as well as in group critiques. (Formerly course 211B, *Critique/Lecture II*) Enrollment restricted to graduate students. Enrollment limited to 18. *J. González*

212. Thesis Proposal (no credit). S

Students work on the development and completion of their thesis project proposal and abstract under the supervision of the program director and their thesis committees. Enrollment restricted to DANM students. Enrollment limited to 18. *The Staff*

215. MFA Exhibition Production. S

Second-year digital arts and new media graduate students work with faculty curator/coordinator to develop these projects specifically for the group exhibition context. Students contribute to exhibition design and collateral materials while studying the unique presentation and curatorial challenges of new media. Enrollment restricted to graduate students. Enrollment limited to 18. *S. Murray*

216. Digital Bodies. *

Explores the appearance, form, and theoretical status of the human body/political subject in online art. Focuses on representations of race and gender, family resemblances, and local communities, as well as the political and colonial metaphors of spatial interaction operating

on the World Wide Web. Visual representations of bodies that take the form of avatars, advertising, robots, and anime studied in their contextual usage. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 17. *J. González*

217. Concepts in Electronic Art. *

Study of concepts developed in contemporary conceptual art practice and their application to technological media. Review a broad spectrum of electronic art—the Internet, digital video, interactive systems, kinetics and robotics, biotechnological work—that hold conceptual art practice in the foreground. Use concepts cultivated by early conceptual artists and apply them to individual projects using electronic media. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 17. *I. Reichert*

218. Interactive Game Design. *

As a team, students design a working prototype of a game including the Design Document, Prototypes, and Game Implementation. Introduced to advanced media types including 3D animation, principles of object-oriented programming, digital music, and video. Strongly recommended that students have a working knowledge of programming language, preferably an object-oriented language (Macromedia Lingo preferred). Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 17. May be repeated for credit. *B. Sinervo*

219. Introduction to Electronics for Artmaking. F

Intensive introduction to electronic devices used in artmaking, providing hands-on experience with sensors, motors, switches, gears, lights, simple circuits, microprocessors, and hardware storage devices to create kinetic and interactive works of art. Students are billed a materials fee. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 18. *E. Anderson*

220. Introduction to Programming for the Arts. W

Covers aspects of computer programming necessary for digital art projects. Students learn to manipulate digital media using program control for installations, presentations, and the Internet. No prior programming experience required. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 10. *P. Elsea*

224. Digital Arts Project Studio. W

Provides a context for significant development of digital arts projects: in the first year, individual and collaborative; in the second year, resolution of thesis projects. Individuals and collaborative groups meet with the instructor for focused critical feedback. Students create a public exhibition of their work-in-progress. Enrollment restricted to graduate students. Enrollment limited to 18. *E. Crichton*

225. Theater, Drama, and the Pixar Feature. *

Viewing of the Pixar Animation Studios canon combined with lectures on the major art history movements within discipline of theater history and its attendant dramatic literature: The Marxist Epic: *A Bug's Life* and the Backstage Musical; Shakespeare's Comedic Weltanschauung: *Finding Nemo*; Postmodern Criticism: *Toy Story*; French Romanticism and the Hugo Hero: *Monsters, Inc.*; Alger, Albee, and *The Incredibles'* American Dream. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 17. *D. Scheie*

226. Creativity, Collaboration, and Professionalism in Art. *

Exploration of the practice of making a living, as well as a life, in art. Examines strategies for connecting with the community using outreach projects and the joys and sorrows of working collaboratively. Compares corporate and nonprofit funding paths and the business of showing work while maintaining creative challenges. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 17. May be repeated for credit. *T. Beal*

227. Projected Light in Performance. *

Exploration of projected light in performance and art. The history of lighting as art is covered in a hands-on demystifying format from the shadow of a bare light bulb to the latest in automated and projection equipment and techniques. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 20. *D. Cuthbert*

228. Techniques of Modernity and Aesthetic Formations. *

Explores the transformations and aesthetic possibilities of the digital age through a study of perceptual shifts of the past, from orality to literacy, gift to commodity, pre-colonial to colonial, "pre-modern" to "modern," and the technological revolutions that accompanied these shifts. (Also offered as Music 228. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 18. *D. Neuman*

229. Interactive Digital Design for Theater. *

Examination of the integration of graphic and sound designs with live theatrical performance. Create a dazzling array of images, animations, video, and sounds that work as an ensemble to create a performance environment that responds to the cues of the performers. Offered in conjunction with Theater Arts 151 and results in a live performance. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit. *J. Bierman*

247. Performance/Performativities. W

Performance acts and theories of performativity in visual culture from modernity to present. Major theoretical positions subtending the emergence of performances/performativities: subjectivity, identity, temporality, media, ritual, the event, the body and embodiment, collaboration, and politics. (Also offered as History of Consciousness 247. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Qualified seniors accepted with permission of instructor. Enrollment limited to 15. *C. Soussloff*

249. Faculty Seminar (2 credits). F

Faculty lectures to familiarize first-year DANM graduate students with program faculty members and their creative work and research so the students can select their faculty advisers and thesis committee members. Enrollment restricted to graduate students. Enrollment limited to 18. *The Staff*

250A. Collaborative Research Project Groups. S

Three-quarter collaborative research project group in one of three focus areas that represent the current research of DANM faculty: participatory culture, mechatronics, and performative technology. Students and faculty engage in research collaborations resulting in publications and

exhibitions. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit. *The Staff*

250B. Collaborative Research Project Groups. F

A three-quarter collaborative research project group in one of three focus areas that represent the current research of DANM faculty: Participatory Culture, Mechatronics, and Performative Technology. Students and faculty engage in research collaborations resulting in publications and exhibitions. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit. *The Staff*

250C. Collaborative Research Project Groups. W

Three-quarter collaborative research project group in one of three focus areas that represent the current research of DANM faculty: participatory culture, mechatronics, and performative technology. Students and faculty engage in research collaborations resulting in publications and exhibitions. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit. *The Staff*

254I. Empirical Approaches to Art Information. *

Reading and practice in empirical methods, as applied to the study of music, visual art, multimedia production, and performance arts. Topics include semiotics, critiques of empiricism, cultural determinants and contingents of perception, the psychophysics of information, sensory perception (visual and auditory), memory, pattern recognition, and awareness. Students apply existing knowledge in the cognitive sciences to a developing creative project, or develop and conduct new experiments. (Also offered as Music 254I. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 17. May be repeated for credit. *B. Carson*

254L. John Cage: Innovation, Collaboration, and Performance Technologies. W

In-depth examination of John Cage's interdisciplinary work, his pioneering activity in live electronic technology, and his influence in current multimedia creativity. Approximately one-half of the seminary is devoted to student research and creative projects and reflect Cage's legacy. (Also offered as Music 254L. Students cannot receive credit for both courses.) Enrollment restricted to juniors, seniors, and graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 12. *The Staff*

267. Workshop in Computer Music and Visualization (2 credits). F,W,S

Graduate-level techniques and procedures of computer music composition and visualization. Practical experience in the UCSC electronic music studio with computer composition systems and software, including visualization and interactive performance systems. Extensive exploration of music and interactive graphic programs such as Max/MSP/Jitter. Enrollment by permission of instructor; appropriate graduate experience required. Enrollment restricted to graduate students. Also offered as Digital Arts and New Media 267. Students cannot receive credit for both courses. (Also offered as Music 267. Students cannot receive credit for both courses.) Enrollment limited to 12. May be repeated for credit. *The Staff*

290. Interactivity in Performance. *

Examines use of interactive technologies to bring about collaboration among visual, performance, and sound art. Goal is to collaboratively produce an interactive live-performance work. Explores methodologies and technologies of interactivity, space, and time and addresses aesthetic

and compositional concerns that arise when using interactive digital tools, including critical discussions about how technology itself shapes form and content of an artwork. Meets 3 1/2 hours/week for combination lab and lecture. Enrollment restricted to graduate students. Upper-division undergraduates may enroll with permission of instructor. *E. Anderson*

297. Independent Study. F,W,S

Independent digital arts and new media research project under the guidance of a digital arts and new media faculty member or other faculty with approval of adviser. Project includes readings, research, and a written report. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. Maximum 10 credits. May be repeated for credit. *The Staff*

297G. Independent Study (3 credits). F,W,S

Independent digital arts and new media research project under the guidance of a digital arts and new media faculty member or other faculty with approval of adviser. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for a maximum 6 credits. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students carry out a master's of fine arts thesis in digital arts and new media research, under the guidance of a thesis committee. The thesis will be an arts project with digital documentation accompanied by a written paper discussing the student's preparatory research as well as the theoretical significance of the project. Enrollment restricted to graduate students. Maximum 10 credits. May be repeated for credit. *The Staff*

Dual-Degree Engineering

See Engineering, page 247.

Earth and Planetary Sciences

A232 Earth and Marine Sciences Building
(831) 459-4089
<http://www.es.ucsc.edu>

Faculty and Professional Interests

ERIK ASPHAUG, Professor
Asteroids, comets, the moon and planetary surface evolution

EMILY E. BRODSKY, Associate Professor
Earthquakes, volcanoes, fluid flow in fractured media

KENNETH L. CAMERON, Emeritus

PATRICK Y. CHUANG, Associate Professor
Clouds, aerosols and climate

MATTHEW E. CLAPHAM, Assistant Professor
Paleobiology, geobiology

ROBERT S. COE, Professor
Geophysics, paleomagnetism, tectonics

ANDREW T. FISHER, Professor
Hydrogeology, crustal studies, coupled flows, modeling

ROBERT E. GARRISON, Professor Emeritus

JAMES B. GILL, Professor
Igneous petrology, geochemistry of island arcs

GARY A. GLATZMAIER, Professor
Computer simulation of geodynamics and planetary dynamics

GARY B. GRIGGS, Professor, Earth Sciences;
Director, Institute of Marine Sciences
Coastal processes, hazards and engineering

JEREMY K. HOURIGAN, Assistant Professor
Thermochemistry, structural geology, tectonics

ELISE KNITTLE, Professor
Mineral physics, experimental geophysics

PAUL L. KOCH, Professor
Isotope biogeochemistry, vertebrate paleontology

DON KORYCANSKY, IGPP/CODEP Associate
Research Planetary Scientist
Planetary impacts, asteroid dynamics

MARC KRAMER, IGPP Assistant Research Earth
Scientist
Biogeochemistry, Earth surface process, remote sensing

MIKHAIL KRESLAVSKY, Assistant Research
Planetary Scientist
Mars surface evolution and planetary data analysis

LEO F. LAPORTE, Professor Emeritus

THORNE LAY, Professor, Earth Sciences
Seismology, geophysics

KAREN C. MC NALLY, Emerita

MARCIA K. MCNUTT, Professor
Tectonic marine geophysics

J. CASEY MOORE, Emeritus

FRANCIS NIMMO, Associate Professor
Mars, icy satellites, planetary geophysics

ADINA PAYTAN, IMS Associate Research Scientist
Biogeochemistry, paleoceanography, environmental and aquatic chemistry

HILDE L. SCHWARTZ, Lecturer
Vertebrate paleontology, environmental geology, paleoecology, chemosynthetic ecosystems

SUSAN Y. SCHWARTZ, Professor
Seismology, geophysics, active tectonics

ELI A. SILVER, Professor
Marine geology and geophysics, active tectonics, remote sensing

LISA SLOAN, Professor
Paleoclimatology and climate change, Earth system science, surficial processes

OTHMAR T. TOBISCH, Emeritus

SLAWOMIR M. TULACZYK, Professor
Glaciology and glacial geology, geomorphology, soil mechanics

STEVEN N. WARD, IGPP Research Geophysicist
Seismology, geophysics

GERALD E. WEBER, Lecturer Emeritus

QUENTIN WILLIAMS, Professor
Mineral physics, tectonophysics, experimental geochemistry

RU-SHAN WU, IGPP Research Geophysicist
Seismology, geophysics; wave propagation and subsurface imaging

XIAO-BI XIE, IGPP Associate Research
Geophysicist

Theoretical and applied seismology

JAMES C. ZACHOS, Professor
Paleoceanography, marine stratigraphy

XIXI ZHAO, Lecturer, Earth Sciences; Research
Geophysicist, IGPP

Paleomagnetism and rock magnetism and their application to the history of Earth's magnetic field



KENNETH W. BRULAND, Professor, Ocean Sciences
Chemical oceanography, biogeochemistry of trace metals and radionuclides, aquatic chemistry, geochemistry

WEIXIN CHENG, Associate Professor,
Environmental Studies

Soil ecology, agroecology, biogeochemistry, global change ecology

MARGARET L. DELANEY, Professor, Ocean Sciences
Paleoceanography, marine geochemistry

A R. FLEGAL, Professor, Microbiology and
Environmental Toxicology

Anthropogenic perturbations of biogeochemical cycles, applications of isotopic tracers in anthropology and archaeology

ANA C. RAVELO, Professor, Ocean Sciences

Stable isotope geochemistry and chemical oceanography, paleoclimatology

Program Description

The study of Earth and planetary sciences encompasses a broad exploration and understanding of the origin and evolution of the Earth, its sister planets and satellites, and life forms found on and in Earth's crust. Earth science has been unified by the theory of plate tectonics, which considers Earth's surface to be broken into a number of interlocking plates. Plate movements result in ocean basin formation, mountain building, and plate translation along great faults such as the San Andreas, only 15 kilometers east of Santa Cruz. Most earthquakes and volcanic activity occur at modern plate boundaries. Energy, mineral, and water resources, geologic hazards, climate change, and earthquake hazard reduction comprise some pressing societal concerns of the Earth sciences. A large question in planetary sciences is whether Earth-like tectonics operate on other planets and satellites, and, if not, how their interiors and surfaces have evolved.

Students who have a strong background in Earth sciences and related disciplines will be prepared for a wide variety of employment opportunities in teaching, research, government, consulting, and industry.

Faculty and research staff cover many subdisciplines, including petrology, geochemistry, paleobiology, paleoceanography, climatology and paleoclimatology, hydrology, geomorphology, glaciology, tectonics, mineral physics, seismology, paleomagnetism, and planetary sciences.

On-campus research facilities include laboratories in seismology, paleomagnetism, mineral physics, stable and radiogenic isotope geochemistry, surface processes, hydrology and hydrogeology, high performance computing for climate modeling and planetary sciences, atmospheric chemistry, electron microscopy, and a wide variety of chemical analysis facilities for rock and water samples (XRF, ICP, microprobe, and XRD spectroscopies). Many laboratory activities are associated with UCSC's Institute of Geophysics and Planetary Physics

(IGPP). Research scientists associated with IGPP add significantly to the intellectual and teaching resources available in Earth and planetary sciences at UCSC.

Earth and planetary sciences is also associated with the Institute of Marine Sciences (IMS), a group of physical, geological, chemical, and biological oceanographers. As with IGPP, IMS adds to the intellectual, research, and teaching resources. IMS also includes numerous affiliated researchers from the nearby U.S. Geological Survey Coastal Branch and the Monterey Bay Aquarium Research Institute.

The Earth and Planetary Sciences Department offers both bachelor of arts (when combined or doubled with another major) and bachelor of science degrees. Combined majors leading to a B.A. degree in Earth sciences/anthropology or environmental studies/Earth sciences are also offered; for the latter program description, see page 262. A minor in Earth sciences is also available. Students planning to transfer into the program are strongly encouraged to satisfy prerequisites to upper-division courses for the B.S. or B.A. degree before transferring to UCSC.

Earth and planetary sciences instruction at UCSC encompasses surficial and internal processes and to geological oceanography, including geology, geophysics, and geochemistry. Undergraduate courses integrate these subdisciplines and applications, with a focus on modern frontiers and career opportunities in the field. A core set of three foundation courses is available to all majors; these provide rigorous development of the central concepts in Earth and planetary sciences. All upper-division Earth and planetary sciences courses involve intensive written work, which most students find helpful in developing skills useful in the job market. In addition, there is a requirement to take two upper-division courses that provide hands-on experience with data acquisition and analysis, which is also valuable training for the job market and for graduate research.

The remaining requirements for the major are designed with sufficient flexibility to tailor each degree to particular student interests and career intentions. Through appropriate selection of elective courses, students can develop a focus in any of a wide variety of areas, emphasizing, for example, environmental issues, geologic hazards, water resources, global change, or traditional areas such as geology, geophysics, or geochemistry. Some of the many course combinations that can be constructed to prepare for various career directions are discussed below. Obtaining advice from the department's faculty and staff to clarify career opportunities is strongly recommended.

Many related courses are offered by other departments, such as Ocean Sciences, Microbiology and Environmental Toxicology, Environmental Studies, Biology, and Astronomy. Weekly seminars by visiting lecturers provide an opportunity for graduates and undergraduates to gain exposure to leading researchers and research topics in Earth and planetary sciences. An internship program provides opportunities for undergraduate (and graduate) students to gain practical work experience, which may prove beneficial in the industrial and governmental job market. The department also offers an optional mentorship course (course 190, 1 credit) which introduces students to research programs and analytical facilities in the department and helps them to prepare for professional life after graduation. The small class format allows students close interaction with three faculty members during each offering.

Those interested in the M.S. or Ph.D. degree programs should see the description below and request further information and apply online through the Division of

Graduate Studies. The Earth and Planetary Sciences Department web site offers valuable information about the graduate program: <http://es.ucsc.edu/grad/gradprog.html>.

Academic Advising

A student who wants to become an Earth sciences major should contact the Earth and Planetary Sciences Department undergraduate degree adviser as soon as possible. After developing a formal study plan on a declaration of major petition, students are required to meet with staff and faculty advisers who can help the student plan his or her program in detail and provide information about independent study, thesis research, advanced study, career options, and other educational opportunities. For the combined major with environmental studies, students begin the advising process with the Department of Environmental Studies; after which they meet with the Earth and Planetary Sciences Department for dual advising. Relevant courses taken at UCSC or other institutions may be substituted for degree requirements by approved petition. Please see the undergraduate adviser for the substitution petition form and more information about this process.

Transfer Students

Transfer students planning to major in Earth sciences are encouraged to call for advice about courses they should complete before arrival at UCSC. It is important that students have completed as many as possible of the required chemistry, biology, calculus, and calculus-based physics courses. Having this course work completed elsewhere allows students greater flexibility in scheduling and completing their UCSC Earth and planetary sciences courses. Junior transfer Earth and planetary sciences majors and prospective majors should meet with department advisers during summer orientation or shortly after their arrival on campus to plan their next two years' schedule of courses.

Bachelor of Science Degree

The B.S. program is designed for students who intend to pursue professional careers in Earth and planetary sciences, engineering, policy, law, teaching, or business or who otherwise desire the broad, quantitative training available at UCSC. In addition to providing comprehensive preparation in the basic physical sciences, and particular breadth and depth in Earth and planetary sciences, the curriculum is structured to prepare students for the competitive graduate school and career marketplace.

The core of the major includes calculus, physics, chemistry, and a group of comprehensive Earth and planetary sciences courses. For the standard B.S., students then select at least four additional courses from a diverse list of upper-division electives, with at least two that involve significant laboratory or field data acquisition and analysis. These electives, often in combination with additional upper-division courses from this and related departments, provide the student with expertise in one or more subdisciplines within Earth sciences.

Elective distributions can be designed to emphasize earthquake and faulting studies, Earth surface processes, Earth system sciences, geologic hazards, geology, crustal and deep-Earth geophysics, marine geophysics, and water resources. Three formal concentrations, all with specific course requirements and leading to an Earth and planetary sciences B.S., are available: environmental geology, ocean sciences, and planetary sciences. A senior comprehensive experience (senior thesis, or geologic field camp, or exemplary performance in a graduate course) is required of all majors.

Preparation for the Standard Major (B.S.)

- Chemistry 1A, 1B/M and 1C/N
- Mathematics 11A or 19A, and 11B or 19B, and 22 or 23A or Earth Sciences 111
- Physics 6A/L and 6B/M (preferred), or 5A/L and 5B/M, and 6C/N or 5C/N or Chemistry 108A/L or 112A/L

Requirements for the Standard Major (B.S.)

- Earth Sciences 5/L, or 10/L, or 20/L; 110A/L, 110B/M, and 110C/N, 190 (optional 1-unit)
- At least four elective courses from upper-division Earth and planetary sciences offerings, or Ocean Sciences 102 or 120, must be completed. Two of the four upper-division electives must be selected from this subset of courses, which involve significant laboratory or field data acquisition/analysis: 109/L, 116, 117/L, 119, 120/L, 130/L, 140/L, 142, 146, 148, 150/L; 168.
- Five (5) credits of internship (Earth Sciences 198) or independent study (Earth Sciences 199) may be substituted for one upper-division elective.

Students also complete the comprehensive requirement described below.

Students are encouraged to take more than the minimum number of elective courses and may craft an elective distribution from many areas of specific research and career interests. The following are examples of suggested elective distributions that develop expertise in important areas (* indicates that the course satisfies the lab or field data acquisition/analysis requirement).

Earth system sciences. Focuses on terrestrial, marine, and atmospheric processes and their relations through time; may include paleoclimatic and paleoenvironmental dynamics, global change issues, and surface geological processes such as weathering, erosion, and hydrology: 100/L, 101/L, 102, 107, 109/L*, 116*, 119*, 120/L*, 121, 128, 148*, 208, Ocean Sciences 102, 120

Earthquake and faulting studies. Focuses on crustal deformation and faulting processes and related phenomena such as plate motions, earthquakes, and stress in the lithosphere: 109/L*, 117/L*, 119*, 150/L*, 162, 168*, 172

Geologic hazards. Focuses on Earth processes that impact society, including earthquakes, volcanoes, coastal erosion, and landslides: 104, 105, 107, 109/L*, 116*, 140/L*, 142*, 146*

Geology. Emphasizes a traditional broad background with field skills, rock genesis and interpretation, and structural relations: 109/L*, 117/L*, 120/L*, 130/L*, 140/L*, 150/L*

Geophysics. Develops breadth in geophysical techniques, composition and structure of Earth's deep interior, and gravitational and magnetic fields: 117/L*, 119*, 150/L*, 160, 162, 168*, 172

Marine geophysics. Emphasizes a breadth of geological and geophysical background for continuing study of the processes involved in the growth, evolution, and destruction of the ocean floor and margins: 107, 117/L*, 146*, 150/L*, 152*, 168*

Surface processes. Emphasizes understanding the fluxes of energy, water, mass, and chemicals within and across Earth's surface and the relations to climatic and tectonic forcing processes: 107, 109/L*, 116*, 119*, 120/L*, 140/L*, 128, 142*, 146*, 148*, 163, Environmental Toxicology 144.

Water resources. Focuses on water resources quality and quantity and relations between climate and water

in and on the crust: 105, 109/L*, 116*, 119*, 121, 140/L*, 142*, 146*, 148*, Environmental Toxicology 144, Ocean Sciences 120

Comprehensive Requirement (B.S.)

Students complete one of the following three options:

- Satisfactory completion of Earth Sciences 188A-B, *Senior Field Internship*
- Satisfactory completion of a senior thesis, which must include a significant element of independent research or original work and can only be undertaken after agreement is obtained from a faculty member to supervise it (approximately three quarters in advance of completion)
- Exemplary performance, including a major written report, in a 5-credit graduate course or seminar (which requires permission from the instructor in order to enroll)

Earth Sciences Standard B.S. Major Planner

Students planning a professional career in the Earth and planetary sciences should take more than the minimum number of courses required for the major if possible. Four-year students have ample flexibility to take additional electives if they begin with the required courses in their second year. Junior transfers also have flexibility if they have taken most of their preparatory courses in calculus, chemistry, and physics before entry. Further advice can be obtained from the undergraduate adviser and from faculty members.

Note: Chemistry 1A, 1B/M and 1C/N are offered fall-winter-spring and winter-spring-fall. Physics 6A/L and 6B/M and 6C/N are offered fall-winter-spring and winter-spring-fall, and Mathematics 11A-B and 19A-B and 22 and 23A are offered every quarter.

Year	Fall	Winter	Spring
1st (frsh)	Chem 1A Math 3 college core	Math 11A or 19A Chem 1B/M	Eart 10/L Chem 1C/N Math 11B or 19B
2nd (soph)	Math 22A or 23A or Eart 111	Physics 6A/L	Physics 6B/M
3rd (jr)	Eart 110A/L* Physics 6C/N or Chem 108A/L	Eart 110B/M* Eart elective	Eart 110C/N Eart elective
4th (sr)	Eart 109/L* senior thesis† Eart 190 (optional)	Eart elective senior thesis†	Eart 188A-B or senior thesis†

* Eart 109/L, 110A/L, and 110B/M are required for participation in Eart 188A-B.

† Students expecting to write a senior thesis for their comprehensive requirement are required to contact the department approximately three quarters before graduation to identify the intended project and faculty adviser. Senior theses usually require two or three quarters for completion.

Earth Sciences Major with Concentration in Environmental Geology (B.S.)

The environmental geology concentration is designed to provide quantitative preparation for career pathways involving interdisciplinary study of the environment with a geological emphasis. Additional biology and environmental studies courses are required for this concentration along with other distributions of upper-division requirements and electives.

Required Lower-Division Courses

- Earth Sciences 20/L (recommended) or 10/L or 5/L
- Environmental Studies 25

- Biology: Molecular, Cell, and Developmental Biology (MCD) BIOL 20A; Biology: Ecology and Evolutionary Biology (EEB) BIOE 20B; BIOE 20C (Environmental Studies 24 may be substituted for BIOE 20C)
- Chemistry 1A, 1B/M and 1C/N
- Mathematics 11A or 19A and 11B or 19B
- Physics 6A/L and 6B/M (preferred), or 5A/L and 5B/M

Required Upper-Division Courses

- Earth Sciences 110A/L and 110B/M, BIOE 150
- At least four of the following Earth and planetary sciences courses: 100/L, 101/L, 102, 104, 105, 107, 109/L, 110C/N, 111, 116, 119, 120/L, 121, 128, 140/L, 142, 146, 148, 150/L
- Two additional upper-division electives with environmental topics from biology, chemistry, Earth and planetary sciences, environmental studies, environmental toxicology, or ocean sciences

Students also complete a comprehensive requirement from the list described above.

Earth Sciences (Environmental Geology) B.S. Major Planner

Year	Fall	Winter	Spring
1st (frsh)	college core Chem 1A	Chem 1B/M Math 11A Eart 20/L	Chem 1C/N Math 11B
2nd (soph)	Eart 110A/L* Biol 20A	Envs 25 Eart 110B/M*	BIOE 20B elective
3rd (jr)	BIOE 20C elective	Phys 6A/L BIOE 150	Phys 6B/M elective
4th (sr)	Eart 109/L* senior thesis† Eart 190 (optional)	elective senior thesis†	elective or senior thesis†

* Eart 109/L, 110A/L, and 110B/M are required for participation in Eart 188A-B.

† Students expecting to write a senior thesis for their comprehensive requirement are required to contact the department approximately three quarters before graduation to identify the intended project and faculty adviser. Senior theses usually require two or three quarters for completion.

Earth Sciences Major with Concentration in Ocean Sciences (B.S.)

The ocean sciences concentration is intended to provide quantitative preparation for career pathways that include oceanography and biogeochemistry. Additional biology and chemistry courses are required for this concentration, along with other distributions of upper-division requirements and electives.

Required Lower-Division Courses

- Earth Sciences 5/L or 10/L, or 20/L
- BIOL 20A and BIOE 20B
- Chemistry 1A, 1B/M and 1C/N
- Mathematics 11A or 19A, and 11B or 19B, and Mathematics 22 or 23A or Earth Sciences 111
- Physics 6A/L and 6B/M (preferred), or 5A/L and 5B/M

Required Upper-Division Courses

- Earth Sciences 110A/L, 110B/M, 110C/N; Chemistry 108A/L and 108B/M, or 112A/L and 112B/M and 112C/N; Ocean Sciences 101
- Four electives from the following list: courses 101/L, 102, 105, 107, 109/L, 111, 116, 119,

120/L, 121, 128, 130/L, 148, 172; Chemistry 122; Ocean Sciences 101, 102, 118, 120, 130, 142, 156, 200, 220

- Students also complete a comprehensive requirement from the list described above. A topic emphasizing ocean sciences is recommended.

Earth Sciences (Ocean Sciences) B.S.

Major Planner

Year	Fall	Winter	Spring
1st (frsh)	Chem 1A college core	Chem 1B/M Math 11A	Eart 10/L Chem 1C/N Math 11B
2nd (soph)	Eart 110A/L* Math 22 or Eart 111	Eart 110B/M* Phys 6A/L	Eart 110C/N Phys 6B/M
3rd (jr)	Biol 20A Chem 108A/L	Ocea 101 Chem 108B/M	elective Bioe 20B
4th (sr)	Eart 109/L* senior thesis† Eart 190 (optional)	senior thesis† elective	elective senior thesis† or Eart 188A-B

* Eart 109/L, 110A/L, and 110B/M are required for participation in Eart 188A-B.

† Students expecting to write a senior thesis for their comprehensive requirement are required to contact the department approximately three quarters before graduation to identify the intended project and faculty adviser. Senior theses usually require two or three quarters for completion.

Earth Sciences Major with Concentration in Planetary Sciences (B.S.)

The planetary sciences concentration is designed to provide students with a quantitative background appropriate for career pathways in the interdisciplinary study of planets and their satellites. The upper-division elective courses can be tailored for students interested in planetary interiors, atmospheres, and/or surfaces.

Required Lower-Division Courses

- Earth Sciences 10/L (preferred); or 5/L; or 20/L
- Astronomy 14; or 16; or 18
- Chemistry 1A, 1B/M, and 1C/N
- Mathematics 19A-B (preferred) or 11A-B
- Mathematics 22; or 23A; or Earth Sciences 111
- Physics 5A/L, 5B/M, 5C/N (preferred); or 6A/L, 6B/M, 6C/N; 5D recommended

Required Upper-Division Courses

- Earth Sciences 110A/L, 110B/M, 110C/N, 119, 160
- Two electives from the following Earth sciences courses: 162, 163, 164
- Two electives from the following courses: Earth Sciences 107, 109/L, 116, 117/L, 121, 128, 130/L, 140/L, 148, 150/L, 152, 162, 163, 164, 172, 209, 210; Astronomy 112, 118; Mathematics 130

Students also complete the comprehensive requirement from the list described above.

Earth Sciences (Planetary Sciences) B.S.

Major Planner

Year	Fall	Winter	Spring
1st (frsh)	Math 19A college core Chem 1A	Math 19B Chem 1B/M	Eart 10/L Chem 1C/N Astr 14 or 16 or 18

2nd (soph)	Eart 110A/L* Phys 5A/L Math 22 or 23A or Eart 111	Eart 110B/M* Phys 5B/M	Eart 110C/N Phys 5C/N
3rd (jr)	Eart 190 (optional) Phys 5D (2 credits)	Eart 160 Eart 119	elective elective
4th (sr)	senior thesis† Eart 109/L	senior thesis† elective	elective senior thesis† or Eart 188A-B

* Eart 109/L, 110A/L, and 110B/M are required for participation in Eart 188A-B.

† Students expecting to write a senior thesis for their comprehensive requirement are required to contact the department approximately three quarters before graduation to identify the intended project and faculty adviser. Senior theses usually require two or three quarters for completion.

Bachelor of Arts Degree

The B.A. program encourages connections between the Earth and planetary sciences and other disciplines, and the degree is granted only as part of a double major or for the combined major with anthropology or environmental studies. Students can prepare for careers in environmental engineering, management, remediation, and policy; education; law; medicine; and interdisciplinary science fields. The B.A. can be granted together with any major field.

The preparatory courses in chemistry, mathematics, and physics and four of the six basic courses required for the standard B.S. degree are required for the Earth sciences B.A.; but only two additional electives, which can be chosen from the entire list of upper-division courses, are required.

Note that B.A. students who want to take courses 188A-B, *Senior Field Internship*, must first complete courses 109/L, 110A/L, and 110B/M.

Preparation for the Standard Major (B.A.)

- Chemistry 1A, 1B/M and 1C/N
- Mathematics 11A or 19A and 11B or 19B
- Physics 6A/L and 6B/M (preferred), or 5A/L and 5B/M

Requirements for the Standard Major (B.A.)

Earth Sciences 5/L or 10/L or 20/L; 110A/L, 110B/M, 110C/N, plus two additional upper-division Earth sciences courses

Comprehensive Requirement for the Standard Major (B.A.)

Students complete one of the following two options:

- Satisfactory completion of courses 188A-B, *Senior Field Internship*
- Satisfactory completion of a senior thesis, which must include a significant element of independent research or original work and can only be undertaken after agreement is obtained from a faculty member to supervise it (approximately three quarters in advance of completion).

Combined Major in Environmental Studies/Earth Sciences (B.A.)

The combined major in environmental studies and Earth sciences is designed to provide enhanced exposure to geological concepts and processes for students emphasizing environmental policy and social science

topics. For the requirements of the combined environmental studies/Earth sciences B.A., see page 262.

Combined Major in Earth Sciences/Anthropology (B.A.)

The Earth sciences/anthropology combined major is intended for students with interests in Earth sciences and the laboratory-based aspect of anthropology. These include anthropology students interested in archaeology or paleoanthropology who desire more intensive training in natural sciences and Earth sciences students interested in paleobiology or archaeology. The combined major provides a rigorous training in both anthropology and Earth sciences and will permit students to enter graduate programs in Earth sciences, archaeology, or paleoanthropology. The combined major has a significantly different set of cognate science and required lower- and upper-division courses than the standard major; therefore, students are advised to plan carefully and to contact academic advisers in the Earth and Planetary Sciences and Anthropology Departments early if they have questions.

Required Lower-Division Courses

- Anthropology 1, 2, and 3
- Earth Sciences 5/L, or 10/L, or 20/L
- Mathematics 11A or 19A, and 11B or 19B
- Five lower-division science cognate courses (plus laboratories) chosen from the following:
 - BIOL 20A, BIOE 20B, BIOE 20C
 - Chemistry 1A, 1B/M, 1C/N
 - Physics 6A/L, 6B/M

Required Upper-Division Courses

- Anthropology 102A, or 107/L, or 185
- Earth Sciences 110A/L
- Three upper-division electives in anthropology from the following:
 - Any three upper-division electives listed under the Anthropology Department's Physical Anthropology and Archaeology Courses subdivision (see page 115).
- Three upper-division electives in Earth sciences from the following:
 - Earth Sciences 100/L, 101/L, 102, 105, 107, 109/L, 110B/M, 117/L, 119, 120/L, 128, 130/L, 142, 148, 150/L, 152

Comprehensive Requirement

One of the following:

- Anthropology 194-series (any senior seminar in physical anthropology) or
- Earth Sciences 188A-B* or
- Earth Sciences 195 and a senior thesis with faculty readers from both departments or any approved anthropology or Earth sciences field program

* Earth Sciences 188A-B has as prerequisites courses 109/L, 110A/L, and 110B/M.

Earth Sciences/Anthropology Combined Major Planner

Year	Fall	Winter	Spring
1st (frsh)	Anth 1 college core	Anth 2	Anth 3 Eart 10/L
2nd (soph)	Math 11A cog sci	Math 11B cog sci	cog sci elective
3rd (jr)	Eart 110A/L cog sci	elective cog sci	Anth 107/L elective

4th (sr)	elective sr comp	elective sr comp	elective sr comp
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Double Majors (B.A. or B.S.)

Each Earth sciences double major is required to complete the full requirements of another UCSC major. If a student elects to major in the environmental geology concentration and the environmental biology (biological sciences) or environmental chemistry (chemistry) concentrations, the lower-division preparatory courses will count toward both majors since they are identical. All other double majors in Earth sciences prohibit counting any upper-division course toward both majors.

Minor Requirements

Students can earn a minor in Earth sciences by taking courses 5/L or 10/L or 20/L and five upper-division Earth sciences courses. Courses offering less than 5 credits (such as Eart 190 or 3-unit labs and independent studies) may not be counted toward the minor requirements, although additional course work is always encouraged. Courses taken for any major may not be double-counted toward meeting the minor requirements.

Graduate Program

The graduate program in Earth and planetary sciences is designed to prepare students for research, industry, consulting, teaching, and numerous other career paths, including business and law. The aim is to develop habits of critical analysis and thorough documentation, skills in quantitative field, computational, and/or laboratory research, and proficiency in one or more fields of research. The fundamental requirement for admission to the program is substantial evidence of superior scholarship, dedication and determination to do quality work, and aptitude for original research. Preparation in the basic sciences and in Earth and planetary sciences equivalent to the requirements for the Earth sciences bachelor's degree at UCSC is expected, but graduates in chemistry, physics, engineering, biology, or other disciplines who meet the requirement of superior scholarship are eligible and encouraged to apply. Gaps in knowledge can be made up through course work. Prospective students should take the Graduate Record Examination (GRE) General Test and have the scores sent to the UCSC Division of Graduate Studies.

UCSC awards both the M.S. and the Ph.D. degrees. The M.S. degree may be the terminal degree for some seeking careers in industry, government, and teaching at the secondary level. It may also be an initial step toward the Ph.D. degree, in which the student gains knowledge and confidence in carrying out and completing a more complex scientific project.

Thesis Track (Ph.D., M.S.). In their first year, all thesis-track graduate students register for courses 203, *Introductory Teaching Seminar*; 205, *Introductory Graduate Seminar*; 206, *Great Papers in the Earth Sciences*; and, in consultation with the graduate preliminary interview committee, choose at least one from among courses 207, *Tectonics*; 208, *Methods in Paleoclimatology*; 209, *Solid Earth Geochemistry*; 210, *Overview of Stellar and Planetary Formation and Evolution*; or 220, *Ground Water Modeling*. In subsequent years, all students participate in course 293, *Graduate Research Seminar*. Other course requirements are tailored to the individual student's academic background, professional experience, and plans for research. No specific number of course credits is required for the Ph.D., but, ordinarily, students put more of their effort

into course work during the first year of graduate study. It is recommended that all thesis-track graduate students attain some teaching experience while at UCSC.

Late in the fall quarter, each first-year thesis track student has an interview with a representative committee of the faculty. Interview topics are drawn from the broad field of Earth and planetary sciences and can include elementary mathematics, physics, chemistry, or biology. The interview is used to determine the student's understanding of basic scientific principles and ability to apply these principles to specific problems. Following the interview, students will be given a list of course requirements and recommendations.

To qualify for candidacy in the Ph.D. program, each student must pass an oral examination in his or her area of specialization by the end of their third year of graduate study, although students are strongly encouraged to take the exam earlier. The exam is based on a research proposal presenting one or more specific questions to be researched by the student in the course of completing their Ph.D. thesis. Students are expected to have in-depth knowledge of fields relevant to the proposal, including familiarity with the professional literature.

The Ph.D. dissertation is a scholarly contribution to knowledge that embodies the results of original and creative effort by the student. Students are urged to prepare their dissertations for publication in peer-reviewed professional journals. A public oral defense of the thesis is required prior to completion of the Ph.D.

The M.S. thesis is a scholarly contribution consisting of results of an original research project by the student. Students are strongly encouraged to prepare their results for publication in the peer-reviewed literature. The M.S. thesis must be completed by the end of the third year after entering the program and students are strongly encouraged to complete their thesis earlier and to present the results of this work publicly.

Course Work M.S. Track. The course work M.S. track is a professional program designed to allow students to increase their breadth, quantitative depth, or emphasis on a particular specialty; to provide the student with a stronger background toward competition for jobs or an enhancement of skills for current employment (e.g., K-14 teaching); and to allow students from other disciplines (e.g., biology, physics, chemistry, mathematics, environmental studies) to acquire advanced training in Earth and planetary sciences. Prior to the first quarter of study, students have a meeting with their faculty adviser in which they develop a study plan of at least nine courses, no more than one of which may be 297 or 298, and a statement of objectives. The plan must be approved by the graduate representative. Students are also limited to one Earth Sciences 290 seminar course. It is expected that the course plan will comprise mainly graduate-level and quantitative upper-level undergraduate elective courses.

Course work master's students are required to fulfill one of the following capstone options: a substantial review/research manuscript or a comprehensive oral examination based on their course work.

There is no foreign language requirement for either the M.S. or Ph.D. degree. However, many students in the Earth and planetary sciences find knowledge of one or more foreign languages necessary in their particular research and therefore study the appropriate language. Details regarding admission to graduate standing, financial aid, examinations, and the requirements for the master of science and doctor of philosophy degrees are available from the Division of Graduate Studies. For more information, see Graduate Studies, page 47.

Lower-Division Courses

1. Oceanography. W

An introduction to the physical environment of the ocean. Origin and evolution of ocean basins; sea-floor morphology; origin, distribution, historical record, and economic significance of marine sediments; ocean currents, waves, tides, and changing sea level; beaches, shorelines, and coastal processes; marine resources, pollution, and human impacts on the oceans. Students may also enroll in and receive credit for Ocean Sciences 1. Laboratory/discussion-1.5 hours. (General Education Code(s): IN.) *G. Griggs*

3. Geology of National Parks. S

Geologic concepts and processes responsible for shaping our national parks including mountain building, volcanic and earthquake activity, sedimentation, weathering, erosion, and glaciation. An understanding of how geology impacts our lives is emphasized. Appropriate for both science and non-science majors who wish to enhance their knowledge, enjoyment, and appreciation of our national parks. (General Education Code(s): IN.) *S. Schwartz*

5. California Geology. F

An introduction to physical geology emphasizing the minerals, rocks, volcanoes, mountains, faults, and earthquakes of California. In-class field trips to study the caves, rocks, and landforms of the campus and the Monterey Bay area. Discussion: 1 hour. Concurrent enrollment in 5L required for majors and minors. (General Education Code(s): IN.) *E. Knittle*

5L. California Geology Laboratory (1 credit). F

Laboratory sequence illustrating topics covered in course 5 with particular emphasis on rock and mineral identification and map interpretation. Field trip. Laboratory three hours. Students are billed a materials fee. *E. Knittle*

6. Concepts in Environmentalism. F

Learn scientific concepts required to be an informed environmentalist. Topics include urban smog; water resources and pollution; waste treatment; acid rain; global climate change; fossil fuel, nuclear, and renewable energy; overpopulation; and how an individual can minimize his or her environmental impact. Offered in alternate academic years. (General Education Code(s): IN.) *P. Chuang*

7. The History of Life. F

An examination of the major events in the history of life, from the origin of life approximately four billion years ago, to the wave of extinctions that has decimated plants and animals around the globe over the past 30,000 years. Offered in alternate academic years. (General Education Code(s): IN.) *P. Koch*

10. Geologic Principles. S

Introduction to the scientific study of Earth, the materials composing it, and the processes shaping it. Topics include minerals and rocks, Earth's internal structure, plate tectonics, earthquakes and volcanoes, oceans and the atmosphere, the formation of landscapes and global change. A one-day, optional field trip is included. Concurrent enrollment in 10L required for majors and minors. (General Education Code(s): IN.) *A. Fisher*

10L. Geologic Principles Laboratory (1 credit). S

Laboratory sequence illustrating topics covered in course 10, with particular emphasis on rock and mineral identification and map interpretation. Laboratory 3 hours. In-lab field trips. Students are billed a materials fee. *A. Fisher*

20. Environmental Geology. W

Introduction to aspects of geology which affect and are affected by humans. Addresses a broad range of topics including resource management, geologic hazards, air and water issues, population and land use, energy costs and effectiveness, and global change, all from a unique geological/environmental perspective. Lectures include strategies for mitigating these issues. Includes a one-day field trip. Concurrent enrollment in 20L required for majors and minors. (General Education Code(s): IN.) *The Staff*

20L. Environmental Geology Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 20, with emphasis on rock and mineral identification, geologic hazard assessment, geologic resource management, and land use planning. In-lab field trip. Laboratory 3 hours. Students are billed a materials fee. *The Staff*

65. Natural History of Dinosaurs. S

Origin, evolution, and extinction of dinosaurs with emphasis on paleobiology and paleoecology. Covers fundamental paleontological and evolutionary principles, dinosaur anatomy and behavior, the hot-blooded/cold-blooded debate, dinosaur-bird relationships, diversity, exploits of the great dinosaur hunters, and dinosaurs' prospects. One and a half hour of discussion each week. Offered in alternate academic years. (General Education Code(s): IN.) *H. Schwartz*

80A. Earth Catastrophes. F

The role of catastrophic processes in shaping Earth and the environment in which we live. The physical processes causing earthquakes, volcanic eruptions, tsunamis, floods, windstorms, landslides, and meteorite impacts will be described, along with the role played by these rapid processes in the geological and biological evolution of the planet. Interdisciplinary approaches to understanding these phenomena will be discussed. The entire time scale from formation of the universe to the present Earth system will be considered. (General Education Code(s): T2-Natural Sciences.) *T. Lay*

80B. Earthquakes. W

Causes and effects of earthquakes. How do we measure, mitigate, and try to predict earthquakes? Plate motion, frictional faulting, earthquake triggering, wave propagation, earthquake damage, related hazards, and other social effects. Hazard reduction through earthquake forecasting and earthquake-resistant design. Class includes one full day weekend field trip to local faults. Advanced algebra and high school geometry recommended. Students are billed a materials fee. (General Education Code(s): T2-Natural Sciences, Q.) *E. Brodsky*

80C. Introduction to Weather and Climate. *

Many meteorological phenomena are familiar to us: clouds, fog, rain, snow, wind, lightning, and severe storms. Climate is the sum of weather over long periods and is changing (e.g., greenhouse warming, ozone depletion, urban smog) due to mankind's activities. Conceptual understanding of how and why the present-day atmosphere behaves as it does and how this may change in the future is the primary goal of this course. Offered in alternate academic years. (General Education Code(s): T2-Natural Sciences, Q.) *P. Chuang*

80D. Earth Sciences and the Cinema. *

Exploration of cinema's role in defining societal awareness of Earth sciences (underlying concepts and factual basis) for disaster and adventure movies and in more subtle presentations. Topics include evolution of life, sur-

face environment and the planet's deep interior, natural hazards, global warming, and meteorite impacts. (General Education Code(s): T2-Natural Sciences.) *T. Lay*

80G. Planetary Discovery. W

An introductory look at modern solar system exploration, focusing on spacecraft missions presently underway. We will examine the scientific context of each mission, the instrumentation and dynamics of each voyage, and the importance of their discoveries. Open to all students. Will be offered in 2008-09 academic year. (General Education Code(s): T2-Natural Sciences.) *E. Asphaug*

98. Earth Sciences Internship. F,W,S

A supervised learning experience involving practical application of lower division Earth sciences knowledge while working with approved companies, governmental agencies, or research organizations. Students consult weekly with supervising faculty and prepare a final report of their work, to be evaluated both by the sponsoring agency and the faculty supervisor. Consult sponsoring agency for enrollment criteria; after instruction on resume preparation and interview skills, student must interview and be selected for internship by approved sponsoring organizations. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

100. Vertebrate Paleontology. *

Introduction to vertebrate history, with an emphasis on vertebrate relationships and the co-evolution of organisms and environments. Specific topics include vertebrate origins, systematics and classification, adaptive revolutions, mass extinctions, and the rise and fall of dinosaurs. Students are billed a materials fee. Prerequisite(s): course 10, 20, 5, Biology 20C, or Anthropology 1. Concurrent enrollment in course 100L is required. Offered in alternate academic years. *H. Schwartz*

100L. Vertebrate Paleontology Laboratory (2 credits). *

Comparative anatomy and functional morphology of vertebrates, and preservation of vertebrate hard parts, using modern and fossil specimens. Laboratory three hours and one 1-day field trip. Concurrent enrollment in course 100 is required. Offered in alternate academic years. *H. Schwartz*

101. The Fossil Record. F

An introduction to paleobiology; the use of fossil evidence to pose and solve evolutionary and geologic questions. Prerequisite(s): course 10 or 5 or 20 or Biology 20C or Anthropology 1. Concurrent enrollment in course 101L is required. Offered in alternate academic years. *M. Clapham*

101L. The Fossil Record Laboratory (1 credit). F

Systematics, ecology, and evolutionary history of the major groups of fossil-forming animals. Laboratory 3 hours and one 1-day field trip. Concurrent enrollment in course 101 is required. Offered in alternate academic years. *M. Clapham*

102. Marine Geology. W

Geology of the marine environment. Topics include controls on the types, origin, and distribution of marine sediments; geology of oceanic crust; evolution of continental margins and plate boundaries; introduction to paleoceanography. Discussion: 1 hour. Students cannot

receive credit for this course and Ocean Sciences 280. Prerequisite(s): course 5 or 10 or 20 or Biology 20C. *M. Delaney*

104. Geologic Hazards. F

The recognition, evaluation, and mitigation of geologic hazards: earthquakes and faulting, tsunamis, volcanism, landslides and mass movements, and flooding. Students are billed a materials fee. Prerequisite(s): course 10/L or 5/L or 20/L. *S. Schwartz*

105. Coastal Geology. S

An investigation of the evolution, morphology, and processes in the coastal zone including the terrestrial (marine terraces, dunes, estuaries, sea cliffs) and marine (beaches, continental shelves, sea level changes, shoreline erosion and protection, waves, tides) components and their interaction. Laboratory: 3 hours. Students are billed a materials fee. Prerequisite(s): course 10 or 5 or 20. Course 10L or 5L or 20L is suggested as an optional preparation for non-Earth sciences majors. *G. Griggs*

107. Remote Sensing of the Environment. W

Introduction to geographic information systems (GIS) and remote sensing (RS) as valuable tools in the study of geology. Covers application of GIS/RS to study of surface processes, including landslides, hydrologic basins, coastal erosion, modern floods, volcanic activity and surface deformation. Prerequisite(s): course 5 or 10 or 20. Enrollment limited to 36. *E. Silver*

109. Elements of Field Geology. F,S

Basic tools and techniques used in geologic fieldwork. Preparation, analysis, and interpretation of geologic maps. Nine days of weekend field trips required, including a six-day geologic mapping exercise. Laboratory: 2 hours. Recommended for courses 120, 130, 150, and required for 188A-B. May not be taken concurrently with course 120. Students are billed a materials fee. (General Education Code(s): W satisfied by taking this course and courses 188A and 188B.) Prerequisite(s): Satisfaction of the Entry Level Writing Requirement, course 10 or 5 or 20, and 10L or 5L or 20L. Concurrent enrollment in 109L is required. Enrollment limited to 25. (F) *H. Schwartz*, (S) *J. Hourigan*

109L. Field Geology Laboratory (2 credits). F,S

Laboratory exercises essential to the successful completion of fieldwork required in course 109. Topics include topographic maps, Brunton compass, rock identification and description, structure sections, and landslide recognition. Concurrent enrollment in course 109 required. Enrollment limited to 25. (F) *H. Schwartz*, (S) *J. Hourigan*

110A. Evolution of the Earth. F

Investigation of the processes and mechanisms that have produced the present Earth system, with an emphasis on the temporal evolution of the earth from the Archean to the present. Specific topics covered include cyclicity in Earth processes and the evolution of, and interplay between the planet's crust, atmosphere, hydrosphere, and biosphere. Prerequisite(s): courses 5 or 10 or 20, and 5L or 10L or 20L, and Mathematics 11A or 19A. *J. Zachos*, *Q. Williams*

110B. Earth as a Chemical System. W

The chemical properties of Earth materials and the chemical processes by which the planet has evolved to its present state. Specific topics covered include properties of minerals; the genesis of igneous, metamorphic, and sedimentary rocks; and the linkage between the solid Earth and the hydrosphere. Enrollment is permitted by permission code with equivalent or exceptional background, or

if enrolled concurrently in Chemistry 1B. Prerequisite(s): courses 5, or 10, or 20, and 5L, or 10L, or 20L, and Chemistry 1B. *E. Knittle*

110C. The Dynamic Earth. S

Physical processes occurring in the interior of the earth, at its surface and in the oceans and atmospheres including plate tectonics, structural deformation of rocks, and material and heat transport. Students are billed a materials fee. Prerequisite(s): course 5 or 10; or 20 and 5L or 10L or 20L; and course 111 or Mathematics 22 or 23A; and Physics 6A or 5A. *E. Brodsky*

110L. Evolution of the Earth Laboratory (2 credits). F

Laboratory sequence illustrating topics covered in course 110A. Emphasis is on quantifying and evaluating different phenomena related to thermal, tectonic, climatic, and evolutionary processes. Prerequisite(s): concurrent enrollment in course 110A. *J. Zachos*, *Q. Williams*

110M. Earth as a Chemical System Laboratory (2 credits). W

Laboratory sequence illustrating topics covered in course 110B. Emphasizes identification of the major rock-forming minerals and common rock types; principles of basic crystallography. Prerequisite(s): concurrent enrollment in course 110B. *E. Knittle*

110N. The Dynamic Earth Laboratory (2 credits). S

Laboratory sequence illustrating topics covered in course 110C. Prerequisite(s): concurrent enrollment in course 110C. *E. Brodsky*

111. Mathematics in the Earth Sciences. F

Series and sequences, vectors, 3D analytic geometry, partial differentiation, matrix algebra, and differential equations with applications in the Earth sciences. Topics include matrix manipulation, systems of linear equations, least-squares, Taylor series, gradients, optimization, analytic and numerical solutions to differential equations. Prerequisite(s): courses 5 or 10 or 20 and Mathematics 11B or 19B. (General Education Code(s): Q.) *W. Nimmo*

113. Physics in the Earth Sciences. *

Physics applied to geological problems, including basic mechanics, stress and strain, heat transport, and fluid flow. Discussion-2 hours. Prerequisite(s): course 111 or Mathematics 22 or 23A, and Physics 5B or 6B. *R. Coe*

116. Hydrology. W

Introduces processes involving water on and near Earth's surface, including meteorology, water properties, surface flows in streams and runoff, flood analysis, ground water, water budgets, sediment transport, erosion, and water quality. Problem set and laboratory each week. Laboratory/field: 3 hours. Students are billed a materials fee. Alternates annually with course 146. Prerequisite(s): course 10 or 5 or 20, and Mathematics 11A or 19A. Course 5L or 10L or 20L recommended. *A. Fisher*

117. Paleomagnetism. S

How the fossil magnetism of rocks is used to decipher Earth's history: applications to tectonics, geochronology, stratigraphy, structural geology, geomagnetism, and archeology. Includes an overnight field trip to collect samples for a class research project. Students are billed a materials fee. Prerequisite(s): course 5, 10 or 20; Mathematics 11A or 19A; course 117L must be taken concurrently. *R. Coe*

117L. Paleomagnetism Laboratory (2 credits). S

A hands-on research project in the Paleomagnetic Laboratory. Students collectively drill oriented cores in the field (one–two days), prepare and measure the samples, and analyze and interpret the data. Each student writes an individual final report based on the class results. Prerequisite(s): concurrent enrollment in course 117 is required. *R. Coe*

119. Introduction to Scientific Computing. S

Introduction to solving scientific problems using computers. A series of simple problems from Earth sciences, physics, and astronomy are solved using a user-friendly scientific programming language (IDL). Prerequisite(s): Mathematics 11A or 19A. (General Education Code(s): IN.) *G. Glatzmaier*, *M. Krumholz*

120. Sedimentology and Stratigraphy. S

Stratigraphic principles used in classifying sedimentary rocks. Fundamentals of sedimentary mechanics. Analysis and interpretation of facies and depositional systems. Introduction to seismic facies and basin analysis. Course includes four Saturday field exercises. Students are billed a materials fee. Prerequisite(s): course 110A. Course 110B is recommended as preparation. May not be taken concurrently with course 109. *M. Clapham*

120L. Sedimentology and Stratigraphy Laboratory (2 credits). S

Laboratory sequence illustrating topics in course 120, including sedimentary petrology, sedimentary structures, sequence stratigraphy, and geohistory analysis. Prerequisite(s): concurrent enrollment in course 120. *M. Clapham*

121. The Atmosphere. W

Course focuses on understanding basic atmospheric weather and climate phenomena starting from the fundamentals of physics and chemistry. Using this approach, covers topics such as atmospheric circulation, precipitation, clouds, storms, urban and regional air quality, atmospheric aerosols, and climate and global change. Prerequisite(s): Mathematics 11B or 19B, and Chemistry 1C. Offered in alternate academic years. *P. Chuang*

128. Isotopes: Fundamentals and Applications in Earth and Marine Sciences. *

Explores the fundamentals and concepts of stable, radiogenic, and cosmogenic isotope chemistry with applications relevant to Earth, marine, and biological sciences. Prerequisite(s): course 110B or permission of instructor. *J. Zachos*, *J. Hourigan*

130. Magmas and Volcanoes. S

Introduction to the relationship between tectonic environments and the genesis of rock assemblages, primarily igneous and metamorphic. Examples from California and elsewhere are used to illustrate petrogenetic processes and characteristic petrologic features of rocks from all major tectonic settings. Students are billed a materials fee. Prerequisite(s): course 110B. Concurrent enrollment in course 130L is required. *J. Gill*

130L. Magmas and Volcanos Laboratory (2 credits). S

An introduction to optical mineralogy and the petrography of igneous rocks. Concurrent enrollment in course 130 required. Prerequisite(s): course 110B. Concurrent enrollment in 130 is required. *J. Gill*

140. Geomorphology. *

An introduction to the evolution of the Earth's landscape, with emphasis on the processes responsible. Review of climatic and tectonic forcing followed by detailed discussion of weathering, glaciers, hillslopes, wind, rivers, and coastal processes with emphasis on their geographic distribution. One single day and one three-day field trip. Prerequisite(s): course 110A. Concurrent enrollment in 140L is required. *S. Tulaczyk*

140L. Geomorphology Laboratory (2 credits). *

Laboratory sequence illustrating topics covered in course 140. These extensive laboratory exercises emphasize the quantification of the geomorphic processes and forms, and on the writing of concise summaries of the science in the form of abstracts. Students are billed a materials fee. Prerequisite(s): Concurrent enrollment in course 140 is required. *S. Tulaczyk*

142. Engineering Geology for Environmental Scientists. S

Introduction to the formation, composition, and classification of soils; the chemical interaction of soil and groundwater; and basic soil mechanics: stress-strain behavior, effective stress concept, consolidation, soil testing methods. Applications to problems including slope stability, landslides, liquefaction, subsidence, soil creep, debris flows. Laboratory: 3 hours. Students are billed a materials fee. Prerequisite(s): course 5 or 10 or 20; Mathematics 11A or 19A. Offered in alternate academic years. *S. Tulaczyk*

146. Ground Water. *

Explores saturated and unsaturated fluid flow below Earth's surface, well hydraulics, and recourse evaluation and development. Introduces modeling, field techniques, geochemistry, and contaminant transport and remediation. Problem set and laboratory each week; final paper. Laboratory: 3 hours. Students are billed a materials fee. Alternates annually with course 116. Prerequisite(s): course 5 or 10 or 20, and Mathematics 11A or 19A. Course 5L or 10L or 20L recommended. *A. Fisher*

148. Glaciology. *

Introduction to the role of snow and ice in the dynamics of the earth surface system. Snow deposition and metamorphosis. Heat and mass balance at snow and ice surfaces. Flow of glaciers, ice sheets, and sea ice. Methods of climate reconstruction. Ice age theories. Students are billed a materials fee. Prerequisite(s): courses 5 or 10 or 20; Mathematics 11A or 19A. Offered in alternate academic years. *S. Tulaczyk*

150. Structural Geology. F

Principles and methods of analysis of brittle and ductily deformed rocks. Includes descriptions of structures, field analysis of structures, and mechanics of deformation. Three day-long field trips on weekends. Students are billed a materials fee. Prerequisite(s): course 110A or 110B; course 109 recommended; concurrent enrollment in course 150L is required. *J. Hourigan*

150L. Structural Geology Laboratory (2 credits). F

Structural analysis of faults, folds, and maps. Use of stereographic projections. Cross section construction and balancing from field data. Concurrent enrollment in course 150 is required. *J. Hourigan*

152. Active Tectonics. S

The processes, techniques, and interpretations involved in the study of active crustal movements; constraints from plate tectonics; horizontal and vertical motions and rates; geodesy, including GPS; stress measurement; image

interpretation; fault system analysis; paleoseismicity; fluid effects. Examples from the circum-Pacific. Laboratory-2 hours. Students cannot receive credit for this course and course 207. Prerequisite(s): course 10 or 5 or 20 and 10L or 5L or 20L, and Physics 5A or 6A; course 110C recommended. *E. Silver*

160. Planetary Science. W

Broad introduction to planetary science. Topics include the fundamental characteristics of solar system bodies; space exploration of these bodies; formation and evolution of surfaces, atmospheres and interiors of planets, satellites and small bodies. Prerequisite(s): Math 11B or 19B, and Physics 5A or 6A. *W. Nimmo*

162. Planetary Interiors. *

The chemical and thermal structure and evolution of silicate planet interiors. Topics include equation of state of mantle and core materials, thermal history of the mantle and core, dynamics of mantle convection, geophysical determination of interior structure. Students cannot receive credit for this course and course 262. Prerequisite(s): course 160; and course 111 or Mathematics 22 or 23A; and Physics 5C or 6C. Offered in alternate academic years. *W. Nimmo*

163. Planetary Surfaces. S

Comparative study of surfaces and atmospheres of planetary bodies in solar system, focusing on comparative planetology and geophysical processes at work, including impact cratering, atmospheric evolution, and exobiology. Explores terrestrial planets, giant planets and their moons. Students cannot receive credit for this course and course 263. Prerequisite(s): course 160. *E. Asphaug*

164. Planetary Atmospheres. *

A quantitative study of the origin, chemistry, dynamics, and observations of the atmospheres of terrestrial and gas-giant planets. Students cannot receive credit for this course and course 264. Prerequisite(s): course 160. Enrollment limited to 18. *E. Asphaug*

168. Reflection Seismology. *

Introduction to reflection seismology, presenting an overview of data acquisition, processing, and interpretation; common depth point method; velocity determinations; filtering; migration; display. Applications to seismic stratigraphy and structure of the crust and of continental margins. Laboratory: 3 hours. Prerequisite(s): course 111 or Mathematics 11A-B or 19A-B. Offered in alternate academic years. *The Staff*

172. Geophysical Fluid Dynamics. *

Introduces fluid motion influenced by rotation. Topics include the Coriolis force, geostrophic flow, potential vorticity, the shallow water model, quasigeostrophic approximation, planetary waves, Ekman theory, thermal wind, models of the large-scale oceanic and atmospheric circulation, and equatorial dynamics. Taught in conjunction with course 272. Students cannot receive credit for this course and course 272. (Also offered as Ocean Sciences 172. Students cannot receive credit for both courses.) Prerequisite(s): Physics 107 or Applied Mathematics and Statistics 107; Mathematics 22 or 23B recommended. Offered in alternate academic years. *C. Edwards*

188A. Summer Field Internship. S

Three weeks of summer field study in geologically complex regions in the White-Inyo Mountains of eastern California. Activities include geologic field mapping on topographic and photographic base maps, stratigraphy, petrology, and structure analysis. A fee is required for participation. Contact sponsoring agency for details.

Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 110A/L, 110B/M, and 109/L. Enrollment restricted to Earth sciences majors. Concurrent enrollment in course 188B is required. (General Education Code(s): W satisfied by taking this course and courses 109 and 188B.) (Formerly *Summer Field Internship, Part A.*) Interview only via application filed with department. *H. Schwartz*

188B. Geographic Information Systems with Applications to the Earth Sciences. S

Introduction to basic principles of geographic information systems (GIS). Visualization of earthscapes with applications to problem-solving in the Earth sciences. Laboratory exercises in loading, manipulation, and interpretation of data sets. Field investigations of phenomena visualized in laboratory, including geological description, interpretation, and written report preparation. Lecture and laboratory portions of course occur during spring quarter. Field investigations and report-writing occur in the summer following spring quarter. A fee is required for participation. Contact sponsoring agency for details. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 110A/L, 110B/M, and 109/L. Enrollment restricted to Earth sciences majors. Concurrent enrollment in course 188A is required. (General Education Code(s): W satisfied by taking this course and courses 188A and 109.) (Formerly *Summer Field Internship, Part B.*) Interview only via application filed with department. Enrollment limited to 25. *C. Moore*

190. Earth Sciences Mentorship (1 credit). F

Faculty research activity, analytic facilities, and career counseling in three separate Earth sciences laboratories are offered with varied formats including field trips, discussions, and equipment demonstrations. Three different faculty participate in each offering. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. Enrollment limited to 24. May be repeated for credit. *The Staff*

195. Senior Thesis. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to seniors. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. May be repeated for credit. (General Education Code(s): W.) *The Staff*

196A. Introductory Teaching Seminar (2 credits). F

Training for undergraduates in practical teaching skills. Focus on preparation, assessment, and feedback. Classroom techniques, organizational and time management strategies, practice teaching sessions. Students cannot receive credit for this course and course 203. Future participation in 196B is encouraged. Course may not be counted toward upper-division major requirements. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. *The Staff*

196B. Teaching Earth Sciences in the University. F,W,S

Students facilitate laboratory and field exercises in conjunction with faculty and teaching assistants in various Earth sciences courses. May not count toward upper-division major requirements. Approval of sponsoring agency; interview and selection by primary instructor of specific courses required. Participation in course 196A is expected. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. *The Staff*

196C. Teaching Earth Sciences in the University (2 credits). F,W,S

Students facilitate laboratory and field exercises in conjunction with faculty and teaching assistants in various Earth sciences courses. May not count toward upper-division major requirements. Approval of sponsoring agency; interview and selection by primary instructor of specific courses required. Participation in course 196A is expected. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. May be repeated for credit. *The Staff*

198. Earth Sciences Internship. F,W,S

A supervised learning experience involving practical application of Earth sciences through working with approved companies, governmental agencies, or research organizations. Students consult weekly with supervising faculty and prepare a final report of their work. Consult sponsoring agency for enrollment criteria. After instruction on resume preparation and interview skills, students must interview and be selected for internship by approved sponsoring organizations. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. May be repeated for credit. *The Staff*

198F. Earth Sciences Internship (2 credits). F,W,S

A supervised learning experience involving practical application of Earth sciences through working with approved companies, governmental agencies, or research organizations. Students consult weekly with supervising faculty and prepare a final report of their work. May not be counted toward upper-division major requirements. Consult sponsoring agency for enrollment criteria. After instruction on resume preparation and interview skills, student must interview and be selected for internship by approved sponsoring organizations. Enrollment restricted to Earth sciences, Earth sciences/anthropology, and environmental studies/Earth sciences majors. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Introduction to research in laboratory, field, or theoretical subjects. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Introduction to research in laboratory, field, or theoretical subjects. May not be counted toward upper-division major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses**203. Introductory Teaching Seminar (2 credits). F**

Intended for new Earth sciences graduate students. Focus on preparation, assessment, and feedback. Classroom techniques, organizational and time management strategies, practice teaching sessions specific to laboratory and/or science instruction. Required follow-up meetings to discuss practical teaching experience. Students cannot receive credit for this course and course 196A. Enrollment restricted to graduate students. *The Staff*

205. Introductory Graduate Seminar. F

Lecture and seminar-style class intended to welcome new graduate students to the department; review fundamental concepts in Earth sciences; introduce students to research and interests of departmental faculty and researchers; develop skills in reading scientific abstracts and papers, and write abstracts and a proposal; and prepare graduate students for the preliminary interview. Features lectures on

fundamental topics and assigned reading from scientific papers and texts for the first half of the course, lectures on faculty and researcher interests in the second half of the course, and tutorials on abstracts, papers, and proposals. Two weekend field trips. Students are billed a materials fee. Enrollment restricted to graduate students. *The Staff*

206. Great Papers in the Earth Sciences. W

Exposure to the most important ideas in the Earth sciences through exploration of the primary literature. Seminal papers in different subdisciplines of the Earth sciences are read and analyzed to provide breadth and improve students' ability to think critically. Enrollment restricted to Earth sciences graduate students. *The Staff*

207. Tectonics. S

An overview of tectonic theory and processes for application to the Earth sciences. The course explores the primary tools of tectonic interpretation including plate kinematics, rheology, plate boundary dynamics, and the behavior of active fault systems. Taught in conjunction with course 152. Students cannot receive credit for this course and course 152. Prerequisite(s): graduate standing or permission of instructor. *E. Silver*

208. Methods in Paleoclimatology. *

Addresses methods used to reconstruct aspects of paleoclimates and paleoenvironments from the geologic record, focusing primarily on terrestrial records. Topics to be covered include dendrochronology and dendroclimatology, paleopalynology, paleobotany, ice cores, and paleosol studies. Lectures, discussions, and laboratory work. Enrollment restricted to graduate students. Offered in alternate academic years. *L. Sloan*

209. Solid Earth Geochemistry. *

Origin and distribution of the elements in the earth and meteorites; bulk and isotopic composition and differentiation of terrestrial planets, core, mantle, and crust; Sr-Nd-Pb-Hf-U isotopic tracers. Course designed for graduate students, but available to qualified Earth sciences majors per instructor permission. Will be offered in 2007–08 academic year. Enrollment restricted to graduate students. *J. Gill*

210. Overview of Stellar and Planetary Formation and Evolution. *

Overview of current understanding of star and planet formation and evolution. Examines our solar system in the context of the galactic planetary census. Provides a uniform introduction to astronomy and Earth science planetary students. Enrollment restricted to graduate students. *The Staff*

213. Biogeochemical Cycles. W

Overview of biogeochemical cycles, present and past, and geochemical models. Topics include: marine, terrestrial, and global views of the carbon, nitrogen, phosphorus, silicon, sulfur, and oxygen cycles, and the evolution of these cycles and Earth's redox balance through geologic time. (Also offered as Ocean Sciences 213. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Upper-division undergraduates may enroll with instructor approval. College-level chemistry and an upper-division course in at least one relevant discipline are recommended. *M. Delaney*

220. Ground Water Modeling. *

Introduction to building and using models to solve hydrogeologic problems. Modeling methods include mainly analytical and finite-difference. Emphasis on using models rather than the details of their functioning, although some coding is required. Comfort with mathematical methods and computers expected. Course designed for

graduate students, but available to qualified Earth science majors. Prerequisite(s): graduate standing or permission of instructor required. One year of calculus and courses in differential equations and basic hydrologic principles are recommended as preparation. Offered in alternate academic years. *A. Fisher*

231. Igneous Petrology. *

Systematic study of the major igneous rock suites, combining petrography, experimental petrology, major and trace elements, volatiles, and isotopic characteristics. Laboratory: three hours. Course designed for graduate students but available to qualified earth sciences majors. Course 130 is recommended as preparation. *J. Gill*

251. Photogrammetry. F

Introduces photogrammetry's basic principles of imaging systems and digital-image processing for both terrestrial and planetary data, leading to the application of photogrammetry techniques to a final project of the student's choosing. Enrollment restricted to graduate students or by permission of instructor. *The Staff*

254. The Climate System. S

Focuses on atmospheric and oceanic processes that are important within the Earth's climate system, especially those that operate on annual to centennial time scales. Format includes lectures by the instructors, paper readings, and discussion. Enrollment restricted to graduate students. *A. Ravelo, P. Chuang*

256. Paleoclimate Modeling: Methods and Applications. *

Addresses methods of paleoclimate modeling on global and regional scales, from both surface and atmospheric perspectives. Applications of models to current significant paleoclimate problems will be examined. Includes both lecture and seminar formats. Enrollment restricted to graduate students; undergraduates by permission of instructor only. *The Staff*

261. Astrobiology. *

Study of the evolution and diversification of life on this planet; and factors affecting habitability of other bodies in this solar system and elsewhere. Enrollment restricted to graduate students in Earth sciences, physics, biology, or chemistry. *P. Koch, W. Nimmo*

262. Planetary Interiors. *

The chemical and thermal structure and evolution of silicate planet interiors. Topics include equation of state of mantle and core materials, thermal history of the mantle and core, dynamics of mantle convection, geophysical determination of interior structure. Students cannot receive credit for this course and course 162. Enrollment restricted to graduate students. Enrollment limited to 20. Offered in alternate academic years. *W. Nimmo*

263. Planetary Surfaces. S

Comparative study of surfaces of planetary bodies in our solar system, focusing on comparative planetology and geophysical processes at work, including on-impact cratering, atmospheric evolution, and exobiology. Explores terrestrial planets, giant planets and their moons, and trans-Neptunian objects, focusing on modern exploration. Students cannot receive credit for this course and course 163. Enrollment restricted to graduate students. Enrollment limited to 20. Offered in alternate academic years. *E. Asphaug*

263L. Planetary Field Course (2 credits). *

Field class in comparative planetology. Three- to four-day field trip plus planning and debriefing sessions.

Students are billed a materials fee. Enrollment restricted to graduate students. Enrollment limited to 12. Offered in alternate academic years. *E. Asphaug*

264. Planetary Atmospheres. *

Quantitative study of the origin, chemistry, dynamics, and observations of the atmospheres of terrestrial and gas giant planets. Students cannot receive credit for this course and course 164. Enrollment restricted to graduate students. *E. Asphaug*

265. Order of Magnitude Estimation. *

Practice in making rough estimates and leading-order approximations in physical and chemical processes. Enrollment restricted to graduate students. *P. Chuang, W. Nimmo*

269. Advanced Marine Stratigraphy: Techniques and Applications. *

Explores concepts and methods of correlating marine sedimentary sequences. Emphasis on the integration of techniques and development of the Cenozoic stratigraphic record. One 2-hour laboratory each week. Upper-division students who have completed course 120 may enroll in this course. Enrollment restricted to graduate students. *J. Zachos*

270. Global Seismology. W

Introduction to quantitative earthquake and global Earth structure seismology. Topics include basic elasticity, wave characteristics, seismic ray theory, wave reflection, surface waves, normal modes, seismic instrumentation, application of seismic waves to reveal Earth structure and resulting models, representation of earthquake sources such as explosions and faulting, earthquake rupture scaling, modern methods of modeling seismic recordings to study source complexity, and an introduction to seismotectonics. Laboratory: 3 hours. Enrollment restricted to graduate students. Offered in alternate academic years. *T. Lay*

271. Current Research Topics in Deep Earth Processes. *

Students and instructor lead discussions of recent and significant publications in geophysics and chemistry of deep Earth. Articles structured around current theme of interest are selected by participants and approved by instructor. Emphasis on defining multidisciplinary significance of each article and its relationship to fundamental processes in deep Earth, including core and mantle. Designed for graduate students but available to qualified Earth sciences majors. May be repeated for credit. *T. Lay*

272. Geophysical Fluid Dynamics. *

Introduces fluid motion influenced by rotation. Topics include the Coriolis force, geostrophic flow, potential vorticity, the shallow water model, quasigeostrophic approximation, planetary waves, Ekman theory, thermal wind, models of the large-scale oceanic and atmospheric circulation, and equatorial dynamics. Students cannot receive credit for this course and course 172. (Also offered as Ocean Sciences 272. Students cannot receive credit for both courses.) Physics 227 is recommended as preparation. Enrollment restricted to graduate students. Offered in alternate academic years. *C. Edwards*

275. Magnetohydrodynamics. *

Study of fluid dynamics and magnetic fields with a focus on convection and magnetic field generation in planets and stars. Students develop a computer program for modeling magneto-convection. Computer programming experience required. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Glatzmaier*

276. Geology of the Peopling of the Americas. *

Using a multidisciplinary approach, examines physical geology, paleoenvironment, human biology, linguistics, and culture history of Americas at end of last Ice Age. Particular emphasis on reconstructing timing, routes, and context of first peopling of the American continents. Taught in conjunction with Anthropology 276D. Students cannot receive credit for both courses. Enrollment restricted to graduate students. Enrollment limited to 15. *P. Koch*

278A. Advanced Seismology. W

Elastic wave propagation. Advanced topics in ray theory, WKBJ solutions in seismology, singularities and nonlinearities, surface wave theory, propagating matrices, normal modes, and inversion theory. Selected topics in time series analysis and seismic signal processing, seismic wave dispersion. Course designed for graduate students but available to qualified Earth sciences majors. Physics 110B and 114B are recommended as preparation. Enrollment restricted to graduate students. May be repeated for credit. *T. Lay*

278B. Advanced Seismology. *

Special topics in wave propagation in heterogeneous, three-dimensional media, applications for determination of Earth's structure, kinematics and dynamics of the seismic source, near field phenomena, engineering applications, current problems. Course designed for graduate students but available to qualified Earth sciences majors. Physics 110B and 116B are recommended as preparation. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

278C. Advanced Seismology. *

Special topics of interest in current research by the seismology group. Discussion of new developments in earthquake mechanics, wave propagation, tectonics, earthquake prediction. Course designed for graduate students but available to qualified Earth sciences majors. Physics 110B and 116B are recommended as preparation. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

290. Proseminar.

Special topics offered from time to time by visiting professors or staff members. May be repeated for credit. *The Staff*

290A. Tectonic Hydrogeology. *

Analysis of tectonics and hydrogeology of modern plate boundaries and continental margins. Discussion of structural styles, physical and chemical processes from modern environments as a basis for interpretation of ancient equivalents. Topics vary from year to year. May be repeated for credit with consent of instructor. Course designed for graduate students but available to qualified Earth sciences majors. *J. Moore*

290B. Topics in Glaciology. W

Advanced review of the physics and chemistry of ice and snow. Mass and heat balance of ice masses. Motion of glaciers and ice sheets. Subglacial and englacial hydrology. Thermodynamics of ice masses and the linkage to climate. Enrollment restricted to graduate students. May be repeated for credit. *S. Tulaczyk*

290C. Topics in Geophysics. *

Different problems and approaches will be stressed from year to year such as geotectonics, paleomagnetism, or properties and processes in the mantle and core. Course designed for graduate students but available to qualified Earth sciences majors. *R. Coe*

290D. Petrology and Plate Tectonics. *

Selected topics illustrating relationships between igneous and metamorphic rocks and plate tectonics are explored in detail. Designed for graduate students but available to qualified Earth sciences majors. May be repeated for credit. *J. Gill*

290E. Topics in Planetary Science. F

We examine one well-defined topic in planetary science, beginning with a summary of current knowledge and concluding with the latest research literature. Topics will vary from year to year and may include planetary collisions, terrestrial planets, origin of planetary systems, small bodies, the New Mars, and satellites of Jupiter. Achievement will be evaluated based on class participation, exams, and a research project. Open to undergraduate majors with permission of instructor. Enrollment restricted to graduate students. May be repeated for credit. *E. Asphaug*

290F. Topics in Coastal Processes (2 credits). F,W,S

Instructor and students lead discussions and make presentations on current research, problems, and publications in coastal processes. These topics include littoral drift, sediment transport and storage on the inner shelf, shoreline erosion/change and its documentation, and related issues. Enrollment restricted to graduate students. May be repeated for credit. *G. Griggs*

290G. Topics in Global Tectonics. *

Explores different problems of special interest in global tectonics with the approach of integrating marine and terrestrial geologic and geophysical information. Course designed for graduate students but available to qualified Earth sciences majors. May be repeated for credit. *E. Silver*

290H. Topics in Hydrogeology. F

Selected topics in groundwater, hydrothermal systems, and related subjects. Discussion of theoretical models, field and laboratory approaches, and recent research. Topics vary from year to year. Course designed for graduate students but available to qualified Earth sciences majors. May be repeated for credit. *A. Fisher*

290J. Topics in Earthquake Physics. *

Why do earthquakes happen? Topics include friction, fracture, earthquake triggering, stress in the crust, observed source scalings, and seismicity statistics. Emphasis on observations and current research topics. Enrollment restricted to graduate students and advanced undergraduates. *E. Brodsky*

290K. Paleontology Seminar (3 credits). *

Seminar discussion based on current readings in the literature around some topic in the history and evolution of life. Course designed for graduate students but available to qualified upper-division science students. Offered in alternate academic years. May be repeated for credit. *P. Koch*

290L. Topics in Climate Change. *

Explores current issues and recent developments in the field of past, present, and future climate change. Topic is different each year, but focuses on the interaction between different components of Earth's environment and the effect of that interaction on climate change. Designed for graduate students but open to qualified undergraduates. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *L. Sloan*

290M. Topics in Atmospheric Chemistry. *

Fundamentals of chemical processes determining the composition of the atmosphere on scales from urban

smog to climate change. Topics include carbon, nitrogen, sulfur biogeochemical cycles; atmospheric aerosols; urban air pollution; greenhouse effect; stratospheric ozone depletion; impacts on humankind and ecosystems. Enrollment restricted to graduate students, undergraduates with permission of instructor. May be repeated for credit. *P. Chuang*

290N. Topics in Mineral Physics. S

Selected topics encompassing the physics and chemistry of Earth's interior, planetary physics, high-pressure experimental geophysics and material properties at high pressure and temperature. Topics vary from year to year. Designed for graduate students but available to qualified Earth sciences majors. May be repeated for credit. *E. Knittle*

290P. Interdisciplinary Topics in the Earth Sciences. *

An understanding of the chemical and physical properties and processes in the earth is sought by integrating information from several subdisciplines in the Earth sciences. Topics vary from year to year, focusing on areas of active research. Course designed for graduate student but available to qualified Earth sciences majors. Prerequisite(s): graduate standing or permission of instructor. Course designed for graduate student but available to qualified Earth sciences majors. May be repeated for credit. *S. Schwartz*

290Q. Topics in Outer Solar System. S

Exploration of the planets and satellites beyond the asteroid belt, with an emphasis on the underlying physical processes at work. Course includes lectures, computer practicals, and student presentations. Enrollment restricted to graduate students. May be repeated for credit. *W. Nimmo*

290R. Topics in the Chemistry and Physics of the Earth. *

Explores problems and current research developments in the application of physics and chemistry to planetary interiors. Topics differ from year to year and include, but are not limited to, research related to the accretion, differentiation, evolution, and structure of the terrestrial planets. Course designed for graduate students but available to qualified Earth sciences majors. May be repeated for credit. *Q. Williams*

290T. Current Research Topics in Paleoclimatology and Paleogeography. *

Students and instructor lead discussions of recent and significant problems in paleoclimatology and paleogeography. Articles structured around current themes of interest are selected by the instructor. Emphasis on major climatic transitions or events which noticeably influenced evolution of biota. Course designed for graduate students but available to qualified Earth sciences majors. *J. Zachos, P. Koch*

290U. Topics in Thermochronology. *

Surveys the use of thermochronometry to quantify the rates of tectonic processes. Topics include heat conduction and diffusion; radioactive decay; analytical methods; and modeling of thermochronologic data. Seminars review seminal papers from the literature. Enrollment restricted to graduate students. Enrollment limited to 20. *J. Hourigan*

292. Seminar (no credit). F,W,S

Weekly seminar attended by faculty, graduate students, and upper-division undergraduate students. *The Staff*

293. Graduate Research Seminar (1 credit). S

Weekly seminar series covering a broad spectrum of topics in the Earth sciences. Graduate students give 15- to 20-minute oral presentations on current or anticipated research. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Permission of instructor required. *The Staff*

297. Independent Study. F,W,S

Permission of instructor required. *The Staff*

298. Earth Sciences Internship. F,W,S

A supervised learning experience involving practical, graduate-level application of Earth sciences through working with approved companies, governmental agencies, or research organizations. Students consult weekly with supervising faculty and prepare a final report of their work. Consult sponsoring agency for enrollment criteria. After instruction on resume preparation and interview skills, students must interview and be selected for internship by approved sponsoring organizations. *The Staff*

299. Thesis Research. F,W,S

Permission of instructor required. *The Staff*

East Asian Studies

Department of History
201 Humanities
(831) 459-2982
<http://history.ucsc.edu>

Program Description

Students interested in pursuing an education in East Asian studies at UCSC may select from among the following programs:

- A minor in Chinese or Japanese studies, with a major in any discipline in any division. The student is expected to acquire a speaking and reading ability in Chinese or Japanese sufficient to pursue advanced studies in China or Japan and use Chinese or Japanese source material for research. A student who wishes to complete the East Asian studies program should enroll in beginning Chinese or Japanese no later than the sophomore year. Students seeking further information about the minor should contact the History Department office, located at 201 Humanities. Requirements for the minor are outlined below.
- A major or minor in the Chinese or Japanese concentration of language studies. Requirements for this are found at the language studies website. Requirements for this major may be found under Language Studies in the catalog and at the language studies web site, <http://ling.ucsc.edu>.
- An individual major in East Asian studies is another option. Students may pursue intensive study in the Chinese or Japanese languages, including study abroad, to gain a broad social, political, and cultural understanding of China or Japan. Students interested in this option should contact their college advising office and the director of East Asian studies.

Requirements for the Minor

Language. Completion of the Chinese or Japanese language sequence through either Chinese 108 or Japanese 105.

Required courses. One of either of the East Asian Studies Core Courses: History 40A, *Early Modern East Asia*, or History 40B, *The Making of Modern East Asia*.

Three additional upper-division courses in East Asian studies, one of which may be an individual study (course 199). Up to two of these courses may be from an Education Abroad Program, upon review and approval of said courses by the director of East Asian studies. Since the goal of these upper-division context courses is to give students an interdisciplinary grounding in East Asian studies, students are strongly encouraged to fulfill these course requirements outside their major whenever possible. Distribution of the upper-division courses must be approved by the program director.

Check the *Schedule of Classes* or consult with the program coordinator for courses added during the academic year that meet the requirement.

Study Abroad

Study abroad, though not a requirement, is strongly encouraged. At present there are UC Education Abroad programs in China, Japan, Hong Kong, Korea, and Taiwan. For more information on the program, see the UC Education Abroad Program, page 40.

Faculty

More information can be obtained from faculty involved in the program: Noriko Aso (History), Dilip K. Basu (History), Raoul Birnbaum (History of Art and Visual Culture), Nancy Chen (Anthropology), Alan S. Christy (History), Christopher Connery (Literature), Sakae Fujita (Language Program), Hiroshi Fukurai (Sociology), K. C. Fung (Economics), Per Gjerde (Psychology), June Gordon (Education), John Hay (History of Art and Visual Culture), Gail B. Hershatler (History), Emily Honig (Feminist Studies and History), Minghui Hu (History), Junko Ito (Linguistics), David Keenan (Language Program), Lisa Rofel (Anthropology), Dana Y. Takagi (Sociology), Alice Yang (History).

Ecology and Evolutionary Biology

See Biological Sciences, page 143.

Economics

401 Engineering 2
(831) 459-2743
<http://economics.ucsc.edu>

Faculty and Professional Interests

Professor

ROBERT F. ADAMS, Emeritus

JOSHUA AIZENMAN

International economics, economic development

YIN-WONG CHEUNG

Econometrics, applied econometrics, exchange rate dynamics, financial price behavior, aggregate output dynamics

MICHAEL P. DOOLEY

International finance, monetary theory and policy

ROBERT W. FAIRLIE

Labor economics, public policy, entrepreneurship, applied econometrics

DANIEL FRIEDMAN

Microeconomic theory, experimental economics, evolution and learning, behavioral economics, financial markets

K.C. FUNG

International trade, WTO, multinational corporations, and Asia/Pacific economies

RONALD E. GRIESON, Emeritus

MICHAEL M. HUTCHISON

International finance, macroeconomics, Japanese financial system

JOHN W. ISBISTER, Emeritus

DAVID E. KAUN

Economics of art and culture; political economy of capitalism (including the quality of public discourse and its impact on public policy)

KENNETH KLETZER

International economics, macroeconomics, economic development

LORI G. KLETZER

Employment and wage determination, impact of globalization on the domestic labor market, industrial relations, government labor market policies, higher education and the labor market

JACOB B. MICHAELSEN, Emeritus

PEGGY B. MUSGRAVE, Emerita

NIRVIKAR SINGH

Industrial organization, political economy, economic development, technology and innovation, South Asian immigrants in the U.S., Indian economy

CARL E. WALSH

Monetary theory and policy, macroeconomics

DONALD A. WITTMAN

Economic theory, politics, law

Adjunct Professor

SHARATH SURY

Investment management and research, portfolio theory, strategic asset allocation, active risk budgeting, hedge funds, alphanbeta risk separation

Associate Professor

BERNARD L. ELBAUM

Economic history

PHILLIP MCCALMAN

International trade, intellectual property rights, industrial organization

Assistant Professor

AI-RU CHENG

Finance (asset pricing) and econometrics

CARLOS E. DOBKIN

Public health, public policy, and econometrics

RICARD GIL

Industrial organization, organizational economics, and applied microeconomics

JUSTIN G. MARION

Public economics, empirical industrial organization

RYAN OPREA

Experimental economics, industrial organization, applied game theory, and financial markets

JENNIFER POOLE

International trade; Latin American economics; applied microeconomics

FEDERICO RAVENNA

Open economy macroeconomics, international finance, monetary economics

JONATHAN ROBINSON

Economic development, with an emphasis on field experiments and primary data collection

ALAN SPEAROT

International trade; industrial organization

THOMAS WU

International finance, macroeconomics, Brazilian macroeconomic policy

HUIBIN YAN

Economic theory, game theory, microeconomic theory, applied microeconomic theory, industrial organization, experimental economics

Lecturer

MARY FLANNERY

Economics of the telecommunications industry, applied microeconomics, business strategy and marketing

ROBERT J. SHEPHERD

Financial, managerial, cost accounting; intermediate accounting; and certified public accountant examination



DAVID GOODMAN, Professor Emeritus of Environmental Studies

PAUL M. LUBECK, Professor of Sociology

Political sociology; political economy of development, globalization, labor and work; logics of methodology; religion and social movements; Islamic society and identities; information and networks

JOHN T. MUSACCHIO, Assistant Professor of Information Systems Management

Control, analysis, and pricing of communications networks; applications of game theory in networking; wireless ad-hoc networks; and management of technology

MANUEL PASTOR JR., Professor of Latin American and Latino Studies

Urban poverty and regional development, Latinos in the urban U.S., environmental justice, macroeconomic stabilization in Latin America; distribution and growth in the developing world; Cuban economic reform; Mexican economic reform

KEVIN G. ROSS, Assistant Professor of Information Systems Management

Service engineering and management; resource allocation; operations research, pricing, scheduling; queueing theory; networks

HELEN SHAPIRO, Associate Professor of Sociology

Political economy, Latin American economic history and development (with an emphasis on Brazil), industrial policy, the auto industry, the state and transnational corporations

YI ZHANG, Assistant Professor of Information Systems Management

Information retrieval, knowledge management, natural language processing, machine learning

Program Description

An understanding of economics is a vital component of a liberal arts education and a necessity for anyone

interested in such areas as business, environmental policy, welfare reform, unemployment, international competitiveness and trade, or transformations in the global economy.

The programs offered by the UCSC Economics Department are designed to acquaint students with the broad range of issues studied by economists and with the tools they use. The department offers three majors:

Economics B.A.

Business management economics B.A.

Global economics B.A.

A minor in economics is also available, as well as the following combined majors:

Economics/environmental studies B.A.

Global economics/Latin American and Latino studies B.A.

Students majoring in other subjects will find that economics courses help them understand current affairs and satisfy their curiosity about the ways society allocates resources. The department provides topical courses in the 80 series for students who are interested in economics or business but do not plan to become majors.

The economics curriculum begins at the introductory level; no specific high school preparation is required. All economics majors study a substantial core of economic theory and mathematical and statistical methods, and then choose among a wide variety of upper-division electives.

Economics majors may combine their upper-division elective choices in a variety of ways to achieve specialization in a number of possible areas, including environmental economics, public policy, political economy, international economics, economic development, and quantitative methods. Highly qualified seniors may take appropriate graduate courses and earn an M.S. as well as a B.A. degree in five years.

General Requirements

Admission into an Economics Major and Minor

The Economics Department administers three undergraduate majors: economics, business management economics and global economics. The admission requirements are the same for the three.

Students must take two courses prior to petitioning for entry to an economics major: Economics 1 (*Introductory Microeconomics*) and Economics 2 (*Introductory Macroeconomics*).

Students may petition for admission to the major by filling out the UCSC declaration of major form and by supplying evidence of their performance in the two pre-major courses.

Equivalent courses may be taken at other universities or at community colleges. Transfer students may have these requests reviewed by the department prior to matriculation at UCSC.

All students with a combined grade point average (GPA) of at least 2.8 in courses 1 and 2 will be allowed to declare the major. To be considered for the major, students with a GPA below 2.8 in these courses must submit a GPA letter of appeal. Letters of appeal should describe any extenuating circumstances that might affect the student's record. GPA appeals will be reviewed three times per quarter; the third, the fifth, and the seventh week of instruction with a four-day turnaround. Please come by the Economics Office, Engineering 2, Room 401, to receive guidelines on the appeal process.

Students should take courses 1 and 2 for letter grades. In the case of courses taken on a Pass/No Pass

basis, the department will use unofficial grades assigned by the instructor but not reported to the Office of the Registrar, in its assessment of eligibility for the major.

Courses for which the grade of W (withdraw) is given are not counted in the computation of the GPA. If courses 1 or 2 are repeated, the department will consider the grades from the first attempt in determining whether students qualify for admittance into the major.

For purposes of advising, students who are interested in pursuing an economics major are encouraged to declare the pre-economics major with the understanding that this does not automatically provide entry to the economics major.

Major Disqualification Policy

Students are expected to maintain good academic standing in the major. Only courses with a grade of P or a minimum letter grade of C or better will satisfy the major requirements. Students who fail any of the upper-division core courses (Economics 100A (or 100M), 100B (or 100N), and 113) twice will be disqualified from the major. Students who are disqualified will be notified by the first day of instruction in the subsequent quarter following the disqualifying failure. The Office of the Registrar and the student's college will be notified of the disqualification.

Students may appeal their disqualification by submitting a letter to the Economics Department. This appeal must be filed no later than 15 days after the disqualification notification was mailed, or the 10th day of classes in the quarter of their disqualification, whichever is later.

Core Requirements for all Economics Majors

Economics 1 and 2, 11A, 11B, 100A (or 100M), 100B (or 100N), 113, and Applied Mathematics and Statistics 5 are required for all economics majors and are prerequisites for most upper-division courses. Students are strongly urged to complete these courses as soon as possible. Students who are committed to the major early in their academic career, or who are considering the combined B.A./M.S. program, should plan to complete at least Economics 1, 2, 11A, and 11B by the end of their sophomore year.

Mathematics and Statistics Content Requirement

Mathematics: Successful completion of Economics 11A and 11B, also offered as Applied Mathematics and Statistics 11A and 11B, (or equivalent) is required of all economics majors and is prerequisite to Economics 100A (or 100M), 100B (or 100N), and 113. (Economics 11B can be taken concurrently with Economics 100A (or 100M) and 100B (or 100N).) Therefore, students are advised to take Economics 11A and 11B or their equivalent as early as possible in their undergraduate career. Mathematics 11A-B and 22 or 23A, or 19A-B and 22 or 23A, are acceptable equivalents to Economics 11A and 11B. Students planning to do graduate work in economics or business should seriously consider more intensive mathematical training; consult an adviser.

Statistics: Applied Mathematics and Statistics 5 *Statistics*.

Comprehensive Requirement

The comprehensive requirement may be satisfied in one of the following ways: (1) by passing the final exams in all three upper-division core courses (Economics 100A

or 100M, 100B or 100N, 113); (2) with consent of an instructor, by completion of a senior thesis.

Note that item 2 (above) has been quite rare in recent years. Most students who write a senior thesis have already met the comprehensive requirement. Also note that passing the final exam does not always guarantee passing a course.

Minor Requirements

Students earn a minor in economics by completing all of the requirements for the major with the following differences:

- The number of additional upper-division courses is reduced from five to three.
- There is no comprehensive requirement.
- Economics 191, 192, 193, 193F, 198, and 198F may not be used to meet minor requirements.

Economics 199 may be counted only once toward the upper-division minor requirements.

Independent Study

Students are encouraged to petition for independent study on topics of special interest to them. Economics 199, *Tutorial*, may be used as only one of the upper-division courses required for the major. The department encourages group tutorial study in which a small number of students join together in a seminar to pursue a common interest with faculty assistance. Such enterprises make economical use of faculty resources, and they also make it possible for students to learn from each other.

Field-Study Program

The Economics Department offers its majors the opportunity to integrate their academic knowledge with career-related work. The field-study program places students in internships under the supervision of a faculty sponsor and a professional at the workplace. Students can select from a wide variety of field placements such as accounting firms, community non-profits, government agencies, brokerage firms, marketing agencies, banks, and businesses in Santa Cruz and beyond. Students apply and prepare for field study a quarter in advance. Acceptance into the field-study program is determined by academic standing, class level, and successful completion of courses 100A (or 100M), 100B (or 100N), and 113. Students may earn a maximum of 10 academic credits and complete up to two quarters in a field placement. A field study requires 12 hours per week spent working on internship duties. Time spent toward the academic requirements set by the faculty sponsor is not included in the 12 hours spent at the field placement.

Along with the training and supervision by a professional at the workplace, students receive guidance from a faculty sponsor who directs their academic project. Students earn credit through the completion of this project and the job supervisor's evaluation of performance. Economics field-study courses (193 and 198) do not satisfy any upper-division requirements for the major and are available as Pass/No Pass only.

Interested students should make an appointment or stop by the Economics Field Study office at 401B Engineering 2; or call (831) 459-2028; or e-mail econintern@ucsc.edu. Web address: <http://econ.ucsc.edu>.

Transfer Students

A student transferring to UCSC may fulfill some of the requirements for the major by completing equiva-

lent courses, with a grade of C or better, at another recognized institution. Transfer students must present their Transfer Credit Summary (available on the student portal) and course syllabi or descriptions to an Economics Department adviser. The department approves courses applicable for economics prerequisites and major requirements. All transfer students must complete the comprehensive requirement at UCSC. Economics and global economics majors must take at least three of their upper-division economics electives at UCSC. Business management economics majors must take at least four of their upper-division economics electives at UCSC, one of which must be 101, 133, or 135. Courses taken for credit elsewhere may not be repeated for credit here.

Combined Majors

The Economics Department offers a combined major in environmental studies/economics. Global economics is offered in a combined major with Latin American and Latino studies. Requirements for these majors may be reviewed under their separate entries in this catalog.

Economics Program Description

Economics is the study of a vast range of human behavior and its social implications, ranging from how individuals and businesses make financial and consumption decisions to how society organizes production and makes allocation decisions over time and place.

Economics majors study a substantial core of economic theory and mathematical and statistical methods. Focusing on these two areas provides the foundation for graduate studies in economics. The required core courses may also be combined with electives in a general economics major program especially suitable for students who plan either to enter law school or to go into more specialized programs emphasizing areas such as applied economics, environmental economics, public policy, political economy, international economics, third world issues and economic development, and quantitative methods.

Economics Major Requirements

Students who major in economics are required to take the following courses:

- 1 *Introductory Microeconomics: Resource Allocation and Market Structure*
- 2 *Introductory Macroeconomics: Aggregate Economic Activity*
- 11A *Mathematical Methods for Economists* (or equivalent)
- 11B *Mathematical Methods for Economists* (or equivalent)
- 100A *Intermediate Microeconomics* (or 100M)
- 100B *Intermediate Macroeconomics* (or 100N)
- 113 *Introduction to Econometrics*

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and five additional upper-division economics courses, at least three of which must be selected from the following:

- 104 *Is There Truth in Numbers: The Role of Statistics in Economics*
- 105 *Macroeconomic Theory*
- 106 *Evolutionary Thought in the Social Sciences*
- 107 *Economic Justice*
- 108 *Business and Society*
- 109 *Business Ethics*

- 114 *Advanced Quantitative Methods*
- 120 *Economic Development*
- 121 *Economic Growth*
- 125 *Economic History of the U.S.*
- 126 *Why Economies Succeed or Fail*
- 128 *Poverty and Public Policy*
- 130 *Money and Banking*
- 137 *Performing Arts in the Public and Private Economy*
- 140 *International Trade*
- 141 *International Finance*
- 142 *Advanced Topics in International Finance*
- 143 *Policy Issues in the International Economy*
- 148 *Latin American Economies*
- 149 *The Economies of East and Southeast Asia*
- 150 *Public Finance*
- 152 *Setting Domestic Priorities*
- 153 *Cost-Benefit Analysis*
- 156 *Health Care and Medical Economics*
- 157 *Economics of Aging*
- 160A *Industrial Organization*
- 160B *Government and Industry*
- 165 *Economics as an Experimental Science*
- 166A *Game Theory and Applications I*
- 166B *Game Theory and Applications II*
- 169 *Economic Analysis of the Law*
- 170 *Environmental Economics*
- 171 *Natural Resource Economics*
- 175 *Energy Economics*
- 183 *Women in the Economy*
- 184 *Labor Wars in Theory and Film*
- 185 *The Value and Support of the Arts: Challenges and Opportunities in American Society*
- 189 *Political Economy of Capitalism*
- 190 *Senior Proseminar*

Courses 191, 192, 193, 193F, 198, and 198F may not be used to meet major requirements. Either course 195 or 199 may be used to fill one of the five upper-division major requirements. Other electives are listed under the Business Management Economics program description.

Business Management Economics Program Description

The business management economics major provides students who are interested in careers in business or management with a foundation in economics and a selection of applied fields related to business management. Particular areas of strength of the program are accounting, finance, and technology management. This course of study prepares students for entrance into the business world or admission to graduate programs—either the master's program in applied economics and finance at UCSC or graduate programs in business and management at other universities.

The program provides a business and management education embedded within a broader economics and liberal arts context and is closely related to the economics and global economics majors and the information systems management major (page 255).

The UCSC business management economics curriculum begins at the introductory level; no specific high school preparation is required. All majors study a substantial core of economic theory and mathematical and statistical methods, and they are then able to choose among a wide range of business and management electives.

This major has several important elements. First, it combines the strong analytic approach of economics with the technical aspects of management. Second, it recognizes that computing is intrinsic to business and is

an essential skill for those who wish to enter this field. Students in this major gain knowledge about using computing as a tool of analysis for economic, statistical, and financial data. Third, the major offers field placements (arranged with the economics field-study program coordinator) which provide an excellent way to apply academic economics, business, and management to issues and problems in the real world; they provide marketable skills as well as important job contacts.

In cooperation with the UC Education Abroad Program (EAP), opportunities are available for students to take some business courses (taught in English) in Europe, Mexico, and Hong Kong. Students should ask the Economics Department for additional information about these programs.

Students who are committed to the major early in their academic career or who are considering the combined B.A./M.S. program should plan to complete Economics 1, 2, 10A, 10B, 11A, and 11B no later than the end of their sophomore year.

Business Management Economics Major Requirements

Introductory and core requirements. Students who major in business management economics are required to take the following courses:

- 1 *Introductory Microeconomics: Resource Allocation and Market Structure*
 - 2 *Introductory Macroeconomics: Aggregate Economic Activity*
 - 10A *Economics of Accounting* (or equivalent, see under General Requirements)
 - 10B *Economics of Accounting* (or equivalent, see under General Requirements)
 - 11A *Mathematical Methods for Economists* (or equivalent)
 - 11B *Mathematical Methods for Economists* (or equivalent)
 - 100A *Intermediate Microeconomics* (or 100M)
 - 100B *Intermediate Macroeconomics* (or 100N)
 - 113 *Introduction to Econometrics*
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Computer literacy requirement. Students must complete a minimum of two courses from the following list (with department approval, a student may substitute other computing courses):

Computer Engineering

- 12/L *Computer Organization*
- 80N *Introduction to Networking and the Internet*

Computer Science

- 10 *Introduction to Computer Science*
- 12A/L *Introduction to Programming*
- 5C *Introduction to Programming in C* (formerly CMPS 60 G/N)
- 5J *Introduction to Programming Java* (formerly CMPS 60 G/N)
- 5P *Introduction to programming in Python* (formerly CMPS 60 G/N)
- 80B *Systems and Simulation*

Information Systems Management

- 50 *Business Information Systems*
- 58 *Systems Analysis and Design*

Linguistics

- 80G *Introduction to Unix*

Economics

- 216 *Applied Econometric Analysis I* (with permission of instructor)

Note: CMPS 5J and CMPS 11 are equivalent to CMPS 12A/L and this is the recommended route for students with no prior programming experience.

Upper-division electives. Students are required to take six additional courses: four in business management and two other economics electives. Students must choose four courses from the following list; at least one of these four must be a course designated with an asterisk (*).

- *101 *Managerial Economics*
- 102 *Forecasting*
- 110 *Managerial Cost Accounting and Control*
- 111A *Intermediate Accounting I*
- 111B *Intermediate Accounting II*
- 115 *Introduction to Management Sciences*
- 117 *Tax Factors of Business and Investment*
- 118 *Fraud Examination*
- 119 *Advanced Accounting*
- 131 *International Financial Markets*
- *133 *Security Markets and Financial Institutions*
- *135 *Corporate Finance*
- 136 *Business Strategy*
- 138 *The Economics and Management of Technology and Innovation*
- 139A *Economics of Electronic Commerce*
- 139B *E-Commerce Strategy*
- 161A *Marketing*
- 161B *Marketing Research*
- 162 *Legal Environment of Business*
- 164 *Economics and the Telecommunications Industry*
- 180 *Labor Economics*
- 181 *Economics of Real Estate*
- 188 *Management in the Global Economy*
- 194 *Advanced Topics in Management*

Students must choose the remaining two courses from the upper-division economics electives listed for the economics major (see page 181).

Courses 191, 192, 193, 193F, 198, and 198F may not be used to meet major requirements. Either course 195 or 199 may be used to fill one of the six upper-division major requirements.

Field study. One quarter of field study is strongly recommended. Placements and credit for course 193 or 198 are arranged through the economics field-study coordinator. See above under Field-Study Program description.

Global Economics Program Description

Global economics is an interdisciplinary major designed to prepare students to participate in the global economy; the program aims to deepen the student's knowledge of economics within a culturally and linguistically diverse world. The major is particularly useful to students contemplating careers at home or overseas in international relations, in international business, or with international organizations. Hence the major requires overseas study, regional area study, and second-language proficiency in addition to the basic economics requirements.

The UCSC global economics curriculum begins at the introductory level; no specific high school preparation is required. The global economics major program is closely related to the economics major program. See above under the general economics program description for more information.

Global Economics Major Requirements

Introductory and core requirements. Students who major in global economics are required to take the following courses:

- 1 *Introductory Microeconomics: Resource Allocation and Market Structure*
- 2 *Introductory Macroeconomics: Aggregate Economic Activity*
- 11A *Mathematical Methods for Economists* (or equivalent)
- 11B *Mathematical Methods for Economists* (or equivalent)
- 100A *Intermediate Microeconomics* (or 100M)
- 100B *Intermediate Macroeconomics* (or 100N)
- 113 *Introduction to Econometrics*

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Students are strongly urged to complete courses 100A (or 100M), 100B (or 100N), and 113 prior to study abroad. In addition, majors must have language study, area study, and overseas study, as described below.

Courses 191, 192, 193, and 198 may not be used to meet major requirements. Either course 195 or 199 may be used to fill one of the five upper-division major requirements.

Upper-division requirements. Five additional upper-division courses are required. Please see courses listed under the Economics and Business Management majors as well. These may include approved courses offered by other departments.

At least one of the five courses must be selected from the following three:

- 120 *Economic Development*
- 140 *International Trade*
- 141 *International Finance*

In addition, at least one course must be chosen from one of the following lists:

Economics

- 120 *Economic Development*
- 126 *Why Economies Succeed or Fail: Lessons from Western and Japanese History*
- 131 *International Financial Markets*
- 140 *International Trade*
- 141 *International Finance*
- 142 *Advanced Topics in International Economics*
- 148 *Latin American Economies*
- 149 *The Economies of East and Southeast Asia*
- 188 *Management in the Global Economy*

Latin American and Latino Studies

- 140 *Rural Mexico in Crisis*
- 168 *Economic History of Latin America*
- 169 *Latin American Industrialization in a Global Perspective: Past, Present, Future*

Politics

- 140B *Comparative Post-Communist Politics*
- 175 *The New Europe*
- 176 *International Political Economy*

Sociology

- 163 *Global Corporations and National States*
- 167 *Development and Underdevelopment*

The other three required upper-division electives are determined by the student's interests.

The global economics major has three additional elements:

1. **Foreign Language Study:** The global economics major requires a foreign language since students who plan to work in the larger world must have fluency in a language other than English. This language should be relevant to their regional area of interest. Students can meet this requirement by completing two years of university-level language courses or by demonstrating an equivalent level of competence through a recognized language test.
2. **Area Study:** The major requires students to take two additional courses selected from the offerings of departments other than economics in order to learn about the history, political economy, or culture of some other part of the world. These can be lower- or upper-division courses; the courses should focus on the area of the student's language study and overseas study. The Economics Department provides a list of approved courses; substitute courses are welcomed when they are part of the student's overseas program or from other UCSC departments, but must be approved by the adviser for the global economics major.
3. **Study Abroad:** All students are required to spend at least one term abroad in an approved course of study in their regional area of concentration; students may also choose a year-long program. Typically, a student will do this through the UC Education Abroad Program (EAP). Numerous overseas study sites are available through EAP. Students desiring to fulfill their required study abroad through EAP must apply directly to the EAP office for the selected program and are subject to the admission requirements determined by UC EAP. In countries and at universities where EAP programs are not available, students may make their own arrangements for study with the permission of the director of the program. Students may use the time abroad to further their language study, to meet the area study course requirements, to meet some of the upper-division economics course requirements, or to take courses unrelated to the major. Students who are not accepted to an overseas program or who cannot meet the language or area course requirements are advised to complete the general economics major as an alternative.

Graduate Programs

Master's Program in Applied Economics and Finance

The master of science program in applied economics and finance is designed for students who wish to supplement their undergraduate work in economics with analytical graduate training that prepares them for careers in business, government, international and domestic banking, consulting firms, and nonprofit organizations. The program is unique in its focus on graduate-level economics training for practical application and its emphasis on communication skills. The curriculum stresses the application of micro and macro concepts, statistical techniques, finding and using data sources, working out substantial practical applications, developing writing and reporting skills, and presenting material orally before an audience. The program differs from typical M.B.A. programs by preparing students to meet the increasing technical demands of private and public sector employers through comprehensive course work in economic analysis.

Requirements for admission include an undergraduate degree in economics or successful completion of

undergraduate courses in intermediate microeconomics, macroeconomics, and statistics and adequate preparation in mathematics. At least two quarters of calculus and one of linear algebra are strongly recommended. Students are also expected to have basic computer skills.

Students normally complete the master's program in two years. All students must complete 12 courses (60 credits) of graduate study, including the following core courses which are taken in the first year:

- 200 *Microeconomic Analysis*
- 201 *Applications in Microeconomics*
- 202 *Macroeconomic Analysis*
- 216 *Applied Econometric Analysis I*
- 217 *Applied Econometric Analysis II*
- 233 *Finance*

In addition, first-year students take a two-unit workshop (course 294) in fall. Students normally enroll for 15 units. The minimum for full-time is 12 units.

In the fourth and fifth quarters, students must take at least four elective courses numbered 200 or higher. Students may choose from among the following courses: finance (courses 234, 235, 236, and 239), international economics (courses 249A, 249B), public economics (courses 250, 259A, 259B), accounting (courses 209A, 209B), or any economics Ph.D. course. Note that these courses are not offered each year; elective courses vary from year to year and are dependent on the staffing capabilities of the Economics Department.

Second-year master's students may count no more than two upper-division economics courses toward the elective requirements.

Students may also satisfy elective requirements by taking relevant courses from another discipline. Students will need to file a departmental petition for review and approval of either their upper-division economics courses and/or courses from a related discipline. Please see the graduate adviser for the pre-approved list. Students should begin the approval process at least one quarter in advance.

In the final quarter, each candidate completes a major project in conjunction with course 291, *Workshop in Applied Economics*, and 10 units of course 297, *Independent Study*. Students with graduate credit from other institutions may submit a written request for course substitution and/or credit to the graduate committee for review.

Applied Economics and Finance B.A./M.S. Dual-Degree Program for Undergraduates

Students entering UCSC as undergraduates may complete a combined B.A./M.S. in applied economics and finance in five years. To qualify for this program, students must complete all of the core courses for their specific major: courses 1, 2, 11A, 11B, 100A (or 100M), 100B (or 100N), and 113. Business management economics majors must also complete 10A and 10B. In addition, students are strongly advised to complete a minimum of three upper-division economics electives (business management economics majors must complete four) as well as the general education requirements before the end of their junior year. Students are also advised to take a course in linear algebra (Mathematics 21). Students majoring in business management economics or global economics should refer to those sections for the respective dual-degree requirements.

Students must also take the Graduate Record Examination General Test during the fall quarter of their junior year. Advance planning for the program is

essential, and interested students should consult with a faculty adviser well in advance of applying to the dual-degree program.

A student in the program begins the first-year M.S. courses in the senior year while continuing to maintain undergraduate status. In the fifth year, the student is officially enrolled as a graduate student and completes the remaining graduate course work, culminating in the M.S. degree.

Admission to the dual-degree program is by formal application directly to the Department of Economics; the application deadline is February 15 of the junior year. Undergraduates who plan to apply to quantitative-oriented Ph.D. programs at other institutions may take some of the first-year M.S. classes with the permission of the instructor.

Ph.D. Program in International Economics

The Ph.D. program in international economics provides students with training in modern microeconomics, macroeconomics, and econometrics, combined with specialized training in the fields of international finance and international trade. Students learn to bring an international perspective to all areas of economics and to conduct research on current and emerging international economic issues. The program offers more intensive course work in international trade and finance, as well as greater faculty depth in various aspects of international economics, than do traditional Ph.D. programs in economics that offer international economics as a single subfield. The large number of internationally recognized faculty in the department who are actively engaged in research in international economics provides a unique focus to the program and the department. While the core emphasis is on international trade and finance, the program also offers courses in economic development and in special topics, and students in the program have conducted research on a wide variety of topics in other areas; examples include monetary economics, experimental economics, environmental economics, and economic growth and development. This makes graduates of the program particularly well prepared for academic careers and for research careers in both domestic and international policy institutions.

Courses and Program Requirements

YEAR	FALL	WINTER	SPRING	
1st	204A <i>Advanced Micro Theory</i>	204B <i>Advanced Micro Theory</i>	204C <i>Advanced Micro Theory</i>	
	205A <i>Advanced Macro Theory</i>	205B <i>Advanced Macro Theory</i>	205C <i>Advanced Macro Theory</i>	
	210B <i>Math Methods Econ Analysis</i>	211B <i>Advanced Econometrics</i>	211C <i>Advanced Econometrics</i>	
	211 A <i>Advanced Econometrics</i>		Micro & Macro Prelim Exams	
	2nd	240A <i>Advanced International Trade</i>	240B <i>Advanced International Trade</i>	240C <i>Advanced International Trade</i>
		241A <i>Advanced International Finance</i>	241B <i>Advanced International Finance</i>	241C <i>Empirical Applications Trade & Finance</i>
220A <i>Development of International Economics</i>		243* <i>History of International Economy</i>	212 <i>Empirical Project</i>	
		220B <i>Development of International Economics</i>	Field Exams	
		212 <i>Empirical Project</i>		

3rd	295A <i>Directed Reading</i>	295B <i>Directed Reading</i>	295C <i>Directed Reading</i>
	296A <i>Third Year Seminar</i>	296B <i>Third Year Seminar</i>	296C <i>Third Year Seminar</i>
	212 <i>Empirical Project</i>		
4th	298 <i>Dissertation Research</i>	298 <i>Dissertation Research</i>	298 <i>Dissertation Research</i>
	297A <i>Independent Study</i>	297B <i>Independent Study</i>	297C <i>Independent Study</i>
			Last qtr to challenge QE without academic probation

*Economics 243 is not offered every year; it may be taken in the 2nd or 3rd year.

Course requirements are satisfied by a letter grade of B or better or a grade of S (satisfactory). A letter grade of C in a course is not satisfactory for meeting a course requirement for the Ph.D. program.

Preliminary Requirements

Preliminary examinations are given in two parts: one test in micro theory and one test in macro theory. Students are expected to pass both exams before the beginning of their second year. Preliminary exams are currently offered in June and September, although scheduling is subject to change.

Field examinations are given in two parts: one test in international trade and one test in international finance. These exams are roughly based on the courses Econ 240A, B, C and 241A, B, C, but they are not restricted to only material taught in a particular year at UCSC. The purpose of the exams is to test adequate knowledge of international economics as a qualification for the Ph.D. program. Students are expected to pass both exams by the beginning of their third year. Field exams are currently offered in June and September, although scheduling is subject to change.

An econometrics paper is due at the end of the first full week of fall quarter of the third year. In the winter and spring quarters of the second year and again in the fall quarter of the third year, each student must enroll in Economics 212 with the faculty adviser. The graduate handbook of the department details the evaluation procedure for the paper.

Students who do not pass both preliminary exams, both field exams and the econometrics paper requirement will not be allowed to continue in the Ph.D. program.

Qualifying Examination

Advancement to candidacy for the Ph.D. degree requires completion with satisfactory grades or better of the required coursework, preliminary examinations, field examinations, the econometrics paper and an oral examination. The oral examination is taken after all of the other requirements have been completed. A student cannot advance to candidacy before clearing any incomplete grades from their record.

Dissertation

The final requirement for the Ph.D. degree is acceptance of the student's dissertation under the rules of the Academic Senate. A three-member dissertation advisory committee, headed by the student's research advisor, evaluates the dissertation for the department. The dissertation advisory committee must be approved by both the Economics Ph.D. Committee and the Graduate Council. The committee may require a formal public defense of the dissertation.

Lower-Division Courses

1. Introductory Microeconomics: Resource Allocation and Market Structure. F,W,S

For all interested students as well as prospective economics majors. Examines how markets allocate resources in different kinds of economies. Topics include competitive markets, monopoly, financial markets, income distribution, market failures, the environment, and the role of government. (General Education Code(s): IS.) *The Staff*

2. Introductory Macroeconomics: Aggregate Economic Activity. F,W,S

For all interested students and prospective economics majors. Examines how the overall level of national economic activity is determined, including output, employment, and inflation. Explores the roles of monetary and fiscal policies in stabilizing the economy and promoting growth, with a focus on contemporary policy debates. (General Education Code(s): IS.) *The Staff*

10A. Economics of Accounting. F,W

Introduction to accounting principles and practice; preparation and analysis of financial statements; study of internal control procedures. Courses 10A and 10B satisfy the Accounting 1A-B requirement at UC Berkeley. *The Staff*

10B. Economics of Accounting. W,S

Managerial accounting emphasizing analysis and control; accounting for corporations; introduction to taxation, budgeting, and equity/debt financing; management decision making. Courses 10A and 10B satisfy the Accounting 1A-B requirement at UC Berkeley. Prerequisite(s): course 10A. *The Staff*

11A. Mathematical Methods for Economists. F,W,S

Mathematical tools and reasoning, with applications to Economics 1. Topics are drawn from differential calculus and include limits, continuity, techniques of differentiation, differentials, relative and absolute extrema, and applied optimization. (Also offered as Applied Math and Statistics 11A. Students cannot receive credit for both courses.) Students who have already taken Mathematics 11A and 19A should not take this course. Prerequisite(s): score of 31 or higher on Mathematics Placement Exam. Students who do not place into precalculus should enroll in Mathematics 2. (General Education Code(s): IN, Q.) *The Staff*

11B. Mathematical Methods for Economists. F,W,S

Mathematical tools and reasoning, with applications to Economics 2. Topics are drawn from integral calculus and multivariable calculus, including indefinite and definite integrals, separate differential equations, partial derivatives, total differentials, optimization in several variables, and Lagrange multiplier. (Also offered as Applied Math and Statistics 11B. Students cannot receive credit for both courses.) Prerequisite(s): course 11A, or Applied Mathematics and Statistics 11A, or Mathematics 11A, or Mathematics 19A. (General Education Code(s): IN, Q.) *The Staff*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

80A. The Theory, Hope, and Crisis of Capitalism. W

Assessment of modern-day capitalism from the three major economic paradigms—liberal, conservative, radical. Theories of Smith, Marx, and Keynes are explored in con-

temporary writing, with focus on the U.S. from WW II to present. Students cannot receive credit for this course and course 189. (General Education Code(s): T3-Social Sciences.) *D. Kaun*

80G. Money and the Arts: Two All-Consuming Passions. W

Analysis of the performing arts: a commodity providing a rich and varied source of satisfaction, an occupation for thousands of talented and creative individuals, and an activity whose funding (public versus private) is the source of significant controversy. Students cannot receive credit for this course and course 137. (General Education Code(s): T3-Social Sciences.) *D. Kaun*

80H. Wall Street and the Money Game. S

Provides a demystifying introduction to financial markets. Examines the theory of stock market investment, the workings of the international money market, the implications of corporate takeovers, and the regulation of the economy by the Federal Reserve Board. (General Education Code(s): T3-Social Sciences.) *The Staff*

80J. Value and Support of the Arts: Challenges and Opportunities in American Society. *

Considers the value of the arts in an era of increasing budgetary duress, along with focus on specific funding concerns arising in such an environment. Students cannot receive credit for this course and course 185. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *D. Kaun*

93. Field Study. F,W,S

Supervised fieldwork experience, off campus, in an area connected with economics or business. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

93F. Field Study (2 credits). F,W,S

Supervised off-campus fieldwork experience in an area connected with economics or business. Prerequisite(s): permission of instructor; students submit petition to sponsoring agency. *The Staff*

99. Tutorial. F,W,S

May be repeated for credit. *The Staff*

Upper-Division Courses

100A. Intermediate Microeconomics. F,W,S

Covers major theoretical issues arising in the study of resource allocation, the function of markets, consumer behavior, and the determination of price, output, and profits in competitive, monopolistic, and oligopolistic market structures. Also considers issues of welfare and public policy. Students cannot receive credit for this course and course 100M. Prerequisite(s): courses 1, 2 and 11A or Applied Mathematics and Statistics 11A or Mathematics 11A or 19A; Course 11B is strongly recommended. *The Staff*

100B. Intermediate Macroeconomics. F,W,S

Covers major theoretical issues arising in the study of income, employment, interest rates, and the price level. Examines the role of monetary and fiscal policy in economic stabilization. Also considers these issues as they relate to the global economy. Students cannot receive credit for this course and course 100N. Prerequisite(s): courses 1, 2, and 11A or Applied Mathematics and Statistics 11A or Mathematics 11A or 19A. Course 100A is strongly recommended as preparation. *The Staff*

100M. Intermediate Microeconomics, Math Intensive. F

Mathematically sophisticated version of course 100A. Provides analytically rigorous treatment of the subject using a calculus-intensive presentation of microeconomic theory. For specific topics, see course 100A. Students cannot receive credit for this course and course 100A. Prerequisite(s): courses 1, 2, and 11A or Mathematics 11A or 19A or Applied Mathematics and Statistics 11A. *The Staff*

100N. Intermediate Macroeconomics, Math Intensive. W

Provides rigorous, mathematical-intensive treatment of topics covered in course 100B. Core is devoted to model-based analysis of questions in macroeconomics. Use of mathematical tools allows study of advanced topics and data-intensive applications. See course 100B for specific topics. Students cannot receive credit for this course and course 100B. Prerequisite(s): courses 1, 2, and 11A or Applied Mathematics and Statistics 11A or Mathematics 11A or 19A. *The Staff*

101. Managerial Economics. F,S

Analysis of the theory and practice of decision making in business firms, applying the concepts and techniques of microeconomics. Topics may include pricing schemes, non-price competition, internal organization of firms, incentive contracts, asymmetric information, and game theory. Case studies are used to illustrate some topics. Prerequisite(s): courses 100A or 100M, and 113. *The Staff*

102. Forecasting. *

Theory and analysis of long-run and short-run forecasts of economic activity. Emphasis is on empirical applications. Applications of forecasting techniques in organizational settings. Prerequisite(s): courses 100B or 100N, and 113. *The Staff*

104. Is There Truth in Numbers: The Role of Statistics in Economics. *

Applies the techniques of econometrics and experimental economics to the understanding of economics. A "hands-on" course where real economic data is used in an interactive way so that students develop the art of empirical analysis. Prerequisite(s): courses 100A or 100M, 100B or 100N, and 113. *The Staff*

105. Topics in Macroeconomic Theory. S

A seminar in advanced macroeconomics focusing on a selection of theoretical issues. Emphasis is on detailed modeling and analysis of macroeconomic processes. Prerequisite(s): course 100B or 100N, and 113. *The Staff*

106. Evolutionary Thought in the Social Sciences. *

Emphasizes class discussion and term papers for social science, philosophy, and biology majors. Covers the development and recent trends of evolutionary thought in biology and social sciences including social Darwinism, sociobiology, evolutionary psychology, and evolutionary game theory. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *D. Friedman*

107. Economic Justice. F

Theories of justice, equity, and rights in economics and their applications to such issues as wages, taxation, property rights, welfare programs, and globalization. Students get extensive practice in writing persuasive, argumentative

essays. Prerequisite(s): courses 1 and 2, satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *The Staff*

108. Business and Society. *

Examine how public policies and social forces affect business, how managers influence these forces; analyze social responsibility and ethical behavior of individuals, business and government regulation, environmental protection, employee—employer relations. Prerequisite(s): courses 1 and 2; satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *J. White*

109. Business Ethics. F

Critical examination of ethical principals, theories, and their application to business, nonprofit, and public organizations; exploration of the process of ethical decision making and ethical problems facing managers, including corporate social responsibility, work place democracy, consumer safety, environmental protection and international business conduct. Prerequisite(s): courses 1 and 2; satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *The Staff*

110. Managerial Cost Accounting and Control. S

Focuses on how cost data are used by managers in the planning and control of both private- and public-sector organizations. Specific topics include organization of the management and control function, use of cost data for the pricing of goods and services, the effect of cost systems on management performance, and capital budgeting. Prerequisite(s): course 10B. *The Staff*

111A. Intermediate Accounting I. F

Principles, control, and theory of accounting for assets; accounting as an information system; measurement and determination of income. Projects involving spreadsheet software required. Students cannot receive credit for this course and course 209A. Prerequisite(s): course 10B. *R. Shepherd*

111B. Intermediate Accounting II. W

Principles, control, and theory of accounting for liabilities and equities; preparation and analysis of cash flow statements and earnings per share computation. Projects involving spreadsheet software required. Students cannot receive credit for this course and course 209B. Prerequisite(s): course 10B. *R. Shepherd*

112. Auditing and Attestation. W

For business management economics majors interested in careers that emphasize accounting, finance, or technology management. Also for students who intend to take the CPA exam. Covers audit techniques, risk analysis, and development of control structures for major financial processes including cash, investments, accounts receivable, inventories, accounts payable, debt, equity capital, and related information systems security. Prerequisite(s): courses 10A and 10B. *The Staff*

113. Introduction to Econometrics. F,W,S

Practical methods for organizing and analyzing economic data, testing economic hypotheses, and measuring economic relationships. Regression analysis is the main empirical method, and basic statistical and probability theory is included. Students gain hands-on computer experience with an econometric software package. Students cannot receive credit for this course and Engineering 113. Prerequisite(s): courses 1, 2, and either course 11B, Applied Mathematics and Statistics 11B, Mathematics 22,

or Mathematics 23A. Courses 100A or 100B strongly recommended as preparation. (General Education Code(s): Q.) *The Staff*

114. Advanced Quantitative Methods. S

Application of statistical methods to estimating and testing economic relationships, i.e., econometric techniques. Topics include the effects of misspecification, choice of functional form, serial correlation, heteroscedasticity, limited dependent variables, and simultaneous equations. Includes discussion of existing empirical work and econometric projects by students. Prerequisite(s): courses 100A or 100M, and 113. *The Staff*

115. Introduction to Management Sciences. W

The scientific study of management decision making. Topics include linear, integer, and non-linear programming. Special emphasis on a wide variety of practical applications, including production scheduling, optimal transportation assignments, and optimal inventory policy. Prerequisite(s): course 100A or 100M. *The Staff*

117A. Income Tax Factors for Individuals. F

Introduces federal taxation for individuals. Topics for study include taxable income, gross income exclusions and inclusions, capital gains, depreciation, business and itemized deductions, personal and dependency exemptions, passive activity losses, tax credits, and methods of accounting. Prerequisite(s): course 10B. *The Staff*

117B. Tax Factors of Business and Investment. W

Focuses on various tax subjects providing a strong foundation in tax concepts and preparation for work in either public or corporate accounting. Topics include historical perspective of the U.S. tax system, introduction to estate and gift taxes, employment and self-employment taxes, tax concepts and laws, business expenses, capital recovery, tax credits, capital gains and losses, capital investments, and corporate operations. (Formerly course 117.) Prerequisite(s): course 10B. *T. Moschetti*

118. Fraud Examination. *

Covers the principles and methodology of fraud detection and deterrence. Includes topics such as skimming, cash larceny, check tampering, register disbursement schemes, billing schemes, payroll and expense reimbursement schemes, non-cash misappropriations, corruption, accounting principles and fraud, fraudulent financial statements, and interviewing witnesses. Prerequisite(s): course 10B. *D. Gusarson*

119. Advanced Accounting. S

Accounting for business organizations; partnerships; government and non-profit organization funds; branches, consolidations, and installment sales. Projects involving spreadsheet software required. Prerequisite(s): courses 111A and 111B. *The Staff*

120. Economic Development. F,W

A comparative approach to the study of the economic development of low-income countries. Various obstacles to growth are identified, and different types of solutions are analyzed. Prerequisite(s): courses 1 and 2. (General Education Code(s): E.) *The Staff*

121. Economic Growth. *

Studies economic growth from theoretical, empirical, and historical perspectives. Topics include: theories of economic growth and their empirical importance, technology and innovation, social institutions and growth, and competing explanations of the global distribution of wealth. Prerequisite(s): courses 1, 2, 11A, and 11B (or the equivalent); course 100B is strongly recommended. *The Staff*

125. Economic History of the U.S. F

The development of the American economy from colonial times to the present, with emphasis on the interaction between institutional structure and economic development. Topics include the economics of slavery, the rise of big business, and the causes of the Great Depression. Prerequisite(s): courses 1 and 2. Related course work in history also helpful. *B. Elbaum*

126. Why Economies Succeed or Fail: Lessons from Western and Japanese History. W

Examines the emergence of capitalism and the world's first industrial revolution in Britain, continental Europe industrialization, Soviet economic growth and collapse, and the Japanese economic miracle. Asks about the historical sources of long-run economic development, stagnation, and decline. Draws lessons for current debates over free market versus more interventionist policies, economic reform in the former Communist nations, and economic rivalry between the U.S. and Japan. Prerequisite(s): courses 1 and 2. Related course work in history also helpful. *B. Elbaum*

128. Poverty and Public Policy. *

Studies the causes, consequences, and governmental response to urban poverty in the U.S. Topics include how public policy, the macroeconomy, race, gender, discrimination, marriage, fertility, child support, and crime affect and are affected by urban poverty. Emphasizes class discussion and research. (Also offered as Legal Studies 128. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing & Composition requirement; courses 100A or 100M; and course 113. Enrollment restricted to economics, business management economics, global economics, legal studies, or economics combined majors. Enrollment limited to 35. (General Education Code(s): W, E.) *The Staff*

130. Money and Banking. W

The institutional structure of central banking and of bank and nonbank financial intermediation in the U.S.; theoretical and empirical investigations of the role of monetary policy in macroeconomic stabilization and economic growth. Prerequisite(s): courses 100B or 100N, and 113. *The Staff*

131. International Financial Markets. S

International financial management analyzes the key financial markets and instruments that facilitate trade and investment activity on a global scale. Inquiry spans two areas: (1) economic determinants of prices in international financial markets; and (2) decisions facing private individuals and enterprises, with topics including capital financing, investment, and risk management. Prerequisite(s): courses 100A or 100M, and 100B or 100N. *The Staff*

133. Security Markets and Financial Institutions. F,W

An examination of all major financial markets: equities, bonds, options, forwards, and futures. Uses modern financial theory, including asset pricing models such as CAPM and APT. Prerequisite(s): courses 100A or 100M, and 113. *The Staff*

135. Corporate Finance. W,S

An analysis of financial policies of business enterprises. Topics include cash flow analysis, stock and bond valuation, asset pricing models, capital budgeting, financial market institutions, and financial planning. Prerequisite(s): courses 10A, 100A or 100M, and 113. *The Staff*

136. Business Strategy. F,W

The strategic management process, techniques for analyzing single-business and diversified companies, implementing strategy, organization, business planning, financial strategy, competitive analysis, entrepreneurial skills. Prerequisite(s): courses 10A and either 100A or 100M. Concurrent enrollment in course 136L is required. *The Staff*

136L. Laboratory Business Strategy (2 credits). F,W

Laboratory sequence discussing business simulation game associated with course 136. One three-hour session in microcomputer lab. Prerequisite(s): concurrent enrollment in course 136. *The Staff*

137. Performing Arts in the Public and Private Economy. W

Analysis of the performing arts: a commodity satisfying a rich and varied source of satisfaction, an occupation for thousands of talented and creative individuals, and an activity whose funding (public versus private) is the source of significant controversy. Economics 1 is strongly recommended as a preparation. Students cannot receive credit for this course and course 80G. *D. Kaun*

138. The Economics and Management of Technology and Innovation. F

Examines the analytics of issues in technology and innovation, including cooperation in research and development (R&D), standardization and compatibility, patents and intellectual property rights, and strategic management, using economic models and firm case studies. Prerequisite(s): course 100A or 100M, or permission of instructor. *The Staff*

139A. The Economics of Electronic Commerce. S

An analysis of the broad spectrum of issues affecting commercial uses of the Internet and the next-generation information infrastructure. Uses economics to examine market structure, pricing quality, intellectual property rights, security, electronic payments and currencies, and public policy implications. Prerequisite(s): course 100A or 100M, or permission of instructor. *N. Singh*

139B. E-Commerce Strategy. *

Introduction and review of economic principles for e-commerce. Overview of trends in e-commerce. Online retailing of physical products; digital products; financial services; housing and related markets. Online business-to-business transactions. Internet infrastructure industry. Government regulation of e-commerce and business strategy responses. Prerequisite(s): course 139A. *N. Singh*

140. International Trade. F,S

The theory of international production and trade. The effects of tariffs and quantitative trade restrictions; the nature of economic integration; multinational firms; effects of trade and protection on economic stability and welfare. Prerequisite(s): course 100A or 100M. *The Staff*

141. International Finance. W

Topics include national accounting, balance of payments theories, parity conditions in international finance, exchange rate determination models, forward-looking financial instruments, international monetary systems, country interdependence and exchange rate regimes, international monetary integration, and Eurocurrency market. Prerequisite(s): course 100B or 100N. *The Staff*

142. Advanced Topics in International Economics. S

Selected issues in contemporary international economics: theory, empirical evidence, and public policy. Semi-

nar emphasizing discussion and individual research. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, courses 100A or 100M, and 100B or 100N; course 113 strongly recommended. (General Education Code(s): W.) *The Staff*

143. Policy Issues in the International Economy. F

Covers selected issues concerning the international economy. Topics include: U.S. competitiveness; U.S. trade policy; immigration; trade and the environment; developing countries; foreign investment; foreign exchange markets; and international economic institutions. Prerequisite(s): courses 1, 2, and 100A or 100M. *The Staff*

148. Latin American Economies. F

This course is designed to familiarize students with the economic and business environment in Latin America. Prerequisite(s): courses 1 and 2. *The Staff*

149. The Economies of East and Southeast Asia. W

Examines the pattern of international trade, investment, and industrial structure in Asia. Examines competing explanations of rapid growth of Japan, Korea, and Taiwan; presents an overview of economic developments in China, Hong Kong, and Taiwan. Concludes with an analysis of high technology trade and multinationals in Asia in 2000 and beyond. Prerequisite(s): courses 1 and 2. *The Staff*

150. Public Finance. F

Economics of taxation, including incidence, equity issues, efficiency, and supply side effects. Close attention to taxes in the U.S. system and tax-reform issues. Students cannot receive credit for this course and course 250. Prerequisite(s): course 100A or 100M, and course 100B or 100N. *The Staff*

152. Setting Domestic Priorities. *

Analysis of the economics and political economy of a number of contemporary policy issues facing the U.S.: immigration, affirmative action programs, health care reform, welfare reform, income inequality, education and training, entitlement spending, taxes, and government budgets. Prerequisite(s): course 100A or 100M. Course 100B strongly recommended as preparation. *The Staff*

153. Cost-Benefit Analysis. *

Study of techniques used in evaluating expenditures in the public sector, including the identification and measurement of benefits and costs and a survey of welfare-theory concepts underlying the analysis. A substantial part of the course is assigned to specific case studies. Students cannot receive credit for this course and course 259A. Prerequisite(s): course 100A or 100M, and 100B or 100N. *The Staff*

156. Health Care and Medical Economics. *

Health economics theory and review of studies of the health industry, including current topics. Focuses on the structure of the U.S. health care system, including analysis of health policy issues. Relationship to models of perfect competition and efforts at reform. Prerequisite(s): courses 100A or 100M and 113. *C. Dobkin*

157. Economics of Aging. *

Explores economic issues of aging, emphasizing the interconnectedness of concerns over the entire life course but focusing especially on old age. Covers theories of exchange, cumulative advantage/disadvantage, feminization of poverty, political economy of aging, and the social construction of dependency. Prerequisite(s): course 100A or 100M or consent of instructor. *The Staff*

160A. Industrial Organization. S

The structure and conduct of American industry with strong emphasis on the role of government, regulation, anti-trust, etc. The evolution of present-day industrial structure. The problems of overall concentration of industry and of monopoly power of firms. Pricing, output decisions, profits, and waste. Approaches include case study, theory, and statistics. (Also offered as Legal Studies 160A. Students cannot receive credit for both courses.) Prerequisite(s): course 100A or 100M. *The Staff*

160B. Government and Industry. *

The influence of government regulation on industry and the allocation of resources is rigorously examined using theory and statistics. Areas of regulation include transportation and power, pollution and congestion, rent control, and liability insurance regulation. Both optimal and actual regulation are examined from the point of view of effectiveness, efficiency, social welfare, and re-distribution. Prerequisite(s): course 100A or 100M. *The Staff*

161A. Marketing. W,S

The evolution of markets and marketing; market structure; marketing cost and efficiency; public and private regulation; the development of marketing programs including decisions involving products, price, promotional distribution. (Formerly course 161.) Prerequisite(s): course 100A or 100M. *The Staff*

161B. Marketing Research. W

Prepares students to conduct market research and use it in solving real management problems. Students work with a company to solve marketing-based problems. Students conduct research, process data, and make a presentation to the company's management. Course work involves marketing, statistics, and communications; material is both qualitative and quantitative. Prerequisite(s): courses 113 and 161A. *The Staff*

162. Legal Environment of Business. F

A study of law and the legal process, emphasizing the nature and function of law within the U.S. federal system. Attention is given to the legal problems pertaining to contracts and related topics, business association, and the impact of law on business enterprise. (Also offered as Legal Studies 162. Students cannot receive credit for both courses.) Prerequisite(s): course 100A or 100M. *R. Bosso*

164. Economics and the Telecommunications Industry. *

Covers the economics of the telecommunications industry including telephone, cellular telephone, and data communications. Particular emphasis on the Internet, satellite, paging, cable television, radio and television broadcasting. Examines the industry structure and implications of moving from a regulated environment to competition. Topics examined from a competitive strategic standpoint as well as public policy perspective. Prerequisite(s): courses 100A or 100M, and 113. *The Staff*

165. Economics as an Experimental Science. S

The design, execution, and analysis of laboratory experiments in economics. Students study experimental methodology, critically survey the published literature, and design an experiment. Literature includes lab studies of investigations in auctions, markets, social choice theory, and game theory. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 100A or 100M. Enrollment limited to 20. (General Education Code(s): W.) *D. Friedman*

166A. Game Theory and Applications I. F

Introduces modern game theory, including applications in social science, biology, and engineering. Topics

include extensive form, strategic form, mixed strategies, incomplete information, repeated games, evolutionary games, and simulation techniques. Prerequisite(s): AMS 5 or 7 or course 113 and either course 11B, AMS 11B, or Mathematics 11B or Mathematics 19B. Enrollment restricted to juniors and seniors. Enrollment limited to 100. *D. Friedman*

166B. Game Theory and Applications II. W

Explores research frontiers in game theory, emphasizing applications in social science, biology, and engineering. Each interdisciplinary team develops a topic, and presents it to the class in oral and written reports and demonstrations. Students must have shown a strong performance in course 166A or equivalent. Prerequisite(s): course 166A; satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to junior and senior economics, business management economics, global economics, computer science, and biology majors. Enrollment limited to 40. (General Education Code(s): W.) *D. Friedman*

169. Economic Analysis of the Law. S

The application of the theories and methods of neoclassical economics to the central institutions of the legal system, including the common law doctrines of negligence, contract, and property; bankruptcy and corporate law; and civil, criminal, and administrative procedure. (Also offered as Legal Studies 169. Students cannot receive credit for both courses.) Prerequisite(s): course 100A or 100M or permission of instructor. *D. Wittman*

170. Environmental Economics. W

Economic analysis of environmental issues. Environmental pollution and deterioration as social costs. Economic policy and institutions for environmental control. Influences of technology, economic growth, and population growth on environmental quality. Prerequisite(s): courses 100A or 100M, and 113. *The Staff*

171. Natural Resource Economics. F

The application of economic analysis to the use of renewable and nonrenewable natural resources. Efficiency and distributional aspects of natural resource scarcity. Measurement of the benefits and costs. Optimal extraction or use policies. Common property and externalities. Government policies. Prerequisite(s): course 100A or 100M. *The Staff*

175. Energy Economics. S

Applications of micro, welfare, and international economic theory and methodology to the energy field. Questions considered include optimal allocation of natural resources; pricing and investment; regulations and taxes; import and export control; redistributional policies. Prerequisite(s): course 100A or 100M. *The Staff*

180. Labor Economics. *

A study of the changing nature and composition of the U.S. labor force. Topics include the demand for and supply of labor; wage determination; the role and impact of unions in the labor market; racial, ethnic, and gender differences in job and income opportunities and the role of discrimination in explaining these differences; and the theory of human capital, all considered from the traditional neoclassical as well as institutional and radical perspectives. Prerequisite(s): courses 1 and 2; courses 100A or 100M, and 113 are strongly recommended as preparation. *The Staff*

181. Economics of Real Estate. *

The economics of real estate, including development, financing, construction and land costs, zoning, land use,

externalities, and planning. Also considers speculation and real estate appreciation. Prerequisite(s): courses 100A or 100M, and 100B or 100N. *The Staff*

183. Women in the Economy. W

Study of gender roles in economic life, past and present. Topics include occupational structure, human capital acquisition, income distribution, poverty, and wage differentials. The role of government in addressing economic gender differentials is examined. (Also offered as Legal Studies 183. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; courses 1, 2, and 100A or 100M; course 113 strongly recommended. (General Education Code(s): W.) *The Staff*

184. Labor Wars in Theory and Film. S

This seminar focuses on the impact of trade unions and labor-market discrimination on the U.S. work force. The neo-classical, institutional, and radical/Marxist approaches to these questions are employed in the analysis. Films, both fictional and documentary, are utilized as primary source material. Prerequisite(s): permission of instructor based on quality of work in economics; courses 100A or 100M, 100B or 100N, and 113; satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 20. (General Education Code(s): W.) *D. Kaun*

185. Value and Support of the Arts: Challenges and Opportunities in American Society. *

Considers the value of the arts in an era of increasing budgetary duress, along with focus on specific funding concerns arising in such an environment. Students cannot receive credit for this course and course 80J. Course 1 is strongly recommended as preparation. *D. Kaun*

186. Mathematical Methods for Economic Analysis. *

Presents mathematical methods commonly used in graduate-level economic analysis: basic matrix algebra, real analysis, functions, continuity concepts, differentiation, Taylor expansions, and implicit function theorem and optimization. Prerequisite(s): interview only; admitted to M.S. or Pathway Programs. *The Staff*

188. Management in the Global Economy. S

An overview of how firms do business in the global economy. Focus is on the firm, but also explores the impact of corporate decision-making on national welfare. Emphasizes how national economic policies and international institutions influence firm strategy and industrial structure. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; courses 2 and 100A or 100M; course 100B or 100N strongly recommended as preparation. (General Education Code(s): W.) *The Staff*

189. Political Economy of Capitalism. W

An assessment of modern day capitalism from the three major economics paradigms—liberal, conservative, radical. Theories of Smith, Marx, and Keynes are explored in contemporary writing, with focus on the U.S. from WW II to present. Students cannot receive credit for this course and course 80A. Prerequisite(s): courses 1 and 2; courses 100A or 100M, and 100B or 100N are recommended as preparation. *D. Kaun*

190. Senior Proseminar. *

Courses focus on problems of interest to advanced students of economics. They offer a flexible framework, so those interested in specific issues can read, present papers, and develop their ideas. *The Staff*

191. Economics Teaching Practicum. F,W,S

Each student serves as facilitator for small discussion group in connection with core economics courses. Facilitators complete course readings and meet with instructor as a group to discuss the teaching process. May not be counted toward upper-division major requirements. May be repeated for credit. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar, course 42, under faculty supervision. May not be counted toward the upper-division major requirements. Students submit petition to sponsoring agency. *The Staff*

193. Field Study. F,W,S

Provides for department-sponsored individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor (in contrast to course 198 where faculty supervision is by correspondence). May not be counted toward the upper-division major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for department-sponsored individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor. May not be counted toward the upper-division major requirements. Students spend 8-10 hours per week at job site. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Advanced Topics in Management. *

Honors course providing detailed analysis of specialized topics in management. Possible topics include: venture capital, the financial services industry, e-business, behavioral finance, advanced consumer behavior, entrepreneurship, high-tech marketing, risk management, and option value approaches to business strategy. Students cannot receive credit for this course and course 194F. Prerequisite(s): courses 100A or 100M, 100B or 100N, and 113. Enrollment by permission of instructor, and review of performance in economics courses. Enrollment restricted to senior and junior business management economics majors. (Formerly Advanced Topics in Business Management Economics.) Enrollment limited to 30. *The Staff*

194F. Advanced Topics in Management (2 credits). *

Detailed analysis of specialized topics in management. Possible topics include: venture capital, the financial services industry, e-business, behavioral finance, advanced consumer behavior, entrepreneurship, high-tech marketing, risk management, and option value approaches to business strategy. Students cannot receive credit for this course and course 194F. Prerequisite(s): courses 100A or 100M, 100B or 100N, and 113. Enrollment by permission of instructor, and review of performance in economics courses. Enrollment restricted to senior and junior business management economics majors. Enrollment limited to 30. *The Staff*

195. Senior Thesis. F,W,S

A supervised research project. If the project is of unusual scope, the course may be repeated for credit. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, students submit petition to sponsoring agency. (General Education Code(s): W.) *The Staff*

198. Independent Field Study. F,W,S

Provides for department-sponsored individual study program off campus for which faculty supervision is not in-person, but by correspondence. May not be counted

toward the upper-division major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for department-sponsored individual study program off campus for which faculty supervision is not in person, but by correspondence. May not be counted toward the upper-division major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

May be repeated for credit, but may be counted only once toward the upper-division major requirements. Undergraduates may not take graduate courses for credit as 199. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Specialized study with individual faculty. May not be applied toward the major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Microeconomic Analysis. F

Survey of partial equilibrium analysis, market distortions, consumer choice and production and trade theory, perfect and imperfect competition, price discrimination, and intertemporal choice theory. *The Staff*

201. Applications in Microeconomics. S

Applies concepts and tools developed in course 200 to problems encountered in private- and public-sector output and labor markets. The focus is empirical; topics include analysis of labor supply and labor demand and the role of government labor market policies, analysis of pricing policies and regulation, estimation of the returns to schooling, estimation of demand and cost functions, and the role of unions in the economy. Course 200 is strongly recommended as preparation. *The Staff*

202. Macroeconomic Analysis. W

Aggregate economic analysis: determinants of aggregate expenditures and output, the roles of monetary and fiscal policy, recent developments in macro theory; macro policy issues. *The Staff*

204A. Advanced Microeconomic Theory. F

Economic theory of individual and market behavior, including constrained optimization, duality, theory of the consumer, theory of the producer, dynamic optimization, behavior under uncertainty, intertemporal choice, asymmetric information, game theory, partial and general equilibrium, pure and applied welfare economics, public goods and externalities. Illustrative examples emphasize international applications. Courses must be taken in sequence. *The Staff*

204B. Advanced Microeconomic Theory. W

Economic theory of individual and market behavior, including constrained optimization, duality, theory of the consumer, theory of the producer, dynamic optimization, behavior under uncertainty, intertemporal choice, asymmetric information, game theory, partial and general equilibrium, pure and applied welfare economics, public goods and externalities. Illustrative examples emphasize international applications. Courses must be taken in sequence. Prerequisite(s): course 204A. *The Staff*

204C. Advanced Microeconomic Theory. S

Economic theory of individual and market behavior, including constrained optimization, duality, theory of the consumer, theory of the producer, dynamic optimization, behavior under uncertainty, intertemporal choice, asymmetric information, game theory, partial and general equilibrium, pure and applied welfare economics, public goods and externalities. Illustrative examples emphasize international applications. Courses must be taken in sequence. Prerequisite(s): course 204B. *The Staff*

205A. Advanced Macroeconomic Theory. F

Modern macroeconomic theory: determination of national income; employment, inflation, and exchange rates; theories of growth and business cycle fluctuations; international transmission of inflation and other disturbances; recent developments in the analysis of macroeconomic policy; modern theoretical and empirical analysis of aggregate relationships. Courses must be taken in sequence. *The Staff*

205B. Advanced Macroeconomic Theory. W

Modern macroeconomic theory: determination of national income; employment, inflation, and exchange rates; theories of growth and business cycle fluctuations; international transmission of inflation and other disturbances; recent developments in the analysis of macroeconomic policy; modern theoretical and empirical analysis of aggregate relationships. Courses must be taken in sequence. Prerequisite(s): course 205A. *The Staff*

205C. Advanced Macroeconomic Theory. S

Modern macroeconomic theory: determination of national income; employment, inflation, and exchange rates; theories of growth and business cycle fluctuations; international transmission of inflation and other disturbances; recent developments in the analysis of macroeconomic policy; modern theoretical and empirical analysis of aggregate relationships. Courses must be taken in sequence. Prerequisite(s): course 205B. *The Staff*

209A. Accounting 1. F

Principles, control, and theory of accounting for assets; accounting as an information system; measurement and determination of income. M.S. level projects required. Students cannot receive credit for this course and course 111A. Enrollment restricted to graduate students. *R. Shepherd*

209B. Accounting II. W

Principles, control, and theory of accounting for liabilities and equities; preparation and analysis of cash flow statements and earnings per share computation. M.S. level projects required. Students cannot receive credit for this course and course 111B. *R. Shepherd*

210A. Mathematical Methods for Economic Analysis. F

Mathematical methods commonly used in economic analysis are discussed. Covers basic matrix algebra, real analysis, functions, continuity concepts, differentiation, Taylor expansion, implicit function theorem, and optimization. Prerequisite(s): qualifications as determined by instructor; inquire at department office. *The Staff*

210B. Mathematical Methods for Economic Analysis. F

A course in introductory mathematical economics which covers standard optimization problems, difference and differential equations, optimal control theory, decisions under uncertainty, game theory, and stochastic calculus. Course 210A or equivalent is strongly recommended as preparation. *The Staff*

211A. Advanced Econometrics. F

Advanced econometric methods are introduced. Topics include the standard regression analysis, simultaneous equation estimation, nonlinear models, qualitative response models, panel data analysis, and univariate and multivariate time series analysis. *The Staff*

211B. Advanced Econometrics. W

Advanced econometric methods are introduced. Topics include the standard regression analysis, simultaneous equation estimation, nonlinear models, qualitative response models, panel data analysis, and univariate and multivariate time series analysis. Course 211A is strongly recommended as preparation for course 211B. *The Staff*

211C. Topics in Empirical Research. F

A topic course in econometrics designed for graduate students interested in quantitative analysis. Selected topics, including standard and recently developed econometric techniques, are critically and thoroughly discussed. In addition to methodology, focuses on exploring the research potential and applications of advanced econometric techniques. Courses 211A and 211B are strongly recommended as preparation. *The Staff*

212. Empirical Project in Econometrics (2 credits). F,W

Empirical project or paper in econometrics to demonstrate student's ability to conduct applied econometric analysis. Ph.D. requirement to be completed by beginning of student's third year of study. Prerequisite(s): courses 211A and 211B. May be repeated for credit. *The Staff*

216. Applied Econometric Analysis I. F

The use of statistical techniques for the testing of economic hypotheses and the estimation of parameters, with emphasis on regression analysis. Includes methods of dealing with serial correlation, errors in variables, multicollinearity, and heteroscedasticity. Experience with common statistical packages. *The Staff*

217. Applied Econometric Analysis II. W

Focuses on the application of advanced econometric and time series techniques to economic issues. Computer assignments and empirical applications are used to discuss and illustrate the practical aspects of simultaneous equation systems, nonlinear models, qualitative response models, time series model specification, unit root test, and cointegration analysis. Course 216 is strongly recommended as preparation. *The Staff*

220A. Development Economics: Theory and Cases. W

Surveys traditional development economics and the neoclassical resurgence in development theory. Topics include sources of growth, income distribution, population and human capital development, savings, fiscal and monetary mobilization and allocation, foreign investment and aid, and macroeconomic policies. Case study focus in the second quarter. Courses 204A and 205A are strongly recommended as preparation. *The Staff*

220B. Development Economics: Theory and Cases. *

Surveys traditional development economics and the neoclassical resurgence in development theory. Topics include sources of growth, income distribution, population and human capital development, savings, fiscal and monetary mobilization and allocation, foreign investment and aid, and macroeconomic policies. Case study focus in the second quarter. Courses 204A and 205A are strongly recommended as preparation. *The Staff*

233. Finance I. S

Applications of economic analysis in private finance. Topics include risky choice and intertemporal choice theory, asset pricing models, efficient market hypotheses, market institutions, and derivative securities. Course 200 is strongly recommended as preparation. *The Staff*

234. Financial Institutions and Markets. F

This course examines the evolving microstructure of financial markets, instruments, and institutions. Topics include the role of banks and other financial intermediaries and the trading practices for domestic and international financial instruments, including equity, debts, futures, and options. Prerequisite(s): course 233. *The Staff*

235. Corporate Finance. W

Application of modern financial theory to corporate decision making. Topics covered include capital budgeting and the firm's investment decision, capital structure, dividend policies, and the implications of corporate governance for enterprise financial goals. Prerequisite(s): course 233. *The Staff*

236. Financial Engineering. *

This course surveys the financial risks faced by corporation, banks, and other financial institutions that arise from changes in interest rates, foreign exchange rates, commodity prices, and stock prices. It examines the characteristics, payoffs, and pricing of financial derivatives and other instruments for managing risk, including options, forwards, futures, swaps, structured notes, and asset-backed securities. Several cases will be used to illustrate how actual firms solve financial risk management problems. Prerequisite(s): course 233. *The Staff*

239. Current Topics in Finance. *

Topics in finance selected by the instructor. Prerequisite(s): course 233. *The Staff*

240A. Advanced International Trade Theory I. F

The theory of international trade and commercial policy. Both traditional analyses and recent developments are covered. Topics include both normative and positive theoretical analyses, as well as empirical testing of theory. Enrollment restricted to graduate students. Courses 204A-B-C are strongly recommended as preparation. *The Staff*

240B. Advanced International Trade Theory II. W

This is the second quarter of a two-quarter sequence. It deals with most major current advanced research topics in trade. It is both theoretical and empirical and is designed to acquaint students with recent research in the field. Research topics include models of political economy of trade policies; trade and labor markets; regionalism and multilateralism; trade and environment; theories, determinants, and implications of foreign direct investments; economic geography. Prerequisite(s): course 240A. *The Staff*

240C. Advanced International Trade Theory III. S

Covers the empirical aspects of international trade issues. Topics include the testing and estimation of various trade models such as the Ricardian model, Heckscher-Ohlin-Vanek model, intra-industry trade models, trade models associated with multinational corporations, models of trade and intellectual property rights, the impact of trade on income inequality, and trade between developed and developing economies. Prerequisite(s): course 240B. Enrollment restricted to graduate students. *The Staff*

241A. Advanced International Finance I. F

Financial aspects of aggregate capital and trade flows and income determination in open economies. Specific topics include financial risk in the international setting, international borrowing and lending, money and exchange rate regimes, income determination and macroeconomic policy, current issues in international monetary reform. *The Staff*

241B. Advanced International Finance II. W

An examination of the formulation and implementation of international economic policy from both theoretical and empirical perspectives. Topics include case studies in fiscal, monetary, exchange rate, tariff, and other regulatory policies. *The Staff*

241C. Advanced International Finance III. S

Focuses on empirical applications in international finance. Topics include structural and reduced form models of exchange rates, interest parity conditions, purchasing power parity, capital controls, capital flows to emerging markets, and government intervention in foreign exchange markets. Courses 202 and 203 or 205A-B-C strongly recommended as preparation. *The Staff*

243. History of the International Economy. W

Studies the evolution and functioning of the international economy from the days of the gold standard to the present. Particular attention is paid to the interwar period with its problems of structural transformations and their relation to the Great Depression and its immediate aftermath, the rise and fall of the Bretton Woods system, the experience of floating exchange rate regimes, the rise of the "new industrial countries," and the problems of international indebtedness. Courses 204A and 205A are strongly recommended as preparation. *The Staff*

249A. International Trade and Development Policy I. W

Focuses on a range of real-life issues in international trade and development. Topics include North American Free Trade Agreement (NAFTA), the semiconductor industry, the Boeing-Airbus aircraft trade problems, the World Trade Organization (WTO) and developing countries, U.S./Japan trade, trade and the environment, and U.S./China trade. Enrollment restricted to graduate students. *The Staff*

249B. International Trade and Development Policy II. *

Emphasizes government policies to promote growth. Topics include the "Washington Consensus," the East Asian "model," and recent policy changes in East Asia, Latin America, Eastern Europe, and the former Soviet Union. Prerequisite(s): course 249A. Enrollment restricted to graduate students. *The Staff*

250. Advanced Public Finance. F

Theory of the role of public sector expenditures and taxes in market economies. Analyzes efficiency and equity arguments for government intervention. Topics include the role of public debt and deficits in economies, international effects of tax and spending policies, and economic theories of public sector decision making. Courses 204A and 205A are strongly recommended as preparation. Students cannot receive credit for this course and course 150. *The Staff*

259A. Cost-Benefit Analysis. *

Applications of economic analysis in public finance, largely from the revenue side: taxation. The issues considered include the effects of taxation on consumer welfare, consumption, labor, capital, production, growth. Course

200 is strongly recommended as preparation. Students cannot receive credit for this course and course 153. *The Staff*

259B. Public Policy Analysis. *

Applications of welfare and microeconomic theory and methodology to the public expenditure question: cost-benefit. Effects of the taxes discussed in course 259A and sophisticated tools used in the face of these and other distortions with regard to measurement of benefits, costs, and the discount rate. Course 200 strongly recommended as preparation. *The Staff*

270. Advanced Topics in Applied Microeconomics. *

Advanced topics and current research in microeconomic theory, including game theory and general equilibrium analysis. Courses 204A-B and 205A are strongly recommended as preparation. (Formerly Advanced Topics in Microeconomic Theory.) *The Staff*

271. Advanced Topics in Macroeconomic Theory. *

Advanced topics and current research in macroeconomic theory, including DSGE models, empirical issues, and optimal policy analysis. Prerequisite(s): courses 204A-B-C, 205A-B-C, and 211A-B-C are strongly recommended as preparation. *The Staff*

272. Evolutionary Game Theory. *

Reviews static equilibrium concepts, games of incomplete information, and the traditional theory of dynamic games in discrete time. Develops recent evolutionary game models, including replicator and best reply dynamics, and applications to economics, computer science, and biology. Prerequisite(s): upper-division math courses in probability theory are strongly recommended. (Formerly Biology 274.) (Also offered as Computer Science 272. Students cannot receive credit for both courses.) *M. Warmuth, D. Friedman, B. Sinervo*

273. Advanced Applied Microeconomics. S

Covers topics in applied microeconomics, including labor economics, public economics, and demography. Discusses advanced econometric techniques and theory commonly used in applied microeconomics and microeconomic theory. Students make extensive use of statistical packages and large data sets to complete course assignments. Upper-division econometric and microeconomics courses strongly recommended. *R. Fairlie*

290. Topics in International Economics. *

Covers several advanced topics in the history of international economics, international trade, and international finance. Topics include imperfect competition and trade, strategic trade policies, increasing returns, and the pattern of trade, economic geography, exchange rate target zones, and balance of payment crises. Topics vary from year to year. Courses 204A-B-C and 205A-B-C are strongly recommended as preparation. *The Staff*

291. Workshop in Applied Economics. S

Experience in applied projects, report writing and presentation, drawing on previous course work. *The Staff*

293. Field Study. F,W,S

Students will undertake analytical projects in public or private institutions. May be taken once to meet course requirements for the master's degree. The material covered must be different from that of the thesis topic. *The Staff*

294A. Applied Economics Laboratory (2 credits). F

Practical experience in managing computerized data sets and running statistical packages. Covers SAS, RATS, TSP,

Bridge Equity System, LIMDEP, GAUSS, and MAPLE programs; and internet, IFS, OECD, and SPIRS EconLit databases. May be repeated for credit. *The Staff*

294B. Applied Economics Seminar (2 credits). *

Weekly seminar designed to present students with current working applications in various fields of applied economics and finance. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

295A. Directed Reading. F

Reading in research area of student interest, with faculty supervision through weekly discussion. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

295B. Directed Reading. W

Reading in research area of student interest, with faculty supervision through weekly discussion. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

295C. Directed Reading. S

Reading in research area of student interest, with faculty supervision through weekly discussion. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

296A. Third Year Ph.D. Seminar. F

Student presentations of literature and/or original research in areas of student research interest. Student discussion of presentations under faculty supervision. Prerequisite(s): courses 204C, 205C, 211B, 240A, 240B, 241A, and 241B are required preparation. *The Staff*

296B. Third Year Ph.D. Seminar. W

Student presentations of literature and/or original research in areas of student research interest. Student discussion of presentations under faculty supervision. Prerequisite(s): courses 204C, 205C, 211B, 240A, 240B, 241A, and 241B are required preparation. *The Staff*

296C. Third Year Ph.D. Seminar. S

Student presentations of literature and/or original research in areas of student research interest. Student discussion of presentations under faculty supervision. Prerequisite(s): courses 204C, 205C, 211B, 240A, 240B, 241A, and 241B are required preparation. *The Staff*

297. Independent Study. F,W,S

Independent study and research under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

298. Dissertation Research. F,W,S

Research toward Ph.D. dissertation under faculty supervision. Prerequisite(s): advancement to candidacy and students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

May be taken once to meet course requirements for the master's degree. Students submit petition to sponsoring agency. *The Staff*

Education

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 Advising: (831) 459-2589
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education@ucsc.edu

Faculty and Professional Interests

Professor

MARGARET (GRETA) A. GIBSON
Immigrants and education; minority status and schooling; community-school relationships; ethnicity, class, gender, and education processes; qualitative research methods

RODNEY OGAWA
Educational leadership, educational reform, and the impact of social institutions on the structure of school organization

ART PEARL, Emeritus

DAVID SWANGER, Emeritus

TRISH STODDART
Teacher education, science education, educational reform

ROLAND G. THARP, Emeritus

C. GORDON Wells
Language and literacy development, analysis of discourse in learning and teaching, inquiry-oriented curriculum; socio-cultural theory and education, collaborative action research

Associate Professor

DORIS ASH
Informal science learning, teacher professional development, science discourse in and out of the classroom

RON GLASS
Moral and political philosophy and education, ideology and education, race and education, urban school reform

JUNE A. GORDON
Urban comparative education; sociology of education; schooling and society in Japan, China, the U.K., and the U.S.A.; marginalized youth and economic conditions

JUDIT MOSCHKOVICH
Mathematics cognition and learning; student conceptions of linear functions; discourse in mathematics and science classrooms; everyday mathematical practices; and bilingual mathematics learners

LUCINDA PEASE-ALVAREZ
Language and literacy development, language-minority education, bilingualism, informal learning

JUDITH SCOTT
Literacy and language learning; academic language; reading, writing, vocabulary development; teachers' professional development through collaboration and inquiry

KIP TÉLLEZ
Preparation of teachers for linguistic and cultural diversity, second language learning, studies of the school curriculum, educational assessment

Assistant Professor

LORA BARTLETT
Educational policy and school reform, schools as workplaces for teachers, the conditions of teachers' commitment

GEORGE BUNCH
Language and education in linguistically diverse settings, preparation of teachers for linguistic diversity, language policy, and bilingualism

CYNTHIA CRUZ
Street ethnography; community-based learning and pedagogies; decolonial feminist pedagogies; Chicana studies and epistemologies; U.S. Third World Feminisms; cultural studies and education

EDUARDO MOSQUEDA
Mathematics education of English learners; large-scale dataset quantitative analysis; urban education issues

KYSA NYGREEN
Urban education; youth organizing; political identity formation; participatory action research

BRAD OLSEN
Teacher development (with emphasis on knowledge and identity), English education, and sociolinguistics

JEROME SHAW
Scientific inquiry, specifically examining the science education experiences of English language learners and their teachers; includes examining ways in which assessments in English measure content knowledge versus language proficiency

Director of New Teacher Center

ELLEN R. MOIR
Bilingual education, English language development, new teacher development and support



Professor

CATHERINE R. COOPER (Psychology)
Cultural perspectives on child and adolescent development; linkages among families, peers, schools, and work; issues of diversity, ethnicity, and gender in identity; research, practice, and policy in university outreach programs; linking qualitative and quantitative research

BRUCE N. COOPERSTEIN (Mathematics)
Algebra, algebraic number theory

BARBARA ROGOFF (Psychology)
Human development in sociocultural activity; informal and formal arrangements for learning; adult/child and peer communication in families and schools in diverse cultural communities; learning through observation; cognitive development, especially problem solving, planning, and attention

Senior Lecturer

DONALD L. ROTHMAN (Writing)
Literacy education and democracy; UC/K-12 partnerships; writing, persuasion, and nonviolence; writing pedagogy; connections between beauty and justice

Program Description

The purpose of the Education Department's instructional programs is to prepare all students, undergraduates and graduates, to engage in the analysis and integration of educational theory, research, and practice for an increasingly diverse society. The department's primary intellectual and practical focus is on fostering equitable and effective schooling for all students. In working toward this goal, the department seeks to understand the profound issues involved in transforming public education so that it better meets the needs of students from diverse language, ethnic, racial, and class backgrounds. We are a small department with the large agenda of developing educational leaders and pursuing educational research that will affect the future of teaching and learning both inside and outside of schools. Our commitment lies in three essential and interrelated domains: 1) school, families, and communities; 2) teacher education and development; and 3)

mathematics and science. Undergirding them all is a focus on the socio-cultural context in which learning and teaching takes place and an understanding of the power of language and literacy in both formal and informal educational settings.

The Education Department has a growing Ph.D. program that attracts students who have exemplary preparation as well as experience working in educational settings; a model teacher-education program; and a vibrant minor that serves over 300 undergraduates each year. The department is developing an Ed.D. program to further its involvement in educational communities.

Minor in Education

The UCSC undergraduate courses in education engage students in the study of the history of educational thought and philosophy, the politics and economics of education, learning theory and pedagogy, and issues of cultural and linguistic diversity in education.

Because an academic major in education is not permitted in the state of California, UCSC offers a minor in education for those students who are considering a career in teaching and also for those who hold a general interest in educational studies. Please note that the minor in education does not provide a California Teaching Credential. Additionally, the UCSC teaching credential program is a graduate program and course work taken in the minor cannot be substituted for credential requirements.

The minor in education consists of six courses: 92A, 92B, 92C, 180, and two upper-division education courses (please refer to the Education Department's web site for a list of approved upper-division courses for the education minor, <http://education.ucsc.edu>).

To declare a minor, students must file a Proposed Plan and Declaration of Major/Minor form at the Education Department. Students pursuing a minor in education should meet with the Education Department's Academic Adviser as early as possible. The adviser will assist students in filing the Proposed Study Plan and the Declaration of a Major/Minor form.

For specific instructions about how to declare a minor in education, please refer to the Education Department's web site <http://education.ucsc.edu>.

Graduate Programs

Master of Arts in Education and California Teacher Credential Program

Please note that students are not admitted into the program for a stand-alone M.A. in education or a stand-alone credential.

Because program requirements are authorized by statutes and regulated by a state entity, the California Commission of Teacher Certification, program requirements must be responsive to new legislation and regulatory policies. Admission requirements and programs of study referred are subject to change to comply with regulatory mandates.

The Master of Arts in education and California teacher credential program prepares prospective teachers to work with California's culturally and linguistically diverse student population. Students in this program earn a master's degree and are eligible to apply for a Preliminary California Credential upon completing a five-quarter program comprised of two summers and one academic year. Graduates of the program are prepared to teach English language learners enrolled in K-12 public schools. The program also offers the Bilingual, Cross-cultural, Language, and Academic Development (BCLAD) emphasis. The UCSC BCLAD

emphasis authorizes primary language instruction or dual language immersion instruction in a K–12 setting. The UCSC BCLAD language of emphasis is Spanish.

Students who complete the program are eligible to apply for a California Preliminary Multiple Subjects teaching credential or a California Preliminary Single Subject teaching credential. The Multiple Subjects teaching credential authorizes the holder to teach in a K–12, self-contained public school classroom, where all subjects are taught by the same teacher. The Single Subject teaching credential authorizes the holder to teach in his/her credential subject area in a departmentalized setting within a public school system.

The UCSC single subject teacher credential program offers the following subject areas: mathematics, English, social science, and science. Programs of study are subject to change.

Prerequisite Admission Requirements

All candidates must have preparation in the following areas:

1. A course, or equivalent experience, that addresses cultural and linguistic diversity. The following UCSC undergraduate education courses are examples of courses that meet this requirement: 128, Immigrants and Education; 141, Bilingualism and Schooling; 164, Urban Education; 181, Race, Class, and Culture in Education; and 92C Introduction to Issues in Diversity and Education. Other courses offered outside the Education Department may be acceptable.
2. A documented field experience with children or youth in an educational setting. Experiences such as directed observation, substitute teaching, school tutoring, work in after-school programs, camp counseling, instructional aide, or the equivalent are acceptable experiences. When applying to the program, please describe your field experience in the designated area of the application titled, PERSONAL STATEMENT.

Application Selection Criteria

Admission to the program is competitive. Candidates for admission are selected, in part, on the following criteria:

Academic record

College course work is evaluated with attention to content and grades or narrative evaluations. The appropriateness of courses taken for the credential sought is also taken into consideration. For the multiple subjects credential, students should have an extensive breadth of courses in the core subject areas taught in elementary school—math, science, social science, and English. For the single subject credential, students should have an extensive body of course work in the content area.

Statement of purpose, writing sample, letters of recommendation, and résumé

Information provided in these documents is used in the selection of candidates. All documents must be submitted by the application deadline.

The statement of purpose should discuss the following:

- an explanation of why you want to become a teacher;
- how your experience has contributed to your motivation and potential to be an educational leader;
- a description of your experiences related to youth, cultural and linguistic diversity, and community involvement.

Writing Sample: a sample of your writing (no more than 10 pages), ideally on an educational or related topic. Applicants may submit an academic paper or other work previously written; alternatively, applicants may choose to write a brief piece specially for this application.

Letters of Recommendation: Three letters of recommendation are required. It is recommended that these letters address your qualifications in the following areas:

- a) academic performance
- b) field work with youth
- c) experience in culturally and linguistically diverse settings and with student populations who have traditionally been underserved in schools and classrooms.

Résumé: a résumé that includes an employment history; any relevant volunteer or community work, especially in schools and/or with children; and experiences in multicultural and multilingual settings. Include information on languages (other than English) in which you have competence.

BCLAD Essay (BCLAD applicants only): Candidates must submit an essay in Spanish as described in the online application.

Admission Requirements

Testing

All required exams must be met by the stated deadlines.

California Basic Educational Skills Test (CBEST): All admitted applicants must verify completion of the CBEST requirement and submit a passing status verification by June 1 in order to enroll in the program. **NOTE:** Additional information can be found at CBEST Registration (*state requirement and subject to change*). It is recommended that passing verification be submitted with the application.

Subject Matter Competence

California state law mandates that all teachers provide evidence of their subject matter knowledge (*state requirement and subject to change*).

Admitted Multiple Subject applicants must submit verification of having passed the California Subject Exam for Teachers (CSET) Multiple Subjects Subtests by June 1 *prior to enrollment in the program*. However, *it is highly recommended that documentation of passing CSET scores be submitted with the application*. Multiple subject applicants must pass each section of the CSET; no coursework or "waiver" program can substitute for passing CSET scores.

Deadline to complete this requirement: June 1 of each year prior to enrollment into the program. However, **applicants are encouraged to complete this requirement prior to applying to the program.**

Additional information can be found at the CSET Registration web site, <http://www.cset.nesinc.com/>.

Single Subject

The California Subject Exam for Teachers (CSET), or verification of an approved subject matter program from the applicant's undergraduate institution is required. Admitted applicants must submit verification of having passed the CSET exam for their subject (e.g., mathematics), or confirmation of 100 percent completion of an approved subject matter program.

Deadline to complete this requirement: June 1 of each year prior to enrollment into the program. However, *it is highly recommended that documentation of subject matter competence be submitted with the application*. Additional information can be found at the CSET Registration web site.

Certificate of Clearance

In accordance with Education Code Section 44320(b), each credential candidate for an initial credential, prior to admission to any credential program, must obtain a Certificate of Clearance. A Certificate of Clearance is a document that indicates that the individual has completed the fingerprint and character and identification process and has been cleared by the California Commission on Teacher Credentialing to begin student teaching. *To comply with this regulation the UCSC Education Department must have on file a copy of the Certificate of Clearance before allowing a person to begin public school fieldwork or student teaching.* If you hold or have applied for a credential from the California Commission on Teacher Credentialing (such as an emergency substitute teaching permit) you are not required to apply for another Certificate of Clearance. Please submit a photo copy of your prior credential for your application to the program by mail to: Education Dept., U.C. Santa Cruz, 1156 High St., Santa Cruz, CA, 95064. Applicants who do not hold a valid California credential or have not previously applied for a Certificate of Clearance through the Commission on Teacher Credentialing must apply for the Certificate of Clearance. Please send an e-mail to the Education Department, edma@ucsc.edu, for further instructions regarding your Certificate of Clearance Application.

Deadline for completing this requirement: January 15 of each year.

Program and State of California Requirements (Not Required for Initial Admission in the Program)

These requirements may be met prior to or while enrolled in the program, but they must be met to be eligible for a California teaching credential.

BCLAD Candidates

The BCLAD language requirement is met by passing Test 6 of the BCLAD exam, which is administered by National Evaluation Systems (NES). Admitted BCLAD candidates must take the first available exam after enrolling in the program if they have not done so prior to admission.

U.S. Constitution Requirement

A course on the U.S. Constitution (or completion of an exam offered by the Education Department to enrolled students) is required. UCSC-approved courses that meet this requirement are Politics 20, *Democracy and Liberalism in American Politics*; Politics 111, *Problems in Constitutional Law*; Politics 120A, *Congress, President, and the Court in American Politics*; and History 25A, *United States History to 1877*.

Reading Instruction Competence Assessment (RICA)

Multiple subjects candidates are required—prior to completion of the program and in order to be recommended for a preliminary credential—to pass the RICA exam. The RICA measures the knowledge, skills, and abilities essential to offer effective reading instruction to K–12 students. Candidates should not take this exam prior to completing course 211A.

CPR

A certified cardiopulmonary resuscitation (CPR) course (infant, child, and adult) must be completed and valid upon application for the credential.

Student Teaching

The successful development of teaching skills in the classrooms is the culmination of a teacher education program. Therefore, candidates must demonstrate, by the end of their program, teaching competence in the classroom. Credentialed public school teachers are responsible for the nurturing of children and youth. Therefore, teaching credential candidates must consistently display conduct befitting the profession. To this end, the candidate must be able to cope with the demands and responsibilities of teaching as outlined below:

- meet university and program requirements and deadlines (including school expectations during field experiences).
- plan ahead to anticipate needs and potential student teaching problems.
- be able to adapt to institutional and/or professional expectations and policies.
- relate appropriately to children, parents, and school staff.
- demonstrate sensitivity to the social, cultural, economic context of the school environment.
- adhere to school expectations for dress, appearance, and personal hygiene.

Candidates whose professional behavior does not meet these minimal standards may be recommended for dismissal from the program.

Beginning student teaching, which begins during the Summer Bridge between the university summer and fall quarters, constitutes the first classroom observation experience for students in the program. Student Teachers are in their classroom placements from 10–14 hours a week depending on the school site schedule. To enroll in this course, students must have a Certificate of Clearance issued and on file with the California Commission on Teacher Credentialing.

Intermediate and advanced student teaching is a two-quarter experience (winter/spring) in which student teachers are placed with cooperating teachers in local schools. Students are in the classroom placements 14 or more hours a week in winter quarter leading toward full time in the classroom by spring quarter. They gradually assume responsibility for preparation, instruction, and evaluation of the class during this two-quarter period. Supervisors of teacher education give ongoing and frequent support to students in their classroom placements and in seminars at UCSC. Multiple Subjects candidates obtain classroom experience in both primary and intermediate grades. Single Subjects candidates obtain classroom experience in middle school/junior high and high school.

Admission to course 283, *Intermediate Student Teaching*, and courses 284A-B-C, *Advanced Student Teaching*, is based on an assessment of academic performance, experience, leadership, and initiative shown in public school placements and required courses taken earlier in the program.

Capstone Requirements

Students will complete a capstone portfolio, which includes a teaching performance assessment and reflective papers. Prompts for these assignments may vary from year to year as they reflect the most current California state credentialing requirements.

Multiple Subject Course Requirements

- 200 *Applied Classroom Analysis and Methods: Beginning Student Teaching*
201 *Intermediate Student Teaching*

- 202ABC *Advanced Student Teaching*
203 *Methods of English Language Development*
205 *Teaching, Learning, and Schooling*
207 *Social Foundations of Education*
208 *Portfolio Development*
209 *Introduction to Technology in Schools*
210 *Creating Supportive, Healthy Environments for Student Learning*
211 *Teaching Special Populations*
212 *(BCLAD students only) Promoting Biliteracy and Bilingualism*
217 *Topics in Elementary Education: Physical Education*
218 *Topics in Elementary Education: Visual Arts*
219 *Topics in Elementary Education: Performing Arts*
220 *Reading and Language Arts for Elementary Classrooms*
221 *Science Learning and Teaching in Elementary Classrooms*
222 *Mathematics Learning and Teaching in Elementary Classrooms*

Single Subject Course Requirements

- 200 *Applied Classroom Analysis and Methods: Beginning Student Teaching*
201 *Intermediate Student Teaching*
201A *Intermediate Student Teaching: Single Subject*
202ABC *Advanced Student Teaching*
204 *Methods of English Language Development*
206 *Teaching, Learning, and Schooling*
207 *Social Foundations of Education*
208 *Portfolio Development*
209 *Introduction to Technology in Schools*
210 *Creating Supportive, Healthy Environments for Student Learning*
211 *Teaching Special Populations*
212 *(BCLAD students only) Promoting Biliteracy and Bilingualism*
225 *Reading Across the Curriculum in Middle School and Secondary*

Single subject credential students enroll in the two methods courses related to their subject area:

- 223 *Writing Across the Curriculum for Secondary*
226 *English Teaching: Theory and Curriculum*
227 *English Teaching for Secondary Classrooms*
228 *Math Education: Research and Practice*
229 *Teaching Mathematics in the Secondary Classroom*
230 *Science Education: Research and Practice*
231 *Teaching Science in the Secondary Classroom*
232 *Social Science: Theory and Curriculum*
233 *Social Science Teaching for Secondary Classrooms*

For Further Information

Phone the Education Department Credential Analyst at (831) 459-2200, send e-mail to edma@ucsc.edu, or view the department's home page on the web at <http://education.ucsc.edu> where potential applicants can obtain full details about the programs.

Ph.D. in Education

Overview

The goal of the Ph.D. in Education is to support graduate students in becoming creative scholars who engage in research focused on the educational needs of students from linguistic and cultural groups that have historically not fared well in our nation's public schools. To achieve this goal, this program provides students with grounding in the varieties of interdisciplinary theorizing, research methods, and applications needed to advance the study of learning and teaching for

diverse student populations. The courses and research experiences are closely related to practice in K-12 classrooms. Students in this interdisciplinary program apply tools and perspectives from education, anthropology, linguistics, philosophy, psychology, sociology, cognitive science, and cultural historical activity theory. The program integrates theory and practice to examine learning and teaching within the multiple contexts of classroom, school, family, and community. Education faculty members utilize both macro- and micro-level frameworks and draw on both quantitative and qualitative methodologies in their research. Graduates of this program will be qualified to teach and to conduct the kinds of educational research demanded by tenure-track positions in research and regional universities. Graduates may also work in non-university based institutions that focus on teacher professional development, curriculum development, and related areas of educational research and development.

Areas of Specialization

Ph.D. students choose from one of the following three areas as their area of specialization:

- The Language, Literacy, and Culture specialization focuses on the numerous inter-relationships among language, learning, culture, and teaching, and foregrounds the reciprocal nature of social practices and language use inside and outside schools. Particular emphasis is paid to issues of equity and social justice for culturally and linguistically diverse students.
- The Mathematics and Science Education specialization focuses on cognition, learning, and teaching in mathematics or science with an emphasis on equity, informal learning, and language issues in these two content areas.
- The Social Context and Policy Studies specialization focuses on the complex interrelations between educational processes within schools and the social, cultural, political, and economic contexts in which they operate.

Together with his or her faculty academic adviser, each student develops an integrated program of study that includes advanced coursework, seminars, and electives. Courses may be taken in other departments, when appropriate.

Program Requirements

During the first two years of study, all students are expected to enroll in a set of required courses, including core seminars, methodology courses, the first- and second-year professional development seminars, and a research apprenticeship. The student and his/her adviser will also design a course of study within one of the three areas of specialization. The overall number courses and seminars taken varies depending on the student's preparation, interests, and plans, which are determined in consultation with relevant faculty and the department chair. The program encourages interdisciplinary study.

To achieve Ph.D. candidacy, students are expected to pass an annual review of their written work, maintain satisfactory academic progress, complete all required courses, attend department colloquia, complete a second-year research project, pass a Qualifying Examination (QE), and meet the specific requirements of the Division of Graduate Studies.

The QE is intended to assess a student's depth and breadth of knowledge in his or her areas of specialization and his/her competence to do extended dissertation-level research and analysis. Normally taken during the third year of enrollment, the QE consists of both

written and oral components. For the written portion, the student prepares three papers, two of which are position papers on a theoretical topic; the third is a dissertation prospectus. The student presents and defends his/her work to at the oral examination.

A dissertation based on original research is required. After the dissertation has been completed and submitted, students must defend the dissertation in an oral exam.

Course Requirements and Sequencing

The following courses are required. Incoming students should consult with their faculty adviser to determine the most appropriate order in which to fulfill core course requirements and requirements in the specialization area. All required courses must be completed prior to advancement to candidacy.

235	<i>Introduction to Educational Inquiry</i> (required Year 1)
236	<i>Quantitative Methods in Educational Research</i> (offered alternate years)
237	<i>Qualitative Research Methods</i> (required Year 1)
261	<i>Thinking, Learning, and Teaching</i>
262	<i>Social and Cultural Context of Education Core Seminar</i>
269ABC	<i>First Year Proseminar</i> (required Year 1)
270ABC	<i>Second Year Proseminar</i> (required Year 2)
293A or 293B	<i>Research Apprenticeship</i> (5 units required in Year 1 or 2)
294	<i>Second Year Research Project</i> (required Year 2)

One additional methods course, approved by the faculty adviser.

A minimum of four specialization courses, approved by the faculty adviser.

Elective courses (no set number required).

Requirements for the M.A. Degree

Although applications for a master's degree are not accepted, students in the Ph.D. program may obtain a M.A. degree after successfully completing a minimum of three quarters residency, 60 course units including courses 235, 237 269ABC, 270ABC, 293A or 293B, 294, and a second-year research project. Students seeking an M.A. degree must adhere to the guidelines set out by the Graduate Division for filing for a degree.

Doctoral students in education may obtain a parenthetical notation on the education Ph.D. diploma indicating that they have specialized in Latin American and Latino studies or sociology. A parenthetical notation is the equivalent of a graduate minor. Students should first consult with his or her faculty adviser prior to pursuing a parenthetical notation in Latin American and Latino studies or sociology. Requirements for each of the parenthetical notations available to doctoral students in education are as follows:

Requirements for a Parenthetical Notation in Latin American and Latino Studies for Education Students

Committee Composition: The student must have a designated graduate adviser from among the Latin American and Latino studies core, participating, or affiliated faculty (see below). This adviser will be in addition to the graduate adviser from the student's home department. The Latin American and Latino studies adviser must serve on the student's qualifying examination committee and/or on the student's dissertation committee.

Writing: The student must prepare a significant piece

of writing in the area of Latin American and Latino studies. This writing may take the form of a substantial seminar paper, master's essay, or doctoral dissertation chapter.

Course Requirements: The student must take five graduate courses in Latin American and Latino studies, including the required LALS 200 and LALS 297. The remainder can be selected from appropriate graduate courses taught in any department by core, participating or affiliated LALS faculty.

Teaching: The student must serve as a teaching assistant in at least one Latin American and Latino studies course or teach a Latin American and Latino studies course independently in the regular curriculum or in summer session.

Requirements for a Parenthetical Notation in Sociology for Education Students

To receive a parenthetical notation in sociology, graduate students must complete the following requirements in addition to degree requirements for the doctorate in Education:

Sociology 201 *The Making of Classical Theory*
Sociology 202 *Contemporary Sociological Theory*
Sociology 203 *Sociological Methods*

Take one course from the following sociology methodology courses:

Sociology 204 *Methods of Quantitative Analysis*
Sociology 205 *Field Research Methods*
Sociology 206 *Comparative Historical Methods*
Sociology 209 *Analysis of Cultural Form*
Sociology 241 *Cross-National and Cross-Cultural Research*

Sociology 242 *Feminist Research Seminar*

Take three seminar courses covering topics in educational sociology, offered by either department (ask your major professor for advice).

Have a designated graduate adviser from among the faculty of the Sociology Department, who commits to serve on the qualifying exam committee and on the Ph.D. dissertation reading committee.

Other Requirements

Students are required to attend the Education Department's colloquium series during their first and second years in the program.

The Education Ph.D. program emphasizes teaching experience, and all students are required to complete one TAship in Education prior to advancement to candidacy.

Financial Support

Financial support for students includes a variety of fellowships, research assistantships, and teaching assistantships in the Education Department. Students may participate in research projects under the auspices of several interdisciplinary research centers, including the Center for the Mathematics Education of Latinos/as (CEMELA), the Center for Justice, Tolerance, and Community (CJTC), Chicano/Latino Research Center (CLRC), the New Teacher Center (NTC), and the Vocabulary in Nearly Everything (VINE) project.

General Admission Requirements

To be admitted to this program the applicant must have received a bachelor's degree or its equivalent from an accepted university prior to the quarter for which admission is sought, have a grade point average or equivalent of 3.0 or better, submit scores on the GRE

Graduate Records Exam (GRE) taken within the past five years, and have experience working with culturally and linguistically diverse communities. Experience working in K-12 classrooms is preferred.

Preferred Prerequisites for Students Concentrating in Language, Literacy, and Culture Studies

- Successful completion of a college-level introductory course in linguistics
- Competence in a second language

Preferred Prerequisites for Mathematics and Science Education Specialization

B.S. or B.A. degree in a mathematical or natural science discipline (mathematics, applied mathematics, biology, chemistry, computer science, physics, etc.) or equivalent upper division coursework.

Joint Doctoral Program in Collaborative Educational Leadership

Due to actions taken by the statewide California State University system, the Joint Ed.D. Program in Collaborative Leadership has been terminated and we are no longer accepting applications for this program.

The Education Department and UCSC are moving assertively to revise the curriculum and launch an independent UCSC Ed.D. program; we hope to accept applications in the fall of 2008.

This program will continue to be accessible to working professionals.

Lower-Division Courses

50A. CAL Teach 1: Science and Mathematics (2 credits).

Introductory seminar exploring secondary students, teaching, and schools in the context of science and/or mathematics instruction. Concurrent participation in a secondary school internship required. Course material supports and enhances students' placement experiences. Prerequisite(s): Acceptance into CAL Teach and concurrent participation in a secondary school internship in a science or math classroom. Enrollment limited to 25. *The Staff*

50B. CAL Teach 1: Mathematics (2 credits). F,W

Introductory seminar exploring secondary students, teaching, and schools in the context of mathematics instruction. Concurrent participation in a secondary school internship required. Course material supports and enhances students' placement experiences. Prerequisite(s): Acceptance into CAL Teach and concurrent participation in a secondary school internship in a math classroom. Enrollment limited to 25. *The Staff*

50C. CAL Teach 1: Science (2 credits). F,W

Introductory seminar exploring secondary students, teaching, and schools in the context of science instruction. Concurrent participation in a secondary school internship required. Course material supports and enhances students' placement experiences. Prerequisite(s): Acceptance into CAL Teach and concurrent participation in a secondary school internship in a science classroom. Enrollment limited to 25. *The Staff*

75A. CAL Teach 2: Science and Mathematics (2 credits).

Examines students, schools, and science and/or mathematics instruction with emphasis on developing an instructional project aligned with state-mandated content standards. Course content supports and enhances students' placement experiences. Prerequisite(s): CAL

Teach 1 (course 50A, 50B, or 50C), and acceptance into CAL Teach 2 and concurrent participation in a secondary school internship in a mathematics classroom. Enrollment limited to 25. *The Staff*

75B. CAL Teach 2: Mathematics (2 credits). F,S
Examines students, schools, and mathematics instruction with emphasis on developing an instructional project aligned with state-mandated content standards. Course content supports and enhances students' placement experiences. Prerequisite(s): CAL Teach 1 (course 50A, 50B, or 50C), and acceptance into CAL Teach 2 and concurrent participation in a secondary school internship in a mathematics classroom. Enrollment limited to 25. *The Staff*

75C. CAL Teach 2: Science (2 credits). F,S
Examines students, schools, and science instruction with emphasis on developing an instructional project aligned with state-mandated content standards. Student must concurrently participate in a K-12 school internship. Course content supports and enhances students' placement experiences. Prerequisite(s): CAL Teach 1 (course 50A, 50B, or 50C), and acceptance into CAL Teach 2 and concurrent participation in a secondary school internship in a science classroom. Enrollment limited to 25. *The Staff*

92A. The Evolution of Education. F
Introduction to educational theory, Plato through Freire. A survey of major ideas and issues in education, ranging from the purposes of education and the organization of knowledge to the nature of teaching, compulsion in schooling, and questions concerning developmental theory, moral education, and aesthetic education. Course enrollment is unrestricted. (General Education Code(s): IS.) *R. Glass*

92B. Introduction to Theories of Education. W
A general survey of theories and partial theories of education organized into three recurrent topics: teaching and learning, schooling, and education in society. Each is considered in terms of the partial theories of James, Dewey, and Skinner; cognitive constructivism, particularly the theories of cognitive science; and, finally, an integrated sociocultural theory of education. (General Education Code(s): IS.) *C. Wells*

92C. Introduction to Issues in Diversity and Education. S
Examines the impact on schools and students of social/ethnic status, social class, and gender, with attention to historical, cultural, and psychological variables. An introduction to the theory, research, and reform movements in education in response to our state's and our nation's increasing diversity. (General Education Code(s): E.) *K. Nygreen*

99. Tutorial. F,W,S
Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

102. Education, Media, and Society. S
Focusing on ways the media (both news and the entertainment industry) portrays schools, teachers, and students to the public, investigates the way society views education, the way education is presented in the media, and the way education is influenced by society. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *B. Olsen*

104. Ethical Issues and Teaching. W
Emphasizes a philosophical exploration of the moral complexities of teaching. Students read theoretical investigations of these complexities, and examine case studies that pose difficult moral questions and illuminate the dilemmas of everyday life in classrooms. Course is grounded in a dialogical approach to learning. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 50. *R. Glass*

115. K-12 Student Assessment. F
Provides an overview of educational testing. Appropriate use and interpretation of standardized, classroom achievement and special needs assessments are examined. Issues on fair testing of diverse populations of students are discussed within each topic area. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *The Staff*

120. The Arts in Schools: Aesthetic Education Theory and Practice. S
Explores the historical legacy of the arts within education; considers aesthetic education as an inter-arts philosophical and practical endeavor; studies alternatives to the current situation of the arts in education; develops theory, curricula and methods necessary to teach the arts. Addresses both elementary and secondary teaching in the arts. Meets third-course requirements. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *B. Olsen*

125. Introduction to Teaching Children's Literature in Grades K-8. W
Offers opportunities for undergraduate and graduate students to learn about fundamental aspects of children's literature, increase their knowledge of range and quality of children's literature, enhance their understanding of multicultural children's literature, and develop ways to integrate children's literature into elementary- and middle-school curriculum areas. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *J. Scott*

128. Immigrants and Education. S
Research and theory on the education of immigrant students. Major topics include the Americanization movement and America's changing demography, identity maintenance and change, home-school relations, and educators' roles in meeting the needs of culturally and linguistically diverse student populations. Enrollment restricted to juniors and seniors. Enrollment limited to 50. (General Education Code(s): E.) *M. Gibson*

135. Gender and Education. W
Addresses the changing but continuing patterns of unequal expectations, opportunities, and treatment throughout the educational system for all students, female and male, who do not match a standard model of gender performance. Fieldwork required. Prerequisite(s): course 92C. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *D. Ash*

141. Bilingualism and Schooling. S
Introduces participants to issues related to the schooling of students who speak languages other than or in addition to English. Uses a multidisciplinary perspective to understand the circumstances these students face in schools and considers approaches and policies that best meet their needs. Enrollment restricted to juniors, seniors and graduate students. Enrollment limited to 50. (General Education Code(s): E.) *L. Pease-Alvarez, G. Bunch*

160. Issues in Educational Reform. F
Explores a variety of perspectives on key educational policy issues including desegregation, bilingual educa-

tion, affirmative action, charter schools, national and state curriculum standards, student assessment and the assessment and certification of teachers. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *L. Bartlett*

164. Urban Education. W
Focuses on urban schooling through critical readings, fieldwork, group projects, and extensive writing. Students explore how socialization, marginalization, and assimilation impede or support academic success, how class intersects with "race", and how "culture" affects one's orientation to education. Prerequisite(s): course 92C. Enrollment restricted to juniors and seniors. Enrollment limited to 50. Satisfies American History and Institutions Requirement. (General Education Code(s): E.) *J. Gordon*

170. Schools and Asian Cultures. F
Focuses on a historical and contemporary study of education in East, Southeast, and South Asia as well as the negotiation of public and private schooling within the Asian immigrant population in California. Specific topics include language acquisition; the role of religious affiliation and other culturally specific schooling; patterns of family life; and the effects of socioeconomic status, career aspirations, and parental participation in schools. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *J. Gordon*

173. Seminar in Critical Pedagogy. S
Philosophical and pedagogical exploration of relationships among oppression, power, society, education, and change. Examines how history, power, economics, and discrimination shape societal perspectives and schooling practices, and considers ways to transform education. Enrollment restricted to juniors and seniors. Enrollment limited to 50. May be repeated for credit. *B. Olsen*

177. Teaching Culturally and Linguistically Diverse Students Math and Science. W
Examines equity issues in the learning and teaching of math and science in culturally and linguistically diverse school settings. Draws on multicultural, bilingual, and math/science education perspectives. Intended for undergraduate majors considering a K-12 teaching career. Satisfies an elective requirement for the minor in education program. Prior completion of courses 92B and 180 is advised. Enrollment limited to 25. *E. Mosqueda*

180. Introduction to Teaching. F,W
Designed to encourage students to think about teaching in new ways. Assumptions about teaching and schooling are examined as well as considering what it takes to teach so that children learn and understand. Not a course in how to teach, but an opportunity to reconsider what teaching should try to accomplish and what kinds of learning teachers should foster. Practicum in the schools of 30 hours per quarter required. Enrollment restricted to juniors and seniors. Enrollment limited to 120. *The Staff*

180A. Introduction to Teaching: CAL Teach 3. W
Analyzes student learning of mathematics and science in formal and informal settings. Assumptions about learning, teaching and schooling are examined as well as considering the contexts and practices that best support the development of students' scientific learning and conceptual development and apply these in their classroom practicum. Students must concurrently participate in a CAL Teach secondary school internship. Prerequisite(s): satisfaction of the Entry Level Writing and Composition

requirements; courses 50A,B, or C; and 75A, B, or C; and acceptance into CAL Teach 3 and concurrent participation in secondary school internship in a science or math classroom. Enrollment limited to 25. (General Education Code(s): W.) *The Staff*

181. Race, Class, and Culture in Education. F

Examines the schooling experience and educational attainment of racial/ethnic minority students in the U.S. Focuses primarily on domestic minorities. Addresses issues of variability between and within minority groups and the role of cultural, structural, and psychological factors in the educational attainment of these students. Enrollment restricted to juniors and seniors. Enrollment limited to 50. (General Education Code(s): E.) *J. Gordon, K. Nygreen*

182. American Teacher. S

Examines multiple and competing images of "teachers" and, more specifically, notions of the "good teacher"; also explores social, cultural, historical, and policy context of teachers' work in the U.S. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *L. Bartlett*

185B. Introduction to Teaching Mathematics. S

Provides an introduction to principles and practices for teaching mathematics in secondary classrooms; examines theoretical and practical approaches to teaching mathematics; provides an introduction to national and state standards and an overview of mathematics curricula and current issues in mathematics teaching. Enrollment restricted to junior and senior majors in mathematics, physics, computer science, computer engineering, and electrical engineering. Enrollment limited to 30. *The Staff*

185C. Introduction to Teaching Science. S

An introduction to the principles and practices for teaching science in secondary classrooms. Course examines theoretical and practical approaches to teaching science, provides an introduction to national and state standards and an overview of science curricula and current issues in science teaching. Enrollment restricted to junior and senior science majors. Enrollment limited to 40. *D. Ash*

187. Cognition and Instruction. W

Addresses the question, "How do people learn?" by examining theories of learning and research on cognition, learning, and instruction. Enrollment restricted to junior and senior education minors. Enrollment limited to 60. *J. Moschkovich*

194. Group Projects. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Projects (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Applied Classroom Analysis and Methods: Beginning Student Teaching. F

A required course that introduces students to the diverse cultural and linguistic settings of today's classrooms. Classroom practices, instructional strategies, and analysis are emphasized. First course in the student teaching placement series. Placements are used to examine and apply teaching methods while developing classroom management skills. Class meetings include discussion and demonstration of teaching methods. (Formerly course 203.) Enrollment restricted to graduate students. Enrollment limited to 50. *The Staff*

201. Intermediate Student Teaching. W

Designed to provide students enrolled in the UCSC teacher education program a coherent, integrated, pre-professional experience in public school classrooms. Students assume part-time student teaching responsibilities totalling 14–16 hours per week under the direct supervision of an exemplary classroom teacher. Weekly seminars and ongoing supervision by department staff are required. (Formerly course 283.) Prerequisite(s): course 200. Enrollment restricted to graduate students majoring in education. Enrollment limited to 50. *The Staff*

201A. Intermediate Student Teaching: Single Subject. W

Provides advanced pre-professional experience for single subject teaching candidates who progressively assume full-time responsibility for public school student teaching beginning in winter quarter. Taken concurrently with course 201. Weekly supervision and seminars with teacher supervisors are required. (Formerly course 283A.) Enrollment restricted to masters of art in education teacher credential students. Enrollment limited to 20. *The Staff*

202A. Advanced Student Teaching. S

Designed for students who have completed course 201, have extensive field and course experience in education, and who wish to qualify for the single-subject or multiple-subject teaching credential by undertaking a quarter of full-time, supervised student teaching. (Formerly course 284A.) Enrollment restricted to education graduate students. *The Staff*

202B. Advanced Student Teaching. S

Designed for students who have completed course 201, have extensive field and course experience in education, and who wish to qualify for the single-subject or multiple-subject teaching credential by undertaking a quarter of full-time, supervised student teaching. (Formerly course 284B.) Enrollment restricted to education graduate students. *The Staff*

202C. Advanced Student Teaching. S

Designed for students who have completed course 201, have extensive field and course experience in education, and who wish to qualify for the single-subject or multiple-subject teaching credential by undertaking a quarter of full-time, supervised student teaching. (Formerly course 284C.) Enrollment restricted to education graduate students. *The Staff*

203. Methods of English Language Development: Multiple Subject Credential. W

This course will help future educators develop a practical theory for teaching English in the elementary and secondary schools to students who speak other languages. Topics include current trends in the field, language assessment,

and the design of instructional units. (Formerly course 253.) Enrollment restricted to program enrollees. Enrollment limited to 30. *K. Téllez, N. Winkler, G. Bunch*

204. Methods of English Language Development: Single Subject. F

Course helps future educators develop a practical theory for teaching English in the elementary and secondary schools to students who speak other languages. Topics include current trends in the field, language assessment, and the design of instructional units. Enrollment restricted to education graduate students. Enrollment limited to 30. *The Staff*

205. Teaching, Learning, and Schooling in a Diverse Society: Multiple Subject. Sum

Required for master's students in education. Three basic units comprise the subject matter: teaching/learning, with such topics as development, learning, pedagogy, and socialization theories; second, schooling, as the context of teaching/learning both in its existent structures and its reform movements; third, the sociocultural context in which educational institutions exist, topics such as cultural and historical forces, political and economic condition, family, and community structures. (Formerly course 250.) Enrollment restricted to graduate students. *C. Wells, P. Stoddart*

206. Teaching, Learning, and Schooling: Single Subject. Sum

Required for master's students in education. Three basic units comprise the subject matter: teaching/learning, with such topics as development, learning, pedagogy, and socialization theories; schooling, as the context of teaching/learning both in its existent structures and its reform movements; and the sociocultural context in which educational institutions exist, including topics such as cultural and historical forces, political and economic conditions, family, and community structures. Enrollment restricted to graduate students. Enrollment limited to 30. *P. Stoddart*

207. Social Foundations of Education. Sum

A sustained inquiry into the social, political, economic, and historical foundations of schools with an emphasis on community attitudes toward education. Student narratives of engagement and resistance will provide a basis for insights and interventions useful to educators. (Formerly course 281.) Enrollment restricted to program enrollees. Enrollment limited to 50. *S. Flinspach, M. Gibson, J. Gordon*

208. Portfolio Development (2 credits). Sum

Provides student and faculty adviser with time to confer over the completion of the required portfolio. (Formerly course 295.) Enrollment restricted to graduate students. *The Staff*

209. Introduction to Technology in Schools (2 credits). Sum

This course is required for prospective teachers. It provides an overview of the use of technology in the K–12 classroom. Topics covered include using the Internet and the web, building a web page, and using resources for educators on the web. Students will review software applications in a particular content area, use technology to develop lesson plans, and create integrated, thematic curricula in which technology is utilized to promote higher-order thinking, creativity, and problem-solving. (Formerly course 220.) Enrollment restricted to graduate students admitted to the credential program. Enrollment limited to 50. *The Staff*

210. Health, Safety, and Community (2 credits). Sum

Addresses the preparation of teachers for creating a supportive, healthy environment for student learning. Covers topics related to physical, emotional, and social health. (Formerly course 265A, *Topics in Elementary Education: Creating a Supportive, Healthy Environment for Student Learning*.) Enrollment restricted to graduate students. *The Staff*

211. Topics in Elementary Education: Teaching Special Populations (2 credits). F

Addresses the preparation of teachers for meeting needs of special populations within the general education setting. Covers basic knowledge, skills, and strategies. (Formerly course 265B.) Enrollment restricted to graduate students. Enrollment limited to 50. *The Staff*

212. Language, Literacy, and Diversity. S

Designed to prepare students to teach reading/language arts in a way that addresses the needs and circumstances of a culturally and linguistically diverse student population. Topics include the following: exploration of the literacy development of native and non-native speakers of English, understanding the theoretical perspectives on language and literacy development, learning instructional approach that enhance development of literacy, and learn to assess students' literacy development. (Formerly course 242A.) Enrollment restricted to graduate students admitted into the credential program. *T. Marchese*

217. Topics in Elementary Education: Physical Education (2 credits). Sum

Examines pedagogical understanding in teaching physical education. Introduces candidates to theoretical and research basis in physical education and content standards and frameworks. Also investigates and presents instructional practices. (Formerly course 288A.) Enrollment restricted to graduate education master's/credential majors. Enrollment limited to 40. *The Staff*

218. Topics in Elementary Education: Visual Arts (2 credits). Sum

Examines pedagogical understanding in teaching visual arts. Introduces candidates to theoretical and research basis for teaching visual arts and content standards and frameworks. Also investigates and presents instructional practices. (Formerly course 288B.) Enrollment restricted to graduate education master's/credential majors. Enrollment limited to 40. *The Staff*

219. Topics in Elementary Education: Performing Arts (2 credits). Sum

Examines pedagogical understanding in teaching performing arts. Introduces candidates to theoretical and research basis for teaching performing arts and content standards and frameworks. Also investigates and presents instructional practices. (Formerly course 288C.) Enrollment restricted to graduate education master's/credential majors. Enrollment limited to 40. *The Staff*

220. Reading and Language Arts for Elementary Classrooms. F

This course provides both a theoretical and practical foundation for literacy instruction, emphasizing reading and language arts instruction in grades K–8. Interactive instruction and field experience will be used to examine curricula, methods, materials, and literacy evaluation. (Formerly course 211A.) Enrollment restricted to graduate students. Enrollment limited to 30. (F) *L. Pease-Alvarez*

221. Science Learning and Teaching in Elementary Classrooms. W

Examines constructivist and sociocultural approaches to the learning and teaching of science in elementary classrooms, including beliefs about the nature of science and theories of how children learn science. Provides a critical overview of curricula, instructional theories, and multiple approaches to teaching the "big ideas" in elementary science. (Formerly course 221.) Enrollment restricted to graduate students admitted to the credential program. Enrollment limited to 50. *The Staff*

222. Mathematics Learning and Teaching in Elementary Classrooms. F

This course is required for the multiple subject credential. Examines constructivist and sociocultural approaches to the learning and teaching of mathematics in elementary classrooms, including the nature of mathematics and theories of how children learn mathematics. Provides an introduction to mathematics teaching standards and a critical overview of curricula, instructional theories, and multiple approaches to teaching the "big ideas" in elementary mathematics. (Formerly course 213A.) Enrollment restricted to graduate students admitted to the credential program. Enrollment limited to 50. *The Staff*

223. Writing Across the Curriculum in Middle and Secondary Classrooms (2 credits). Sum

Reviews issues of literacy and writing in secondary content areas. Students write in several genre and prepare lesson plans for teaching writing within the discourse of their respective curricular area. Co-requisite(s): course 225. Enrollment restricted to education graduate students. Enrollment limited to 45. *M. Kipps*

225. Reading Across the Curriculum in Middle School and Secondary. Sum

Provides a theoretical and practical foundation for teaching reading within content area instruction in middle school and secondary classrooms. Field experiences and interactive instruction will facilitate learning about strategies, curricula, methods, materials, and observation. Intended for students pursuing a single subject credential. (Formerly course 211B.) Enrollment restricted to graduate students. Enrollment limited to 30. *The Staff*

226. English Teaching: Theory and Curriculum. F

Required for the single subject English credential student. Examines sociocultural approaches to the learning and teaching of English in secondary classrooms, including theories of how children learn English language, literature, and composition. (Formerly course 214A.) Enrollment restricted to education graduate students. *B. Olsen*

227. English Teaching for Secondary Classrooms. W

Prepares English single subject credential candidates for student teaching in winter and spring. Course focuses on developing curricula and strategies in the content area. Through classroom placements, students observe and apply techniques to develop curriculum units used in student teaching. (Formerly course 214B.) Enrollment restricted to graduate students. Enrollment limited to 50. *L. Baker*

228. Math Education: Research and Practice. F

Examines research on the learning and teaching of mathematics. Topics include the nature of mathematics cognition and learning, how children learn mathematics, mathematical discourse, and perspectives on addressing diversity in mathematics classrooms. Course is required for M.A./credential students in secondary (single subject)

mathematics and of Ph.D. students in mathematics education. (Formerly course 213B.) Enrollment restricted to graduate students admitted to the secondary mathematics M.A./credential program and to Ph.D. students in the Education Department. Graduate students in other departments admitted by permission of the instructor. Enrollment limited to 25. *J. Moschkovich*

229. Teaching Mathematics in the Secondary Classroom. W

Examines constructivist and sociocultural approaches to teaching mathematics in the secondary classroom. Course will provide an introduction to mathematics teaching standards and a critical overview of curricula, instructional theories, and multiple approaches to teaching the "big ideas" in secondary mathematics. Required for mathematics secondary credential. (Formerly course 213C.) Prerequisite(s): course 213B. Enrollment restricted to graduate students admitted to the credential program. Enrollment limited to 50. *A. England*

230. Science Education: Research and Practice. F

Examines theoretical approaches to the learning and teaching of science including the nature of scientific knowledge, theories of how children learn science, approaches to scientific discourse, and perspectives on addressing diversity in science classrooms. Course is required for single subjects science credential. (Formerly course 212B.) Enrollment restricted to program enrollees. Enrollment limited to 50. *D. Ash*

231. Teaching Science in the Secondary Classroom. W

Examines constructivist and sociocultural approaches to teaching science in secondary classrooms. Course will provide a critical overview of curricula, instructional theories, and multiple approaches to teaching the "big ideas" in science. (Formerly course 212C.) Enrollment restricted to program enrollees. Enrollment limited to 50. *The Staff*

232. Social Science: Theory and Curriculum. F

Required for the single subject social science credential student. Tracks both the implicit and explicit connections between theory and practice, illustrating that theory suggests best practice while practice informs theory-formation and testing. (Formerly course 215A.) Enrollment restricted to education graduate students. *The Staff*

233. Social Science Teaching for Secondary Classrooms. W

Prepares social science single subject credential candidates for student teaching in winter and spring. Course focuses on developing curricula and strategies in the content area. Through classroom placements, students observe and apply techniques to develop curriculum units that are used in student teaching. (Formerly course 215B.) Enrollment restricted to graduate students. Enrollment limited to 50. *S. Roe*

235. Introduction to Educational Inquiry. F

Addresses foundational knowledge needed to understand and conduct educational inquiry and research. Topics include epistemology in the human sciences, philosophical foundations of modern research strategies, and general classes of research investigations in education. (Formerly course 200A.) Enrollment restricted to education graduate students. Enrollment limited to 15. *R. Ogawa*

236. Quantitative Methods in Educational Research. S

Promotes intermediate-level knowledge of quantitative research methods in educational settings. Students learn

the foundations of quantitative data theory, general logic behind statistical inference, and specific methods of data analysis in educational contexts. (Formerly course 200B.) Prerequisite(s): course 235. Enrollment restricted to graduate students. Enrollment limited to 15. *E. Mosqueda*

237. Qualitative Research Methods. W

Graduate level introduction to qualitative methods, with special attention to ethnographic research on schooling. Moves from overview of different methods, through examination of selected studies, to discussion of issues in research design, data collection, analysis, and writing. (Formerly course 200C.) Enrollment restricted to graduate students; priority is given to graduate students in education. Enrollment limited to 12. *L. Bartlett*

251. Analysis of Activity and Interaction in Educational Settings. W

Analyzes topics, which vary systematically from year to year, including analysis of classroom interaction, video recording and transcription, coding and analysis of discourse data, and software programs for qualitative analysis. (Formerly course 200D, *Advanced Topics in Qualitative Research*.) Prerequisite(s): course 237. Enrollment restricted to graduate students. Enrollment limited to 12. May be repeated for credit. (W) *C. Wells, (S) B. Olsen*

252. Hermeneutics of Education. S

Investigates philosophical hermeneutics to deeply interrogate education. Addresses such questions as: What is hermeneutics? How is education an hermeneutic enterprise? How does knowing hermeneutics deepen the ability to engage in education research? Enrollment restricted to graduate students. Enrollment limited to 12. *B. Olsen*

253. Research Design in Mathematics and Science Education. F

Examines multiple approaches to designing research studies in mathematics and science education. Introduces multiple types of research designs and principles used by education researchers examining mathematics/science learning and teaching. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Moschkovich*

254. Critical and Alternative Paradigms in Education Research. F

Examines theoretical foundations of critical and alternative research paradigms commonly used in education, including critical ethnography, participatory research, counter-storytelling, and social-design experiments. Examines critiques of qualitative/quantitative research from feminist and critical theory; surveys how such critiques have informed the development of new paradigms in education research; and explores the benefits and limits of selected alternative paradigms. Enrollment restricted to graduate students. Enrollment limited to 15. *K. Nygreen*

255. Intermediate Quantitative Methods. W

Focuses on the applied statistical modeling and analysis of educational data (large-scale data sets), not on the mathematical foundations of science. Students learn to address quantitative research questions using general linear model (GLM) statistical methods. GLM includes regression analysis, analysis of variance (ANOVA), and analysis of covariance (ANCOVA). Students learn statistics by doing statistics. Prerequisite(s): introductory statistics course (course 236 or equivalent). Enrollment restricted to Education graduate students. Enrollment limited to 15. *E. Mosqueda*

260A. Math Education and Latinos (2 credits). F

Introduction to research literature relevant to mathematics education and Latinos and topics such as "Language and Mathematics Learning" and "Teaching Mathematics in Bilingual Classrooms." Intended for education Ph.D. students working with the Center for Mathematics Education and Latinos (CEMELA). Seminar extends over three quarters (fall, winter, spring). Enrollment restricted to graduate students. Enrollment limited to 10. *J. Moschkovich*

260B. Math Education and Latinos (2 credits). W

Introduction to research literature relevant to mathematics and Latinos and topics such as "Language and Mathematics Learning" and "Teaching Mathematics in Bilingual Classrooms." Intended for education Ph.D. students working with the Center for Mathematics Education and Latinos (CEMELA). Seminar extends over three quarters (fall, winter, spring). Enrollment restricted to graduate students. Enrollment limited to 10. *J. Moschkovich*

260C. Math Education and Latinos (2 credits). S

Introduction to research literature relevant to mathematics education and Latinos and topics such as "Language and Mathematics Learning" and "Teaching Mathematics in Bilingual Classrooms." Intended for education Ph.D. students working with the Center for Mathematics Education and Latinos (CEMELA). Seminar extends over three quarters (fall, winter, spring). Enrollment restricted to graduate students. Enrollment limited to 10. *K. Téllez*

261. Thinking, Learning, and Teaching. F

Examines multiple theoretical perspectives on thinking, learning, and teaching; the development of the whole person in a variety of cultural contexts; the roles thinking, learning, and teaching play in that development; and how researchers' and educators' conceptions shape instruction. Enrollment restricted to education graduate students. Enrollment limited to 15. *C. Wells*

262. Social and Cultural Context of Education. S

Application of anthropological and sociological theories to study of education. Examines social, cultural, and linguistic context of schooling with particular attention to role of race, class, culture, power, and language in influencing schooling outcomes. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Gibson*

263. Foundations of Educational Reform. S

Core course in Ph.D. program in education providing students with multiple analytic perspectives from which to examine important educational issues by analyzing political, historical, and philosophical origins of educational reform in the U.S. and internationally. Enrollment restricted to graduate students. Enrollment limited to 10. *R. Glass*

264. Research on Teacher Development and Teacher Education. W

Addresses personal and professional development of teachers. Explores models of teacher education with specific attention to methods and processes by which teachers can be better prepared to work with culturally and linguistically diverse students. Enrollment restricted to graduate students. Enrollment limited to 20. *P. Stoddart*

269A. First-Year Doctoral Proseminar (2 credits). F

This three-quarter seminar supports professional development for first-year doctoral students. Students develop essential skills for success as scholars, discuss issues in

educational research and practice, and are introduced to research by Education Department faculty. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

269B. First-Year Doctoral Proseminar (2 credits). W

This three-quarter seminar supports professional development for first-year doctoral students. Students develop essential skills for success as scholars, discuss issues in educational research and practice, and are introduced to research by Education Department faculty. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

269C. First-Year Doctoral Proseminar (2 credits). S

This three-quarter seminar supports professional development for first-year doctoral students. Students develop essential skills for success as scholars, discuss issues in educational research and practice, and are introduced to research by Education Department faculty. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

270A. Second-Year Professional Development Seminar (2 credits). F

Three-quarter seminar supports professional development for second-year doctoral students. Activities include preparation of research and conference proposals, presentation of second-year project findings, and attendance at department colloquia. Enrollment restricted to second-year Ph.D. students. Enrollment limited to 12. *J. Scott*

270B. Second-Year Professional Development Seminar (2 credits). W

Three-quarter seminar supports professional development for second-year doctoral students. Activities include preparation of research and conference proposals, presentation of second-year project findings, and attendance at department colloquia. Enrollment restricted to second-year Ph.D. students. Enrollment limited to 12. *J. Scott*

270C. Second-Year Professional Development Seminar (2 credits). S

Three-quarter seminar supports professional development for second-year doctoral students. Activities include preparation of research and conference proposals, presentation of second-year project findings, and attendance at department colloquia. Enrollment restricted to second-year Ph.D. students. Enrollment limited to 12. *J. Scott*

271. Theoretical Perspectives on Learning and Using Literacy. W

Examines theoretical perspectives, educational issues, and scholarship related to use and development of literacy among diverse populations, particularly those who have not fared well in U.S. schools. (Formerly course 266A.) Enrollment restricted to graduate students. Enrollment limited to 12. *L. Pease-Alvarez*

272. Sociolinguistics in Education. F

Investigates discipline of sociolinguistics and explores actual ways in which sociolinguistics has become a useful lens for better understanding teaching, learning, and schooling. Conduct own sociolinguistic analyses of data collected for culminating project. (Formerly course 266B.) Enrollment restricted to graduate students. Enrollment limited to 15. *B. Olsen*

273. Language Acquisition, Bilingualism, and Education. S

Foundations of first- and second-language acquisition and bilingualism with emphasis on implications for education in linguistically diverse settings. Topics include linguistic, cognitive, sociolinguistic, and sociocultural approaches to development of languages and the nature of individual and societal bilingualism. (Formerly course 266C.) Enrollment restricted to graduate students. Enrollment limited to 20. *G. Bunch*

274. Language and Power in Education. F

Examines relationships between sociopolitical struggles and language/language practices. Students study ways in which Marxism, critical theory, and post structuralism have represented links between language and power, and investigate contemporary studies of language and power in education. (Formerly course 266D.) Enrollment restricted to graduate students. Enrollment limited to 15. *B. Olsen*

275J. Research Seminar in Educational Reform: Supporting Dissertation Writing 279B. F

Familiarizes students with the basic concepts of educational research and facilitates progress toward completion of dissertation while identifying faculty and community resources available to assist in research. Enrollment restricted to Ed.D. graduate students. *The Staff*

275K. Research Seminar in Educational Reform: Supporting Dissertation Writing 279C. W

Familiarizes students with the basic concepts of educational research and facilitates progress toward completion of dissertation while identifying faculty and community resources available to assist in research. Enrollment restricted to Ed.D. graduate students. *The Staff*

275L. Research Seminar in Educational Reform: Supporting Dissertation Writing 279D. S

Familiarizes students with the basic concepts of educational research and facilitates progress toward completion of dissertation while identifying faculty and community resources available to assist in research. Enrollment restricted to Ed.D. graduate students. *The Staff*

276. Theory and Practice of Writing. S

Explores first and second language-writing theory, research, and practice, especially relating to language minority students and others considered academically under-prepared. Focuses on educational settings from pre-school settings including families and communities. (Formerly course 266E.) Enrollment restricted to graduate students. Enrollment limited to 15. *L. Pease-Alvarez, G. Bunch*

278. Critical Exploration of Reading Theory and Practice. W

Doctoral seminar that examines historical and current research on reading processes and instructional practices. Intensive study of factors affecting the development of proficient, engaged, and reflective readers who can acquire new knowledge from text. (Formerly course 266G.) Enrollment restricted to graduate students. Enrollment limited to 15. *J. Scott*

279A. Dissertation Supervision for Ed.D. Sum

Supervision of Ed.D. candidate through third year of research analysis, writing, and editing of dissertation. Preparation for oral defense and assistance with bringing dissertation to standards of publication and conference presentation. Enrollment restricted to Ed.D. graduate students. Enrollment limited to 20. *The Staff*

279B. Dissertation Supervision for Ed.D.. F

Supervision of Ed.D. candidate through third year of research analysis, writing, and editing of dissertation. Preparation for oral defense and assistance with bringing dissertation to standards of publication and conference presentation. Enrollment restricted to Ed.D. graduate students. Enrollment limited to 20. *The Staff*

279C. Dissertation Supervision for Ed.D. W

Supervision of Ed.D. candidate through third year of research analysis, writing, and editing of dissertation. Preparation for oral defense and assistance with bringing dissertation to standards of publication and conference presentation. Enrollment restricted to Ed.D. graduate students. Enrollment limited to 20. *The Staff*

279D. Dissertation Supervision for Ed.D. S

Supervision of Ed.D. candidate through third year of research analysis, writing, and editing of dissertation. Preparation for oral defense and assistance with bringing dissertation to standards of publication and conference presentation. Enrollment restricted to Ed.D. graduate students. Enrollment limited to 20. *The Staff*

280. Academic Language. S

Considers and critiques conceptualizations of the language used for academic pursuits, from the early years of schooling to higher education. Focuses on implications for research and practice related to the education of students in linguistically diverse schools and societies. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Scott, G. Bunch*

281. Conceptual Change in Science and Mathematics. W

Examines approaches in cognitive science, mathematics education, and science education to documenting student conceptions in science and mathematics, defining conceptual change, and describing relationship between conceptual change and learning with understanding. (Formerly course 267A.) Enrollment restricted to graduate students. Enrollment limited to 12. *J. Moschkovich*

282. Informal Learning in Sciences and Mathematics. S

Explores research on learning outside of school in multiple settings such as museums, after-school clubs, aquariums, workplaces, and homes. Readings draw from multiple fields and disciplines, including cognitive psychology, cognitive anthropology, cognitive science, education, museum education and evaluation, science, and mathematics education. Examine theoretical approaches to describing and understanding how people learn science and mathematics outside of school, empirical studies documenting learning in multiple non-school settings, and diversity issues in out-of-school settings. (Formerly course 267B.) Enrollment restricted to graduate students. Enrollment limited to 20. *D. Ash*

283. Equity and Social Justice in Mathematics and Science Education. W

Examines the theory, research, policy and practice of social justice and equity in mathematics and science education in local, national, and international contexts. Emphasizes the promotion of equity and critical mathematics and science literacy in schools and communities. (Formerly course 267C.) Enrollment restricted to graduate students. *J. Shaw*

284. Gender in Mathematics and Science Education. S

Explores basic aspects of gender in the fields of mathematics and science education. Discusses historical trends,

current dilemmas, and how science and mathematics block or enable access for women. (Formerly course 267D.) Enrollment restricted to graduate students. Enrollment limited to 15. *D. Ash*

288. Ethnographies of Education. W

Offers opportunity to critique a range of book-length ethnographic studies of education focusing on relationship between culture, learning, and schooling in the U.S. with comparative studies from other countries. (Formerly course 268A.) Enrollment restricted to graduate students. Enrollment limited to 12. *M. Gibson*

289. School Organization. F

Applies multiple perspectives drawn from organizational theory, highlighting important aspects of organization of schools, including their operational environment, instructional organization, and professional and bureaucratic dimensions. (Formerly course 268B.) Enrollment restricted to graduate students. Enrollment limited to 12. *R. Ogawa*

290. CHAT and Educational Practice and Research. W

Introduction to cultural-historical activity theory (CHAT) based on work of Vygotsky, Bakhtin, and contemporary developments of their ideas. Explores the utility of CHAT as a framework for thinking about educational practice and research. (Formerly course 268C.) Enrollment restricted to graduate students. Enrollment limited to 15. *C. Wells*

291. Comparative and International Education. F

Examines educational access and advancement in several nations affected by globalization, national policies, and localized identity and opportunity structures. Attention to language and cultural expectations relevant to research in international contexts and how this knowledge provides reflection on the American condition. (Formerly course 268D.) Enrollment restricted to graduate students. Enrollment limited to 15. *J. Gordon*

292. Ideology and Education. S

Philosophical study of the theory of ideology from Marx to the present and how ideologies (racism, sexism, classism, linguisticism, abilityism) become embodied, reproduced, resisted, and transformed (and particularly the role of education therein). (Formerly course 268E.) Enrollment restricted to graduate students. Enrollment limited to 22. *R. Glass*

293A. Research Apprenticeship (2 credits). F,W,S

Research apprenticeship under guidance of faculty member during first or second year of doctoral studies. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

293B. Research Apprenticeship. F,W,S

Research apprenticeship under guidance of faculty member during first or second year of doctoral studies. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

294. Second-Year Research Project. F,W,S

Doctoral students work with faculty advisors to plan, carry out, and write up small independent research project during second year of graduate studies. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

295. Critical Theories of Education. W

Investigates critical theories in education. Situates the themes against and within critical theory and philosophic foundations of Paulo Freire's theory of liberation education. Elaborates these themes within the discourses on critical race theory and education, and feminism and education. (Formerly course 268F.) Enrollment restricted to graduate students. Enrollment limited to 15. *R. Glass*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297F. Independent Study (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Electrical Engineering

See Engineering, page 247.

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PROFESSOR DARRELL LONG, Associate Dean for Graduate Studies and Research

Baskin School of Engineering

The Baskin School of Engineering has a high-technology focus incorporating programs and curricula that educate students to meet the changing demands of society and a high-technology global marketplace. The school offers a stimulating academic environment that provides a foundation for professional growth as well as a lifetime of learning. The Baskin School's programs and courses prepare students for the human aspects, as well as the technical challenges, of careers in engineering, computer science, and bioinformatics. The Baskin School of Engineering includes the Department of Applied Mathematics and Statistics, the Department of Biomolecular Engineering, Department of Computer Engineering, the Department of Computer Science, and the Department of Electrical Engineering.

The Department of Technology and Information Management is awaiting approval.

Graduate Study

The Baskin School of Engineering offers 10 graduate programs designed to prepare students for advanced study and research in major areas of biomolecular, computer, and electrical engineering, as well as computer science and statistics and stochastic modeling:

- Bioinformatics M.S. and Ph.D.
- Computer engineering M.S. and Ph.D.
- Computer science M.S. and Ph.D.
- Electrical engineering M.S. and Ph.D.
- Statistics and stochastic modeling M.S. and Ph.D.

These programs are described in subsequent sections. The aim of these programs is to develop professionals who can address the complex scientific and technological problems of today and tomorrow.

Undergraduate Study

The School of Engineering offers 18 undergraduate degree programs. Students may choose from the following options:

- Applied Mathematics and Statistics minor
- Bioengineering B.S.
- Bioinformatics B.S. or combined B.S./Graduate Bioinformatics minor
- Computer engineering B.S. or combined B.S./M.S.
- Computer engineering minor
- Computer science B.A. and B.S.
- Computer science: computer game design B.S.
- Computer science minor
- Computer technology minor
- Electrical engineering B.S.
- Electrical engineering minor
- Information systems management B.S.
- Information systems and technology minor
- Statistics minor

Also available is a dual degree engineering program that allows a student to obtain a B.A. in the social sciences, humanities, or arts from UCSC and a B.S. degree in engineering from UC Berkeley (excluding EECS) by attending UCSC for three years followed by UC Berkeley for two years.

Bioengineering. The bioengineering program prepares graduates for a rewarding career at the interfaces between engineering, medicine and biology. UCSC Bioengineering graduates will have a thorough grounding in the principles and practices of bioengineering and the scientific and mathematical principles upon which they are built; they will be prepared for further education (both formal and informal) and for productive employment in industry. The program includes a broad range of courses in the sciences, engineering, ethics, and other topics, and is co-sponsored by the Departments of Biomolecular Engineering, Computer Engineering, Electrical Engineering, and Molecular, Cell and Developmental Biology.

Bioinformatics. The bioinformatics curriculum combines mathematics, the physical sciences, computer science, and engineering to explore and understand biological data from high-throughput experiments, such as genome sequencing and gene expression chips. The immense growth of biological information stored in computerized databases has led to a critical need for people who can understand the languages, tools, and techniques of mathematics, science, and engineering. The undergraduate bioinformatics degree program

prepares students for graduate school or a career in the fast-paced pharmaceutical or biotechnology industries.

Computer Engineering. The computer engineering curriculum focuses on making digital systems that work. It overlaps with computer science on one end (software systems) and with electrical engineering on the other (digital hardware). The emphasis of our program is on design rather than analysis—on making things work, rather than on explaining the abstract theory of computation or electronics. The program's emphasis on problem solving provides both excellent training for future engineers and a strong foundation for graduate study. The computer engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The combined B.S./M.S. program provides an opportunity for outstanding undergraduates to begin advanced study and earn both degrees in five years.

Computer Science. The computer science curriculum has options that include topics in hardware and software, giving students a solid grounding in both theoretical and practical aspects of computer technology and computer usage. Students become proficient in many areas, with a good academic foundation for various careers in the software industry, as well as preparation for graduate school.

Computer Science: Computer Game Design.

The computer game design curriculum is a four-year interdisciplinary program that focuses on the technical, dramatic, and artistic elements of computer games. The program provides a rigorous education in computer science, in concert with a broad introduction to those aspects of art, music, narrative, digital media, and computer engineering most relevant to games. An intensive year-long game design studio sequence permits students to create substantial video games as part of a multi-student team. Students receive proficiency in many aspects of computer science, a good academic foundation for careers in the computer game industry or information technology industry, or for the pursuit of graduate studies in computer science, or computer game design.

Computer Technology. The computer technology minor is intended for students outside the School of Engineering interested in exploring computer software and hardware. It is particularly recommended for students interested in the use of computer technology in another discipline or in K-12 teaching.

Electrical Engineering. The electrical engineering curriculum provides a balance of engineering science and design and allows students to specialize in both the traditional topics and the latest subjects in electrical engineering. Students may concentrate their electives in the areas of electronics and optics, communications, or signals and systems. The major is designed to attract motivated students who, upon graduation, will be sought by employers in the high-tech industry. The electrical engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Information Systems Management. The information systems management (ISM) curriculum is multidisciplinary and focuses on the fusion of information systems, technology, and business management for two purposes: the use of information systems to solve business problems and the management of technology, which includes new product development and enterprise management. Students must learn the mathematics, science, and technical fundamentals of

computer science and engineering as well as understand the environment in which information technology (IT) solutions will be applied—through economics, business, and management of technology courses. It is a rigorous, challenging major for those students wanting to pursue careers in information systems management and the management of technology.

Statistics. The statistics curriculum is an interdisciplinary program with formal training in the quantification of uncertainty. The minor is designed to give students statistical skills that they can use on applications in their primary major. MS students obtain preparation for careers in technical fields with strong quantitative components. Ph.D. students obtain skills for original state-of-the-art research.

Dual Degree Engineering. The 3/2 program, a five-year program in association with UC Berkeley, enables students to receive two bachelor's degrees: a B.A. in a subject within the social sciences, humanities, or arts at UCSC, and a B.S. in engineering from the College of Engineering at Berkeley (excluding EECS). Many combinations of fields are possible, such as economics, environmental studies or philosophy with civil, mechanical, or industrial engineering. The 3/2 Dual-Degree program is open only to first-year students at the freshman level.

Undergraduate Advising Office

The Baskin School of Engineering Undergraduate Advising office offers general advising for prospective and declared undergraduates majoring in School of Engineering programs. The office handles major declarations, transfer credits, course substitutions, articulations, and degree certifications. Undergraduate students obtain and submit all paperwork requiring departmental approval to the Undergraduate Advising office. Students may obtain additional information and assistance on the School of Engineering web site: www.soe.ucsc.edu/advising/undergraduate/.

Admission to School of Engineering Majors

High School Preparation for Engineering Students

It is recommended that high school students intending to apply to a School of Engineering major have completed four years of mathematics (through advanced algebra and trigonometry) and three years of science in high school. Comparable college mathematics and science courses completed at other institutions also serve to properly prepare students for these majors.

College Board Advanced Placement Credit

Prospective students are encouraged to take the College Entrance Examination Board (CEEB) Advanced Placement (AP) Examinations in computer science, mathematics, economics, chemistry, or biology, because an acceptable score on these examinations may satisfy both university and major degree requirements. Students must provide verification of exam scores to the School of Engineering Undergraduate Advising office and other course-sponsoring departments to be granted credit toward course prerequisites or degree requirements as follows:

Biology: a score of 3, 4, or 5 on the AP Biology exam can be substituted for Biology 3, *Concepts in Biology*, and exempt student from the biology placement exam. A score of 5, 6, or 7 on the IBH Biology exam can be substituted for Biology 3,

Concepts in Biology, and exempt student from the biology placement exam.

Chemistry: a score of 5 on the AP Chemistry exam fulfills the prerequisite for enrollment in Chemistry 1B/M; a score of 5 satisfies Chemistry 1A.

Computer Science: a score of 4 or 5 on Exam A satisfies Computer Science 12A, *Introduction to Programming*, and the associated lab, Computer Science 12L; a score of 4 or 5 on Exam AB satisfies both Computer Science 12A, *Introduction to Programming*, and Computer Science 12B, *Introduction to Data Structures*, and the associated labs, Computer Science 12L, and Computer Science 12M. A score of 5 on the IBH Computer Science exam satisfies Computer Science 12A, *Introduction to Programming*, and the associated lab, Computer Science 12L; a score of 6 or 7 on the IBH Computer Science exam satisfies Computer Science 12A, *Introduction to Programming*, and Computer Science 12B, *Introduction to Data Structures*, and the associated labs, Computer Science 12L, and Computer Science 12M.

Economics: a score of 4 or 5 on the Microeconomics exam satisfies Economics 1, *Introductory Microeconomics*; a score of 4 or 5 on the Macroeconomics exam satisfies Economics 2, *Introductory Macroeconomics*.

Mathematics: a score of 4 or 5 on the Calculus AB exam satisfies Mathematics 19A, *Calculus for Science, Engineering, and Mathematics*, or Economics 11A, *Mathematical Methods for Economists*; a score of 4 or 5 on the Calculus BC exam satisfies both Mathematics 19A-B.

Students may check with the Office of Admissions for details about other AP examinations that also satisfy university requirements.

Admission as First-Year Students

Students interested in declaring a School of Engineering major are encouraged to do so during their first year at UCSC. Some students may be admitted directly into their School of Engineering major of choice at the time they are admitted to UCSC. Students not directly admitted may still apply during their first year and their acceptance into their selected major will be based upon their School of Engineering GPA (described below), their high school grade point average, courses completed in mathematics and sciences, and scores on standardized tests.

First-year applicants to UCSC may apply for direct acceptance to a School of Engineering major by indicating the major as their first or second choice on the application. Applicants will be granted direct acceptance based on their high school grade point average, courses completed in mathematics and sciences, scores on standardized tests, and/or their personal statement.

To take advantage of direct acceptance, first-year students must complete the declaration of major process in their first term at UCSC or forfeit their direct acceptance status.

Post First-Year Current Students Acceptance to Majors

Any student admitted to UCSC as a lower-division student that has completed 3 or more quarters at UCSC can apply to declare a School of Engineering major upon completion (with a grade of C or better) of all the foundation courses for that major. Application

details can be found at <http://www.soe.ucsc.edu/advising/undergraduate/>.

School of Engineering GPA Calculation

The School of Engineering GPA is calculated on grades received for all School of Engineering and Physical and Biological Sciences courses. Students are strongly advised not to request Pass/No Pass grading in any School of Engineering or Division of Physical and Biological Sciences courses since a grade of P is treated as a C for calculating the School of Engineering GPA regardless of the content of the evaluation. No Pass grades are treated as an F. Although the campus GPA excludes the first 15 units of repeated courses from the GPA calculation, all attempts are included in the School of Engineering GPA calculation. The School of Engineering GPA is used in determining acceptance into School of Engineering majors and the School of Engineering disqualification process described later in this section.

Junior Transfer Acceptance to Majors

The School of Engineering strongly encourages applications from transfer students. Due to the prerequisite structure for upper-division courses, prospective transfer students should have completed as many of the lower-division requirements for the respective majors as possible to complete the degree within a reasonable time. Students must plan carefully because many courses must be taken sequentially.

Transfer students should **not** follow the Intersegmental General Education Transfer Curriculum (IGETC) because it will not provide transfer students with enough mathematics and engineering courses to allow them to complete School of Engineering programs at UCSC in two years.

Students who apply as transfer students with junior status (90 quarter credits or more of transfer credit) who wish to earn a degree from the School of Engineering must indicate a School of Engineering major as their first choice on their UC application. (Students may also indicate an alternative School of Engineering major as their second choice.)

Junior transfers who do not list a School of Engineering major on their application to UCSC will not be considered for admission to such majors after the first day of their first quarter on campus.

Acceptance into the major is based on the student's academic college record. Applicants are encouraged to take and excel in as many courses that are equivalent to the department's foundation courses as possible. For many School of Engineering majors, completion of a year of calculus (accepted as equivalent to Mathematics 19A-B), linear algebra, differential equations, a year of calculus-based physics courses (accepted as equivalent to Physics 5A, 5B, 5C), and two programming courses (accepted as equivalent to Computer Science 12A, Computer Science 12B, or Computer Engineering 12/L) are strongly recommended. An applicant will be approved, conditionally approved, or declined. Only students who have completed most or all of the foundation courses will be approved or conditionally approved for the major.

Students who are approved for acceptance and who have course credit for all the foundation courses for their major must declare the major in their first term of enrollment at UCSC. The status of students who are approved for acceptance but who, upon review of their transcripts, are found not to have course credit for all the foundation courses for their major will be changed to conditionally approved.

Students who are conditionally approved must complete the remaining required foundation courses for their major in their first term at UCSC and declare the major at the beginning of the following term at UCSC. Conditionally approved students will be evaluated based upon their performance in the foundation courses attempted during their first term at UCSC. Students who are conditionally approved for the major should be prepared to declare an alternative major outside of the School of Engineering in case they are unsuccessful in their attempt to complete their remaining foundation courses.

Students whose petitions are denied may still be admitted to UCSC, but they may not reapply for acceptance to engineering major(s) for which they were originally considered.

Course Substitutions: The School of Engineering Undergraduate Advising office may require that a Petition for Course Substitution be approved before credit for a course completed at another institution can be applied to any School of Engineering major requirement. The Undergraduate Advising staff can help determine if this petition process is necessary based on transcript information provided to them by the student. This petition is in addition to and separate from the transfer credit awarded by the university. Forms are available at the Undergraduate Advising office. Each petition must be accompanied by a course description, syllabus, and verification of the number of credits earned with a grade of C or better. To guarantee equivalency, departments may sometimes require a grade of B or better. It is very helpful if students can provide further evidence of course content, such as examples of programming assignments, homework, or examinations.

Appeal Process

Appeal of negative decisions concerning School of Engineering admission will be evaluated by the academic program to which the student applied. Appeal letters must be submitted in writing to the Undergraduate Advising office within the time frame given in the letter of denial. Late appeals will not be considered. Letters of appeal should describe any extenuating circumstances that might affect the faculty's evaluation of the record.

Students whose petitions and appeals have been turned down may not reapply for the same major.

Letter Grade Policy

The School of Engineering strongly advises students to request letter grades in all foundation courses for all engineering concentrations. Many majors in the School of Engineering have additional restrictions on the use of the Pass/No Pass option. Foundation courses should not be taken Pass/No Pass because doing so may lower students' School of Engineering GPA and affect their admission into School of Engineering majors. Major grade requirements are as follows:

Bioengineering major: All courses required for the major must be taken for a letter grade. Two lower-division exceptions are allowed.

Bioinformatics major: Same as campus requirements, but foundation courses should not be taken Pass/No Pass, since doing so may lower the declaration GPA needed for admission to the major.

Computer engineering major: All courses required for the major must be taken for a letter grade. Two lower-division exceptions are allowed.

Computer engineering minor: Same as campus requirements.

Computer science major and minor: All courses required for the major and minor must be taken

for letter grades. Two lower-division exceptions are allowed.

Computer game design major and minor: All courses required for the major and minor must be taken for letter grades. Two lower-division exceptions are allowed.

Electrical engineering major: All courses required for the major must be taken for letter grades. Two lower-division exceptions are allowed (not to include Electrical Engineering 70).

Information systems management major: All courses required for the major must be taken for letter grades. Two lower-division exceptions are allowed (not to include Information Systems Management 50 or 58).

Statistics minor: same as campus requirements.

Note: for admission into any School of Engineering major, a grade of Pass is treated as a C, which may adversely affect your admission to the major.

Disqualification Policy

GPA Requirement

Your cumulative School of Engineering GPA is calculated from all School of Engineering and Physical and Biological Sciences courses attempted. Your term School of Engineering GPA is calculated from all School of Engineering and Physical and Biological Sciences courses you have taken in the previous quarter as a UCSC student.

If both your cumulative and term School of Engineering GPAs are 2.0 or greater, you are in good departmental standing. If either your cumulative or term GPAs are less than 2.0, you are on departmental probation. If you are on departmental probation and your cumulative School of Engineering GPA is below 2.0 at the beginning of the next quarter, you are subject to disqualification from the major. If your term School of Engineering GPA falls below 1.5 in any term, you are also subject to disqualification from the major. All students that are subject to disqualification are reviewed by their departmental faculty to determine whether to require the student to choose a different major or to be on departmental probation.

Ethics Requirement

Graduates of the Baskin School of Engineering are expected to become professionals with the highest ethical standards. Knowledge and practice of professional ethics is a requirement for the degree. Examples of professional society codes of ethics are available at www.ieee.org/about/whatis/code.html and www.acm.org/serving/se/code.htm. Students of the Baskin School of Engineering are also expected to adhere to high ethical standards while pursuing their undergraduate studies.

Students found guilty of a single incident of academic dishonesty may, at the discretion of the department, be disqualified from the major. In addition, students may be subject to other possible university sanctions. A second incident of academic dishonesty will result in automatic disqualification from the major.

Additional Notes on Disqualification

Please note the Repeating Courses policy in the School of Engineering section of this catalog. Two failed attempts in a class will endanger your opportunity to continue in a School of Engineering major.

Bioinformatics, Computer Engineering, and Computer Science have additional disqualification criteria. Please see those sections of this catalog for details.

Repeating Courses

No School of Engineering course may be attempted more than twice without prior approval from the chair of the department offering the course. A class in which a W is given is counted as an attempt.

Courses Taken Elsewhere After Enrollment

It is the intent of the faculty of the Baskin School of Engineering that all degree requirements be completed at UCSC or prior to first enrollment at UCSC. Course substitutions, such as taking a course at another UC campus, in the Education Abroad Program, or at a community college, require approval prior to taking the class. Applications and procedures for pre-approval are obtained from and given to the School of Engineering Undergraduate Advising office.

Articulation agreements do not apply to enrolled students. You must get pre-approval before taking a class at a community college.

When a student declares their major, minor, or proposed major in a School of Engineering program, the decision as to whether a course taken elsewhere is accepted for this School of Engineering major or minor is made by the major department at that point. (Note: There is no guarantee that a course will be applicable toward a School of Engineering major, minor, or proposed major even if the student has completed more advanced courses in that department.)

School-Wide Information and Policies

Computing Facilities

The Baskin School of Engineering houses research facilities and teaching laboratories in the Baskin Engineering Building for courses in programming, software design, circuits, electronics, graphics, digital design, and computer and system architecture. Emphasis in these laboratories is on state-of-the-art equipment, including personal computers, engineering workstations, a 1000-processor Linux cluster, logic analyzers, microprocessor development systems, a wireless network for mobile computers, and network support at 100MB/sec.

All Unix computers and workstations and most personal computers on campus are networked together, allowing students to access the School of Engineering and the Information Technology Services (ITS) facilities from any computer account on campus. For a more complete description of the computing facilities on campus, see <http://its.ucsc.edu>.

Prerequisites

Because of the sequential nature of the School of Engineering curricula, most courses have prerequisites, which are listed in the course descriptions. Students should carefully review these descriptions in the catalog and the quarterly *Schedule of Classes*. Students must have passed all prerequisites of a course for which they are enrolling. Pre-enrolled students who then fail a prerequisite are no longer eligible to be enrolled in the course and will be dropped.

For example, to enroll in Computer Science 101, a prerequisite to many upper-division courses, the prerequisite courses that must be completed or in progress are Computer Science 12B (or 13H), Computer Engineering 16, Mathematics 19B, and one of the following: Mathematics 21, 22, 23A, 24, or Applied Mathematics and Statistics 10.

Students who have transferable course work from another institution that appears to satisfy a UCSC course prerequisite should promptly consult with the School of Engineering's staff advisers. Students will be

asked to present records from the other institution to document the course equivalency. Until such evidence has been verified by the department, students attempting to enroll in a course using a prerequisite course that was not completed at UCSC will be informed that they have not satisfied the course prerequisite. (See the Course Substitutions section under Admission to School of Engineering Majors.)

Permission Numbers

Students not meeting the regular prerequisite requirements for courses sponsored by the Baskin School of Engineering may petition the course instructor to receive a permission number to enroll. Students requesting a permission number must submit the form found at www.soe.ucsc.edu/advising/undergraduate/pdf/prereq_waiver.pdf to the instructor. The instructor may ask a student to demonstrate the ability and/or potential to succeed in the course or may request additional information to formulate a decision. If no instructor has been assigned to the course, please contact the Undergraduate Advising office for direction.

Materials Fee

Students should be aware that some laboratory courses require each student to purchase miscellaneous parts or a material kit for completion of the laboratory work. Some laboratory courses may include consumable (one-time use) parts and materials that are distributed to the entire class. Some laboratory kits include parts that the student will assemble into a project and keep. Please refer to the Baskin Engineering Lab Support web page for specific course material fee amounts: www.soe.ucsc.edu/administration/labs/.

Miscellaneous Fees

Miscellaneous breakage or loss of equipment fees are assessed to address the cost of damaged laboratory equipment and loss of laboratory materials due to abuse or negligence. This fee is only charged if a student breaks or loses laboratory equipment or materials and is not a mandatory fee charged to all students taking the course. Please refer to the Baskin Engineering Laboratory Support web page for more information: www.soe.ucsc.edu/administration/labs/.

Lower-Division Courses

50. Engineering Mechanics. W

An introduction to statics and engineering graphics, and their applications. Topics include equilibrium of two-dimensional and three-dimensional systems, work and potential energy, virtual work, orthographic projections and descriptive geometry, engineering drawing, computer graphics and modeling, and empirical equations. Prerequisite(s): Physics 5A/L or 6A/L, and concurrent enrollment in course 50L. *K. Groppi*

50L. Engineering Mechanics Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 50. One two-hour laboratory session per week. Students are billed a materials fee. Prerequisite(s): Physics 5A/L or 6A/L, and concurrent enrollment in course 50. *K. Groppi*

Applied Mathematics and Statistics

Faculty and Professional Interests

Professor

DAVID DRAPER

Bayesian statistics, hierarchical modeling, nonparametric methods, model specification and model uncertainty, quality assessment, risk assessment, statistical applications in the environmental, medical, and social sciences

HERBERT LEE

Bayesian statistics, computational statistics, spatial statistics, inverse problems, model selection and model averaging, nonparametric regression, neural networks, classification and clustering

MARC MANGEL

Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

BRUNO SANSÓ

Bayesian spatio-temporal modeling, environmental and geostatistical applications, modeling of extreme values, statistical assessment of climate variability

Associate Professor

NICHOLAS BRUMMELL

Fluid dynamics; magnetohydrodynamics; numerical simulations of geophysical and astrophysical dynamics, especially solar interior physics; supercomputing

ATHANASIOS KOTTAS

Bayesian nonparametric, analysis of computer model experiments, mixture models, quantile regression, spatial statistics, survival analysis, applications in ecology and engineering

RAQUEL PRADO

Bayesian non-stationary time series modeling, multivariate time series, biomedical signal processing and statistical genetics

HONGYUN WANG

Molecular modeling and biophysics, numerical analysis, fluid mechanics, computer animation, partial differential equations, parallel computing, statistical physics, data structures, fast algorithms

Assistant Professor

PASCALE GARAUD

Astrophysics, geophysics, fluid dynamics, numerical resolutions of differential equations, mathematical modeling of natural flows

QI GONG

Computational methods for real-time control systems, trajectory optimization and motion planning, nonlinear filtering and observer design, robust and adaptive control of nonlinear systems, industry applications of control theory

ABEL RODRÍGUEZ

Bayesian nonparametrics, Bayesian time series and spatial models, public health, financial econometrics, structural proteomics

Associate Adjunct Professor

ROBIN MORRIS

Earth remote sensing, active remote sensing, particle and astroparticle physics, materials science, computer vision, computational complexity, audio signal processing, sensor networks

Assistant Adjunct Professor

ERIC ANDERSON

Statistical methods in fisheries management and ecology; parentage inference of species hybrids; genetic stock identification

Lecturer

JONATHAN R. KATZNELSON

Mathematical methods for economists, number theory

BRUNO MENDES

Applied mathematical and statistical modeling, environmental risk assessment and geophysics



Professor

ANDREW T. FISHER (Earth Sciences)

Hydrogeology, crustal studies, coupled flows, modeling

GARY A. GLATZMAIER (Earth Sciences)

Computer simulation of geodynamics and planetary dynamics

DAVID HAUSSLER (Biomolecular Engineering; Director, Institute for Quantitative Biomedical Research)

Molecular evolution, neurodevelopment, genomics, bioinformatics, computational molecular biology, statistical models, machine learning, neural networks

DAVID P. HELMBOLD (Computer Science)

Machine learning, computational learning theory, analysis of algorithms

RICHARD MONTGOMERY (Mathematics)

Celestial mechanics, differential geometry, gauge theory, mechanics (quantum and classical), and control theory

KATIA OBRACZKA (Computer Engineering)

Computer networks, distributed systems, operating systems, Internet information systems, mobile computing, wireless networks

MANFRED WARMUTH (Computer Science)

Online learning, machine learning, statistical decision theory, neural computation, analysis of algorithms

PETER YOUNG (Physics)

Condensed matter theory, statistical mechanics

Associate Professor

ROBERTO MANDUCHI (Computer Engineering)

Sensor processing and image analysis with application to assistive technology and environmental modeling

HAMID SADJADPOUR (Electrical Engineering)

Wireless communication systems, coding and information theory, ad hoc and sensor networks

JACK VEVEA (Psychology)

Applied statistics, item response theory, mathematical models for bias in memory, statistical methods for meta-analysis

Assistant Professor

WILLIAM DUNBAR (Computer Engineering)

Theory and application of feedback control, air traffic control, nanopore sensors, dynamics and control of biomolecules

GABRIEL ELKAIM (Computer Engineering)

Embedded systems; robust software architectures for real-time reactive systems; sensor fusion; guidance, navigation, and control (GNC) system identification; robust and advanced control schemes; feedback control systems, robotics; unmanned autonomous vehicles (UAVs); and cooperative control

YI ZHANG (Information Systems Management)

Information retrieval, knowledge management, natural language processing, machine learning

Program Description

Applied mathematics and statistics are disciplines devoted to the use of mathematical methods and reasoning to solve real-world problems of a scientific or decision-making nature in a wide variety of subjects, principally (but not exclusively) in engineering, medicine, the physical and biological sciences, and the social sciences. Applied mathematical modeling often involves the use of systems of (partial) differential equations to describe and predict the behavior of complex real-world systems that unfold dynamically in time. Statistics, construed broadly, is the study of uncertainty: how to measure it (using ideas and methods in probability theory), and what to do about it (using concepts from statistical inference and decision theory).

The Applied Mathematics and Statistics Department at UCSC offers both a master's program and a doctoral program in statistics and stochastic modeling. The goal of these programs is to help students develop into independent scholars who are prepared for productive careers in research, teaching, and industry. The department also offers a parenthetical notation in statistics, a minor in statistics, and a minor in applied mathematics. Additional information on these programs can be found on the department's web pages at www.soe.ucsc.edu.

Undergraduate Programs**Requirements for an Undergraduate Minor in Statistics**

The statistics minor is available for students who wish to gain a quantitative understanding of how to (a) measure uncertainty and (b) make good decisions on the basis of incomplete or imperfect information, and to apply these skills to their interests in another field. This minor could also be combined with a major in mathematics as a preparation for a graduate degree in statistics or biostatistics.

Students are required to take a two-quarter basic calculus sequence:

Basic calculus sequence:

- Applied Mathematics and Statistics 11A-B or Economics 11A-B or Mathematics 11A-B or Mathematics 19A-B or Mathematics 20A-B
- Plus one course from each of the following nine categories:
 - Statistical Concepts: Applied Mathematics and Statistics 5 or 7/L
 - Computer Programming: Bioinformatics 60 or Computer Science 12A/L or 5C or 5J or 5P or Computer Engineering 13/L
 - Engineering Mathematics or Linear Algebra: Applied Mathematics and Statistics 27/L or Applied Mathematics and Statistics 10 or Mathematics 21
 - Multivariate Calculus: Mathematics 22 or 23A
 - Probability: Applied Mathematics and Statistics 131 or Computer Engineering 107

- Statistical Inference: Applied Mathematics and Statistics 132 or Applied Mathematics and Statistics 162
- Computational Methods: Applied Mathematics and Statistics 147
- Bayesian Statistics: Applied Mathematics and Statistics 206
- Statistical Elective: Applied Mathematics and Statistics 198, or Applied Mathematics and Statistics 205A, or Biomolecular Engineering 205, or Computer Engineering 108, or Economics 114, or Electrical Engineering 151, or Mathematics 114, or Psychology 181, or Sociology 103A

Students planning graduate work in statistics are recommended to choose Mathematics 23A and Applied Mathematics and Statistics 205A, and also to take Mathematics 23B and Mathematics 105A-B.

Requirements for an Undergraduate Minor in Applied Mathematics

The applied mathematics minor is available for students who wish to develop (1) proficiency in modeling real-life problems using mathematics and (2) knowledge of standard, practical analytical and numerical methods for the solution of these models. This minor could be combined with a major in any of the physical, biological, mathematical, or engineering sciences as preparation for a graduate degree in that field or in applied mathematics.

Students are required to take the four-quarter calculus sequence:

- *Calculus Sequence*: Mathematics 19A-B and Mathematics 23A-B
- Plus one of the following sequences:
 - Applied Mathematics and Statistics 10 and 20
 - Mathematics 21, Mathematics 24, and Applied Mathematics and Statistics 27L
 - Physics 116A, Physics 116B, and Applied Mathematics and Statistics 27L
- Plus one course from each of the following categories:
 - *Probability Theory*: Applied Mathematics and Statistics 131 or Computer Engineering 107
 - *Dynamical Systems*: Applied Mathematics and Statistics 114 or Applied Mathematics and Statistics 214
 - *Introduction to Numerical methods*: Applied Mathematics and Statistics 147, Physics 115, or Earth Sciences 119
 - *Partial Differential Equations*: Applied Mathematics and Statistics 212A, Physics 116C, or Mathematics 106B
- Plus one applied-mathematics elective from the following list:
 - Applied Mathematics and Statistics 107/217, 115/215, 132, 198, 212B, 213, 216, 231, 290B

Students may also propose other electives which use applied mathematical methods, subject to approval by the department.

Graduate Programs (M.S., Ph.D.)**Requirements for a Graduate Degree in Statistics and Stochastic Modeling**

All students must complete the core courses described below (30 units) and a 3-unit course on research and teaching, together with participation in a 2-unit research seminar (Applied Mathematics and Statistics

280B) for one quarter per year. M.S. students must complete two additional 5-unit courses from the approved list, for a total requirement of 43 units. Ph.D. students must complete four additional 5-unit courses from the approved list, for a total requirement of 53 units.

The core courses for the M.S. and Ph.D. in statistics and stochastic modeling are:

Applied Mathematics and Statistics

- 205A *Mathematical Statistics* (M.S.)
- 205B *Statistical Inference* (Ph.D.)
- 206 *Bayesian Statistics*
- 207 *Intermediate Bayesian Modeling*
- 211 *Applied Mathematical Methods I*
- 256 *Linear Statistical Models*
- 280B *Seminar in Statistics and Stochastic Modeling*

Computer Science

- 200 *Research and Teaching in Computer Science and Engineering*

For students seeking a parenthetical degree notation in applied mathematics, the core courses for the Ph.D. in statistics and stochastic modeling are:

Applied Mathematics and Statistics

- 205A *Mathematical Statistics or 205B Statistical Inference*
- 211 *Foundations of Applied Mathematics for Science and Engineering*
- 212A *Applied Mathematical Methods I*
- 212B *Applied Mathematical Methods II*
- 213 *Numerical Solutions Differential Equations*
- 214 *Applied Dynamical Systems*
- 280B *Seminar in Statistics and Stochastic Modeling*

Computer Science

- 200 *Research and Teaching in Computer Science and Engineering*

M.S. students may substitute course 205B for 205A. M.S. students will be allowed to substitute up to two courses with their required research project in which they conduct a research program in one or two of the quarters of their second year. The project will consist of solving a problem or problems from the selected area of application and will be presented to the sponsoring faculty member as a written document.

Ph.D. students will be required to serve as teaching assistants for at least two quarters during their graduate study. Certain exceptions may be permitted for those with extensive prior teaching experience or those who are not allowed to be employed due to visa regulations.

Qualifying Examinations

At the end of the first year, all students will take a pre-qualifying examination covering the six (non-seminar) core courses. This examination will have two parts: an in-class written exam, followed by a take-home project involving data analysis. Students who do not pass this exam will be allowed to retake it before the start of the following fall quarter; if they fail the second examination they will be dismissed from the program.

Ph.D. students must complete the oral proposal defense, through which they advance to candidacy, by the end of the spring quarter of their third year. The proposal defense is a public seminar as part of an oral qualifying examination given by the qualifying committee.

Thesis and/or Dissertation Requirements

A capstone project is required for the M.S. degree and a dissertation for the Ph.D. degree.

For the M.S. degree, students will conduct a capstone research project in their second year (up to three quarters). Students must submit a proposal to the potential faculty sponsor by the start of the fourth academic quarter. If the proposal is accepted, the faculty member will become the sponsor and will supervise the research and writing of the project. The project will involve the solution of a problem or problems from the selected area of application. When the project is completed and written, it will be submitted to and must be accepted by a committee of two individuals, consisting of the faculty adviser and one additional reader. Additional readers will be chosen appropriately from within the Applied Mathematics and Statistics Department or outside of it. Either the adviser or the additional reader must be from within the Applied Mathematics and Statistics Department.

A dissertation is required for the Ph.D. degree. Ph.D. students must select a faculty research adviser by the end of the second year. A written dissertation proposal will be submitted to the adviser, and filed with the graduate secretary. A qualifying examination committee will be formed, consisting of the adviser and three additional members, approved by the Chair of the Graduate Program and the Dean of the Graduate Division. The student will submit the written dissertation proposal to all members of the committee and the graduate secretary no less than one month in advance of the qualifying examination. The dissertation proposal will be formally presented in a public oral qualifying examination with the committee, followed by a private examination. Students will advance to candidacy after they have completed all course requirements (including removal of all incompletes), passed the qualifying examination, and paid the filing fee. Under normal progress, a student will advance to candidacy by the end of the spring quarter of her/his third year. A student who has not advanced to candidacy by the start of the fourth year will be subject to academic probation. Upon advancement to candidacy, a dissertation reading committee will be formed, consisting of the dissertation supervisor and at least two additional readers appointed by the Graduate Program chair upon recommendation of the dissertation supervisor. At least one of these additional readers must be in the Applied Mathematics and Statistics Department. The committee is subject to the approval of the Graduate Division.

The dissertation will consist of a minimum of three chapters composed of material suitable for submission and publication in major professional journals in statistics and stochastic modeling. The completed dissertation will be submitted to the reading committee at least one month before the dissertation defense, which consists of a public presentation of the research followed by a private examination by the reading committee. Successful completion of the dissertation defense is the final requirement for the Ph.D. degree.

Relationship of Masters and Doctoral Programs

The M.S. and Ph.D. programs are freestanding and independent, so that students can be admitted to either. Students completing the M.S. program may proceed into the Ph.D. program, and students in the Ph.D. program will receive a M.S. degree upon completion of M.S. requirements, including the capstone research project. Each Ph.D. student will be required to have knowledge of statistics and stochastic modeling equivalent to that required for the M.S. degree. In addition, Ph.D. candidates will be required to complete coursework beyond the M.S. level.

Transfer Credit

Up to three School of Engineering courses fulfilling the degree requirements of either the M.S. or Ph.D. degrees may be taken before beginning the graduate program through the concurrent enrollment program. Ph.D. students who have previously earned a master's degree in a related field at another institution may substitute courses from their previous university with approval of the adviser and the graduate committee. Courses from other institutions may not be applied to the M.S. degree course requirements.

Petitions should be submitted along with the transcript from the other institution or UCSC Extension. For courses taken at other institutions, copies of the syllabi, exams, and other course work should accompany the petition. Such petitions are not considered until the completion of at least one quarter at UCSC. At most, a total of three courses may be transferred from concurrent enrollment and other institutions.

Review of Progress

Each year, the faculty reviews the progress of every student. Students not making adequate progress toward completion of degree requirements are subject to dismissal from the program (see the Graduate Handbook for the policy on satisfactory academic progress.) For specific guidelines on the annual student reviews, please refer to <http://www.soe.ucsc.edu/programs/ssm/graduate/index.html>.

Lower-Division Courses

2. Pre-Statistics. S

Reviews and introduces mathematical methods useful in the elementary study of statistics, including logic, real numbers, inequalities, linear and quadratic equations, functions, graphs, exponential and logarithmic functions, and summation notation. Prerequisite(s): Mathematics 2 or placement exam score of 20 or higher. (General Education Code(s): Q.) *B. Mendes, The Staff*

3. Precalculus for Science and Engineering. F,W

Includes real numbers, inequalities, linear and quadratic equations, functions, inverse graphs, exponential and logarithmic functions, trigonometry, and analytic geometry, and their use in real-world problems. Students cannot receive credit for both this course and Mathematics 3. Mathematics 3 can substitute for course 3. Prerequisite(s): score of 20 or higher on Mathematics Placement Exam or Mathematics 2. (General Education Code(s): Q.) *B. Mendes, The Staff*

5. Statistics. F,W,S

Introduction to statistical methods/reasoning, including descriptive methods, data-gathering (experimental design and sample surveys), probability, interval estimation, significance tests, one- and two-sample problems, categorical data analysis, correlation and regression. Emphasis on applications to the natural and social sciences. Students cannot receive credit for this course if they have already received credit for course 7. (General Education Code(s): IN, Q.) *The Staff, H. Lee, A. Rodriguez, B. Sansó, A. Kottas*

7. Statistical Methods for the Biological, Environmental, and Health Sciences. F,W,S

Case-study-based introduction to statistical methods as practiced in the biological, environmental, and health sciences. Descriptive methods, experimental design, probability, interval estimation, hypothesis testing, one- and two-sample problems, power and sample size calculations, simple correlation and simple linear regression, one-way

analysis of variance, categorical data analysis. (Formerly *Statistical Methods for the Biological and Environmental Sciences*.) Prerequisite(s): score of 31 or higher on mathematics placement exam, course 3, 11A, Mathematics 3, 11A, 19A or by permission of instructor. Concurrent enrollment in course 7L is required. (General Education Code(s): IN, Q.) *H. Lee, D. Draper, R. Prado*

7L. Statistical Methods for the Biological, Environmental, and Health Sciences Laboratory. (2 credits). F,W,S

Computer-based laboratory course in which students gain hands-on experience in analysis of data sets arising from statistical problem-solving in the biological, environmental, and health sciences. Descriptive methods, interval estimation, hypothesis testing, one- and two-sample problems, correlation and regression, one-way analysis of variance, categorical data analysis. (Formerly *Statistical Methods for the Biological and Environmental Sciences Laboratory*.) Prerequisite(s): score of 31 or higher on mathematics placement exam, course 3, 11A, Mathematics 3, 11A, 19A, or by permission of instructor. Concurrent enrollment in course 7 is required. *H. Lee, D. Draper, R. Prado*

10. Mathematical Methods for Engineers I. F,S

Applications-oriented course on complex numbers and linear algebra integrating MATLAB as a computational support tool. Introduction to complex algebra. Vectors, basis and transformations. Matrix algebra. Solutions of linear systems, inverse and determinants. Eigenvalues and eigenvectors. Geometric transformations. Students cannot receive credit for this course and for courses 10A or 27L or Mathematics 21. (Formerly course 27, *Mathematical Methods for Engineers*.) Prerequisite(s): Score of 40 or higher on mathematics placement exam, or course 3, or Mathematics 3. (General Education Code(s): Q.) *The Staff, N. Brummell, B. Mendes, H. Wang*

10A. Basic Mathematical Methods for Engineers I. (3 credits). F,S

Applications-oriented course on complex numbers and linear algebra integrating MATLAB as a computational support tool. Introduction to complex algebra. Vectors, basis and transformations. Matrix algebra. Solutions of linear systems, inverse and determinants. Students cannot receive credit for this course and courses 10 or 27L or Mathematics 21. Prerequisite(s): Score of 40 or higher on mathematics placement exam, or course 3, or Mathematics 3. *The Staff, N. Brummell, B. Mendes, H. Wang*

11A. Mathematical Methods for Economists. F,W,S

Mathematical tools and reasoning, with applications to Economics 1. Topics are drawn from differential calculus and include limits, continuity, techniques of differentiation, differentials, relative and absolute extrema, and applied optimization. (Also offered as Economics 11A. Students cannot receive credit for both courses.) Students who have already taken Mathematics 11A and 19A should not take this course. Prerequisite(s): score of 31 or higher on Math Placement Exam. Students who do not place into precalculus should enroll in Mathematics 2. (General Education Code(s): IN, Q.) *J. Katznelson*

11B. Mathematical Methods for Economists. F,W,S

Mathematical tools and reasoning, with applications to Economics 2. Topics are drawn from integral calculus and multivariable calculus, including indefinite and definite integrals, separate differential equations, partial derivatives, total differentials, optimization in several variables,

and Lagrange multiplier. (Also offered as Economics 11B. Students cannot receive credit for both courses.) Prerequisite(s): course 11A, Economics 11A, Mathematics 11A, or Mathematics 19A. (General Education Code(s): IN, Q.) *J. Katznelson*

20. Mathematical Methods for Engineers II. W

Applications-oriented class on ordinary differential equations (ODEs) and systems of ODEs using MATLAB as a computational support tool. Linear ODEs and systems of linear ODEs. Nonlinear ODEs using substitution and Laplace transforms. Phase-plane analysis. Introduction to numerical methods. Students cannot receive credit for this course and for courses 20A or 27L or Mathematics 24. Prerequisite(s): Mathematics 19B, and course 10 or 10A or Mathematics 21. *Q. Gong, The Staff*

20A. Basic Mathematical Methods for Engineers II (3 credits). W

Applications-oriented class on ordinary differential equations (ODEs) and systems of ODEs integrating MATLAB as a computational support tool. Linear ODEs and systems of linear ODEs. Nonlinear ODEs using substitution and Laplace transforms. Students cannot receive credit this course and for courses 20 or 27L or Mathematics 24. Prerequisite(s): Mathematics 19B, and course 10 or 10A or Mathematics 21. *Q. Gong, The Staff*

27L. MATLAB for Engineers Laboratory (2 credits). W

Introduction to MATLAB; elementary programming. Visualization of functions and data. Linear algebra and numerical solutions of differential equations using the supplied MATLAB programs. Previous knowledge of linear algebra and differential equation is expected. (Formerly *Mathematical Methods for Engineers Laboratory*) Enrollment limited to 40. *The Staff*

80A. Gambling and Gaming. *

Games of chance and strategy motivated early developments in probability, statistics, and decision theory. Course uses popular games to introduce students to these concepts, which underpin recent scientific developments in economics, genetics, ecology, and physics. (General Education Code(s): Q.) *A. Rodriguez*

Upper-Division Courses

107. Introduction to Fluid Dynamics. W

Fundamental topics in fluid dynamics. Euler and Lagrange descriptions of continuum dynamics. Conservation laws for inviscid and viscous flows. Potential flows. Exact solutions of the Navier-Stokes equation. Boundary layer theory. Gravity waves. Students cannot receive credit for this course and Applied Mathematics and Statistics 217. (Also offered as Physics 107. Students cannot receive credit for both courses.) Prerequisite(s): course 27 or 20 or 20A, or Physics 116A and 116B and 116C, or equivalent. *N. Brummell*

113. Managerial Statistics. *

Practical methods for analyzing data relevant to the management sciences, with particular emphasis on information systems management. Reviews basic topics in probability and statistics, including correlation and simple linear regression and multiple regression. Experience using statistical software package. Case studies drawn from business problems. Students cannot receive credit for this course and Economics 113. Prerequisite(s): course 11B or Economics 11B or Mathematics 11B or 19B. (General Education Code(s): Q.) *H. Lee*

114. Introduction to Dynamical Systems. W

Linear difference equations and the calculus of differences. Nonlinear difference equations and maps. Fixed points, stability, bifurcations, and cycles. The logistic map and the period-doubling cascade to chaos. Strange attractors and measures of chaos. Students cannot receive credit for this course and Mathematics 145. (Formerly course 146.) Prerequisite(s): course 27 or 20 or 20A, or Mathematics 27 or Mathematics 21 and 24. *P. Garaud*

115. Stochastic Modeling in Biology. S

Application of differential equations, probability, and stochastic processes to problems in cell, organismal, and population biology. Topics include life-history theory, behavioral ecology, and population biology. Students may not receive credit for this course and course 215. Prerequisite(s): course 131, a university-level course in biology, and operational knowledge of a programming language; or consent of instructor. *M. Mangel*

131. Introduction to Probability Theory. S

Introduction to probability theory and its applications. Combinatorial analysis, axioms of probability and independence, random variables (discrete and continuous), joint probability distributions, properties of expectation, Central Limit Theorem, Law of Large Numbers, Markov chains. Students cannot receive credit for this course and Computer Engineering 107. Prerequisite(s): course 11B or Economics 11B or Mathematics 11B or 19B. (General Education Code(s): Q.) *R. Prado, M. Mangel, A. Kottas*

132. Statistical Inference. F

Introduction to statistical inference at a calculus-based level: maximum likelihood estimation, sufficient statistics, distributions of estimators, confidence intervals, hypothesis testing, and Bayesian inference. Prerequisite(s): course 131 or Computer Engineering 107. *A. Rodriguez, The Staff*

147. Computational Methods and Applications. W

Applications of computational methods to solving mathematical problems using MATLAB. Solution of nonlinear equations, linear systems, differential equations, sparse matrix solver, and eigenvalue problems. Prerequisite(s): course 27 or 10 or 10A, or Mathematics 21. Knowledge of differential equations is recommended (course 20 or 20A, or Mathematics 24). *H. Wang*

162. Design and Analysis of Computer Simulation Experiments. *

Methods for the design and analysis of computer simulation experiments: random number generation; estimation of sample size necessary to achieve desired precision goals; antithetic variables and other devices for increasing simulation efficiency; analysis of the output of large "deterministic" computer programs, exploring the sensitivity of outputs to changes in the inputs. Applications drawn mainly from engineering and environmental sciences. Prerequisite(s): course 5 or 7 or 113 or 131 or Computer Engineering 107 or permission of instructor. (General Education Code(s): Q.) *H. Lee, The Staff*

198. Independent Study or Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Study or Research (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

202. Linear Models in SAS. S

Case study-based course teaches statistical linear modeling using the SAS software package. Teaches generalized linear models; linear regression; analysis of variance/covariance; analysis of data with random effects and repeated measures. Prerequisite(s): course 156 or 256, or permission of instructor. Enrollment restricted to graduate students. *B. Mendes*

205A. Mathematical Statistics. F

Graduate introduction to topics in probability and statistical inference. Probabilities, random variables, common families of distributions; expectation and higher moments; multivariate distributions, marginals and conditionals; point estimation, methods and properties; interval estimation, methods and properties; and hypothesis testing, methods and properties. (Formerly course 205.) Prerequisite(s): Strongly recommended: course 131. Previous experience with univariate and multivariate calculus, and experience with elementary probability also recommended. Enrollment restricted to graduate students. *A. Rodriguez, B. Sansó*

205B. Statistical Inference. F

Statistical inference from a frequentist point of view. Properties of random samples; convergence concepts applied to point estimators; principles of statistical inference; obtaining and evaluating point estimators with particular attention to maximum likelihood estimates and their properties; obtaining and evaluating interval estimators; and hypothesis testing methods and their properties. Prerequisite(s): course 131 or equivalent. Enrollment restricted to graduate students. *B. Sansó*

206. Bayesian Statistics. W

Introduction to Bayesian statistical methods for inference and prediction; exchangeability; prior, likelihood, posterior, and predictive distributions; coherence and calibration; conjugate analysis; Markov Chain Monte Carlo methods for simulation-based computation; hierarchical modeling; Bayesian model diagnostics, model selection, and sensitivity analysis. Prerequisite(s): graduate standing, or course 132, or permission of instructor. Enrollment restricted to juniors, seniors, and graduate students. *H. Lee*

207. Intermediate Bayesian Statistical Modeling. S

Hierarchical modeling, linear models (regression and analysis of variance) from the Bayesian point of view, intermediate Markov chain Monte Carlo methods, generalized linear models, multivariate models, mixture models, hidden Markov models. Prerequisite(s): course 206, and graduate standing or permission of instructor. *R. Prado, D. Draper, B. Sansó*

211. Foundations of Applied Mathematics. F

Accelerated class on applied mathematical methods for all sciences. Topics include: multivariate calculus, linear algebra, Fourier series, ordinary differential equations, complex analysis, and integral transforms. Enrollment restricted to graduate students. *N. Brummell*

212A. Applied Mathematical Methods I. W

Focuses on the analytical and numerical methods for solving differential equations. Topics include well-posed problems, Fourier transform, separation of variables, Green's functions, Huygen's principle, calculus of variation, numerical discretization, local truncation error, global error, error estimation, numerical stability, multigrid method. (Formerly course 211.) Enrollment restricted

to graduate students. Undergraduates are encouraged to take this class with permission of instructor. *H. Wang, N. Brummell, P. Garaud*

212B. Applied Mathematical Methods II. S

Covers perturbation methods: asymptotic series, stationary phase and expansion of integrals, matched asymptotic expansions, multiple scales and the WKB method, Padé approximants and improvements of series. (Formerly course 212.) Prerequisite(s): course 212A. *H. Wang, N. Brummell, P. Garaud*

213. Numerical Solutions of Differential Equations. S

Focuses on numerical solutions of differential equations. Topics include Runge-Kutta methods; error estimation and error control; consistency, stability, and convergence; conjugate gradient method; multigrid method; CFL condition; and high-resolution methods for conservation laws. Enrollment restricted to graduate students or permission of instructor. *H. Wang, Q. Gong, N. Brummell, P. Garaud*

214. Applied Dynamical Systems. W

Introduction to applied dynamical systems and the qualitative study of differential equations. Topics include: Lyapunov stability, invariant manifolds, periodic orbits, Lagrangian and Hamiltonian equations, center manifold theory, bifurcations, and perturbation theory, and averaging. Special emphasis on motivation behind new concepts and their application to problems in science and engineering. Examples drawn from astronomy, biology, engineering, and robotics. Prerequisite(s): AMS 146 or permission of the instructor. Enrollment restricted to graduate students. Undergraduates are encouraged to enroll with permission of the instructor. Enrollment limited to 15. *H. Wang, P. Garaud, M. Mangel*

215. Stochastic Modeling in Biology. S

Application of differential equations and probability and stochastic processes to problems in cell, organismal, and population biology. Topics include life history theory, ecology, and population biology. Enrollment restricted to graduate students or permission of instructor. *M. Mangel*

216. Stochastic Differential Equations. W

Introduction to stochastic differential equations and diffusion processes with applications to biology, biomolecular engineering, and chemical kinetics. Topics include Brownian motion and white noise, gambler's ruin, backward and forward equations, and the theory of boundary conditions. Enrollment restricted to graduate students or consent of instructor. *M. Mangel*

217. Introduction to Fluid Dynamics. W

Fundamental topics in fluid dynamics. Euler and Lagrange descriptions of continuum dynamics. Conservation laws for inviscid and viscous flows. Potential flows. Exact solutions of the Navier-Stokes equation. Boundary layer theory. Gravity waves. Students cannot receive credit for this course and course 107. Enrollment restricted to graduate students. *N. Brummell*

221. Bayesian Decision Theory. F

Explores conceptual and theoretical bases of statistical decision making under uncertainty. Focuses on axiomatic foundations of expected utility, elicitation of subjective probabilities and utilities, and the value of information and modern computational methods for decision problems. Prerequisite(s): course 206. Enrollment restricted to graduate students. *B. Sansó*

223. Time Series Analysis. *

Graduate level introductory course on time series data and models in the time and frequency domains: descriptive time series methods; the periodogram; basic theory of stationary processes; linear filters; spectral analysis; time series analysis for repeated measurements; ARIMA models; introduction to Bayesian spectral analysis; Bayesian learning, forecasting, and smoothing; introduction to Bayesian Dynamic Linear Models (DLMs); DLM mathematical structure; DLMs for trends and seasonal patterns; and autoregression and time series regression models. Prerequisite: course 206. Enrollment restricted to graduate students. *R. Prado*

231. Nonlinear Control Theory. *

Covers analysis and design of nonlinear control systems using Lyapunov theory and geometric methods. Includes properties of solutions of nonlinear systems, Lyapunov stability analysis, effects of perturbations, controllability, observability, feedback linearization, and nonlinear control design tools for stabilization. Prerequisite(s): basic knowledge of mathematical analysis and ordinary differential equations is assumed. Enrollment restricted to graduate students or permission of instructor. *The Staff*

236. Motion Coordination of Robotic Networks. *

Comprehensive introduction to motion coordination algorithms for robotic networks. Emphasis on mathematical tools to model, analyze, and design cooperative strategies for control, robotics, and sensing tasks. Topics include: continuous and discrete-time evolution models, proximity graphs, performance measures, invariance principles, and coordination algorithms for rendezvous, deployment, flocking, and consensus. Techniques and methodologies are introduced through application setups from multi-agent robotic systems, cooperative control, and mobile sensor networks. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

241. Bayesian Nonparametric Methods. W

Theory, methods, and applications of Bayesian nonparametric modeling. Prior probability models for spaces of functions. Dirichlet processes. Pólya trees. Nonparametric mixtures. Models for regression, survival analysis, categorical data analysis, and spatial statistics. Examples drawn from social, engineering, and life sciences. Prerequisite(s): course 207. Enrollment restricted to graduate students. *A. Kottas*

245. Spatial Statistics. S

Introduction to the analysis of spatial data: theory of correlation structures and variograms; kriging and Gaussian processes; Markov random fields; fitting models to data; computational techniques; frequentist and Bayesian approaches. Prerequisite(s): course 207. Enrollment restricted to graduate students. *B. Sansó, H. Lee*

256. Linear Statistical Models. W

Theory, methods, and applications of linear statistical models. Review of simple correlation and simple linear regression. Multiple and partial correlation and multiple linear regression. Analysis of variance and covariance. Linear model diagnostics and model selection. Case studies drawn from natural, social, and medical sciences. Course 205 strongly recommended as a prerequisite. Undergraduates are encouraged to take this class with permission of instructor. Prerequisite(s): course 205A or 205B or permission of instructor. Enrollment restricted to graduate students. *B. Sansó, R. Prado*

261. Probability Theory with Markov Chains. *

Introduction to probability theory: probability spaces, expectation as Lebesgue integral, characteristic functions, modes of convergence, conditional probability and expectation, discrete-state Markov chains, stationary distributions, limit theorems, ergodic theorem, continuous-state Markov chains, applications to Markov chain Monte Carlo methods. Prerequisite(s): course 205B or by permission of instructor. Enrollment restricted to graduate students. *A. Kottas*

263. Stochastic Processes. *

Includes probabilistic and statistical analysis of random processes, continuous-time Markov chains, hidden Markov models, point processes, Markov random fields, spatial and spatio-temporal processes, and statistical modeling and inference in stochastic processes. Applications to a variety of fields. Prerequisite(s): course 205A, 205B, or 261, or by permission of instructor. *A. Kottas, The Staff*

274. Generalized Linear Models. S

Theory, methods, and applications of generalized linear statistical models; review of linear models; binomial models for binary responses (including logistical regression and probit models); log-linear models for categorical data analysis; and Poisson models for count data. Case studies drawn from social, engineering, and life sciences. Prerequisite(s): course 205A, 205B, or 256. Enrollment restricted to graduate students. *A. Kottas*

280A. Seminar in Mathematical and Computational Biology (2 credits). F,W,S

Weekly seminar on mathematical and computational biology. Participants present research findings in organized and critical fashion, framed in context of current literature. Students present own research on a regular basis. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *M. Mangel*

280B. Seminars in Statistical and Applied Mathematical Modeling (2 credits). F,W,S

Weekly seminar series covering topics of current research in applied mathematics and statistics. Permission of instructor required. Enrollment restricted to graduate students. (Formerly *Seminar in Applied Mathematics and Statistics*.) May be repeated for credit. *The Staff, A. Rodriguez, B. Sansó*

285. Seminar in Career Skills (2 credits). *

Seminar in career skills for applied mathematicians and statisticians. Learn about professional activities such as the publication process, grant proposals, and the job market. Enrollment restricted to graduate students, typically within two years of their expected Ph.D. completion date. *The Staff*

290A. Topics in Mathematical and Computational Biology (2 credits). F

Focuses on applications of mathematical and computational methods with particular emphasis on advanced methods applying to organismal biology or resource management. Students read current literature, prepare critiques, and conduct projects. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *M. Mangel*

290B. Advanced Topics in the Numerical Solution of PDEs. *

Modern practical methods for the numerical solution of partial differential equations. Methods considered depend on the expertise of the instructor, but are covered in-depth and up to the cutting-edge of practical

contemporary implementation. Content could be method-based (e.g., spectral methods, finite-element methods) or topic-based (e.g., simulations of turbulence). Some programming and numerical analysis (e.g., course 213) highly recommended. Enrollment restricted to graduate students and undergraduates with permission of the instructor. *H. Wang, N. Brummell, P. Garaud*

291. Advanced Topics in Bayesian Statistics (3 credits). *

Advanced study of research topics in the theory, methods, or applications of Bayesian statistics. The specific subject depends on the instructor. Enrollment restricted to graduate students and by permission of instructor. May be repeated for credit. *The Staff*

296. Masters Project (2 credits). F,W,S

Independent completion of a masters project under faculty supervision. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study or Research. F,W,S

Independent study or research under faculty supervision. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. *The Staff*

297F. Independent Study (2 credits). F,W,S

Independent study or research under faculty supervision. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Thesis research under faculty supervision. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. *The Staff*

Bioengineering

Faculty and Professional Interests

MARK AKESON (Biomolecular Engineering)
DNA structure and dynamics, single molecule biophysics, bioethics

MANUEL ARES JR. (Molecular, Cell, and Developmental Biology)
RNA processing, structure and function of RNA

PHILLIP BERMAN (Biomolecular Engineering, Department Chair)
Drug development, vaccines, AIDS, monoclonal antibody therapeutics, immunology, molecular cell/biology, recombinant protein production (commercial scale)

DAVID DEAMER (Biomolecular Engineering, Chemistry and Biochemistry)
Membrane biophysics, single molecule analysis

DAVID DRAPER (Applied Mathematics and Statistics)
Bayesian statistics, hierarchical modeling, nonparametric methods, model specification and model uncertainty, quality assessment, risk assessment, statistical applications in the environmental, medical, and social sciences

WILLIAM DUNBAR (Computer Engineering)
Theory and application of feedback control; air traffic control; nanopore sensors, dynamics and control of biomolecules

CAMILLA FORSBERG (Biomolecular Engineering)
Hematopoietic stem cells, transcriptional regulation, chromatin, blood cell development, cell surface receptors, genomics

DIETLIND L. GERLOFF (Biomolecular Engineering)
Protein to protein interactions, protein function prediction, functional genomics, protein structure prediction

ALEXANDER A. GRILLO (SCIPP, Research Physicist)
Neurophysiology, neural systems, high-energy particle physics

GRANT HARTZOG (Molecular, Cell, and Developmental Biology)
Biochemistry, genetics, chromatin and transcriptional regulation

DAVID HAUSSLER (Biomolecular Engineering; Director, Institute for Quantitative Biomedical Research and the Center for Biomolecular Science and Engineering)
Molecular evolution, neurodevelopment, genomics, bioinformatics, computational molecular biology, statistical models, machine learning, neural networks

RICHARD HUGHEY (Biomolecular Engineering, Computer Engineering) (Chair, B.S. in Bioengineering)
Computer architecture, parallel processing, computational biology

MICHAEL ISAACSON (Electrical Engineering)
Nano- and microfabrication technology and applications to biomedical and diagnostic devices, nanocharacterization of materials with emphasis on the development of microscopy tools, novel modes of imaging, electron and light optics

KEVIN KARPLUS (Biomolecular Engineering)
Protein structure prediction, protein design

DOUGLAS KELLOGG (Molecular, Cell, and Developmental Biology)
Coordination of cell growth and cell division

JOEL KUBBY (Electrical Engineering)
Micro-Electro-Mechanical-Systems (MEMS), adaptive optics, integrated optics, bio-MEMS, bio-imaging

SRI KURNIAWAN (Computer Engineering)
Human-computer interaction; human factors and ergonomics; accessibility; assistive technology; usability; empirical studies; user-centered design

ALAN M. LITKE (Physics)
Neural systems; retinal processing; development and prosthesis; technology development for neurophysiology; high-energy physics

WENTAI LIU (Electrical Engineering)
Retinal prosthesis, biomimetic systems, integrated neuro-electronics, molecular electronics, CMOS and SOI transceiver design, current mode band limited signaling, microelectronic sensor, timing/clock recovery and optimization, noise characterization and modeling, and computer vision/image processing

TODD LOWE (Biomolecular Engineering)
Experimental and computation genomics, ncRNA gene finders, DNA microarrays to study the biology of Archaea

ROBERTO MANDUCHI (Computer Engineering)
Sensor processing and image analysis with application to assistive technology and environmental modeling

DOMINIC W. MASSARO (Psychology)
Understanding language, speech perception and reading, language learning and speech technology, pattern recognition, psychology of interactive media, psychology of art and new media, human-machine interface

GLENN L. MILLHAUSER (Chemistry and Biochemistry)
Electron spin resonance; nuclear magnetic resonance, melanocortin receptor signaling, agouti proteins, prions, peptide synthesis

LINDA OGREN (Molecular, Cellular, and Developmental Biology)
Endocrinology

NADER POURMAND (Biomolecular Engineering)
Biosensors, microarray, nanotechnology, pathogens, sequencing, genotyping, DNA fingerprinting

RAQUEL PRADO (Applied Mathematics and Statistics)
Bayesian non-stationary time series modeling, multivariate time series, biomedical signal processing and statistical genetics

WENDY ROTHWELL (Biomolecular Engineering)
Biotechnology, molecular genetics

HOLGER SCHMIDT (Electrical Engineering)
Integrated optics for biomedicine and quantum optics, nano-magneto-optics, single-particle spectroscopy, ultrafast optics

ANDREA STEINER (Community Studies/Health Sciences)
Health-care systems, health justice, critical public health, gerontology, ageism, long-term care

JOSHUA STUART (Biomolecular Engineering)
Computational functional genomics, comparative analysis of gene regulation, cross-species inference of gene networks, probabilistic graphical models

ELLEN KAPPY SUCKIEL (Philosophy)
Ethics, William James, American philosophy, genetic ethics, ethics of biotechnology

JOHN TAMKUN (Molecular, Cell, and Developmental Biology)
*Transcriptional regulation, molecular genetics of *Drosophila* development, regulation of gene expression*

JOHN F. VESECKY, (Electrical Engineering)
HF radar design and construction and observation of ocean surface winds, waves and currents with applications to coastal and deep water ocean processes; project MEDSAT

ALAN M. ZAHLER (Molecular, Cell, and Developmental Biology)
Molecular biology, splice site selection, and alternative pre-mRNA processing

JIN Z. ZHANG (Chemistry and Biochemistry)
Design, synthesis, characterization, and application of nanomaterials, including semiconductor and metal nanoparticles; femtosecond laser spectroscopy; ultrafast dynamics on surfaces and at interfaces; cancer biomarker detection; surface-enhanced Raman spectroscopy

YI ZUO (Molecular, Cell, and Developmental Biology)
Glia-synapse interaction and synaptic plasticity in vivo

Program Description

Bioengineering focuses on the application of engineering tools and techniques to the problems of medicine and the biological sciences. The UCSC program in bioengineering, through its participating faculty and departments, provides students with inspiration and quality education in the theory and practice of bioengineering.

The UC Santa Cruz B.S. in bioengineering program prepares graduates for a rewarding career at the interfaces between engineering, medicine, and biology. UCSC bioengineering graduates will have a thorough

grounding in the principles and practices of bioengineering and in the scientific and mathematical principles upon which these principles and practices are built; graduates will be prepared for further education (both formal and informal) and for productive employment in industry.

Bioengineering is a particularly broad discipline, involving issues at many different levels. To guide students in their study, the faculty have developed three concentrations: bioelectronics, biomolecular, and rehabilitation. Bioelectronics is an ideal concentration for students interested in the interfacing of organisms with electronic instrumentation or implants. Biomolecular is an ideal concentration for students interested in drug design or biomolecular sensors. Rehabilitation is an ideal concentration for students interested in developing technology to aid the human experience.

In the UCSC bioengineering B.S. program, many undergraduates work on faculty research projects, analyzing ideas, developing technologies, and discovering new approaches. Areas include biomolecular sensors and systems, nanoelectronic implants, assistive technologies for the elderly and disabled, bioinformatics, microfluidics, nano-scale biotechnology, and other areas at the junction between engineering, medicine, and the life sciences. More information about bioengineering research and undergraduate research opportunities can be found on the web at www.cbse.ucsc.edu, biomedical.ucsc.edu, marcmbrs.ucsc.edu, surf-it.soe.ucsc.edu, and graddiv.ucsc.edu/nucleads.

The program is sponsored by the departments of biomolecular engineering, computer engineering, electrical engineering, and molecular, cell, and developmental biology, with additional participating faculty in the departments of applied mathematics and statistics, community studies, chemistry and biochemistry, philosophy, physics, and psychology.

The program has extensive course requirements in mathematics, science, and engineering, and students potentially interested in bioengineering as a major should contact the School of Engineering Advising Office (advising@soe.ucsc.edu) before enrolling in any courses at UC Santa Cruz.

Bioengineering students may continue their research and studies at UC Santa Cruz in the graduate programs of the collaborating department and other departments. Programs and application information may be found at <http://www.graddiv.ucsc.edu>.

Courses for Nonmajors

The bioengineering program does not sponsor any courses. However, the program recommends the following courses to nonmajors interested in bioengineering. Computer Engineering 80A, *Universal Access: Disability, Technology, and Society* (T6-Natural Sciences or Social Sciences); Biomolecular Engineering/Philosophy 80G, *Bioethics in the 21st Century: Science, Business, and Society* (T5-Natural Sciences or Humanities and Arts); and Biomolecular Engineering 5, *Introduction to Biotechnology (Introduction to the Discipline, Natural Sciences/Engineering)*. Students planning careers in medicine should consider Biology 89, *Clinical Health Care: Organization and Financing* (IS). Students are also advised to consult the program discussions of the collaborating departments for additional possibilities related to bioengineering.

Bioengineering Policies

Admissions Policy

Admission to the major is selective. First-year applicants may receive direct admission at the time they apply to UCSC, based on their high school record and test scores.

Admission to the bioengineering major after a student has entered UCSC is based on performance in courses offered by the School of Engineering and the Division of Physical and Biological Sciences (the SOE GPA). An SOE GPA of 2.5 or better is expected at the time of major declaration. Progress in the major and ability to complete the major within campus limits will also be considered.

After the first year, at least six courses required for the major, and any associated laboratories, must be completed prior to declaration. Required courses are listed below.

Transfer Students

Transfer admission will be based on GPA and the level of completion of lower-division requirements. Most importantly, transfer students should have completed articulated calculus and differential equations, as well as at least three of the four other introductory areas (programming, biology, chemistry, and physics). Students may satisfy the bioethics requirement if they have completed a suitable ethics course at their community college.

Honors in the Major

Bioengineering majors are awarded "Honors in the Major" and "Highest Honors in the Major" based on major GPA and on results of undergraduate research. Students with an SOE GPA of 3.7 in most cases receive Highest Honors. Students with an SOE GPA of 3.3 in most cases receive Honors. Students with particularly significant accomplishments in undergraduate research may be considered with a lower SOE GPA.

Disqualification Policy

Please refer to the School of Engineering section of this catalog for the School of Engineering's Major Disqualification Policy.

Letter Grade Policy

The bioengineering program requires letter grading for all courses applied to the degree with the exception of two lower-division courses, which students may elect to take Pass/No Pass.

School of Engineering Policies

Please refer to the School of Engineering section of the catalog for additional policies that apply to all School of Engineering programs.

Materials Fee and Miscellaneous Fees

Please see the section on fees in the School of Engineering section.

Major Requirements

Advising and Elective Approval

Every major must have a bioengineering faculty adviser, assigned by the Baskin School of Engineering Undergraduate Advising Office, and with that adviser must formulate a program of proposed course work that meets the major requirements. All electives must be pre-approved by the Bioengineering Undergraduate Director.

Optional Courses for Majors

Bioengineering students planning a career in medicine may wish to take Biology 89, *Clinical Health Care*, which also satisfies the Introduction to the Discipline-Social Sciences (IS) general education requirement. Students desiring or needing an early introduction to the use of mathematics in engineering may wish to take Computer Engineering 8, *Robot Automation*, in their first quarter. Students pursuing the rehabilitation concentration may wish to include one or more psychology courses in their study plan.

Introductory Requirements, 15 courses

Mathematics 19A-B *Calculus for Science, Engineering, and Mathematics*

Applied Mathematics and Statistics 7/L *Statistical Methods for the Biological and Environmental Sciences/Laboratory*

Applied Mathematics and Statistics 10A and 20A *Basic Mathematical Methods for Engineers I & II* (3 units each); or *Applied Mathematics and Statistics 10 and 20 Mathematical Methods for Engineers I & II*; or Mathematics 24 *Ordinary Differential Equations*

Biomolecular Engineering 80G *Bioethics in the 21st Century: Science, Business, and Society*

Chemistry and Biochemistry 1A, 1B/M, and 1C/N *General Chemistry*, or (with preapproval) courses completed elsewhere that enable enrollment in 108A/L

Chemistry and Biochemistry 108A/L *Organic Chemistry/Laboratory*

Biology 20A *Cell and Molecular Biology*

Biology 20B *Development and Physiology*

Physics 5A/L or 6A/L *Introduction to Physics I/Laboratory*

Physics 5C/N or 6C/N *Introduction to Physics III/Laboratory*

Two (three for rehabilitation concentration, see below) of:

Computer Engineering 12/L *Computer Systems and Assembly Language/Laboratory*; or

Computer Engineering 13/L *Computer Systems and C Programming/Laboratory*; or

Computer Science 12A/L *Introduction to Programming/Laboratory*; or

Computer Science 12B/M, *Introduction to Data Structures/Laboratory*; or

Biomolecular Engineering 60/L *Programming for Biologists and Biochemists/Laboratory*. or

Biomolecular Engineering 160/L *Research Programming for Biologists and Biochemists/Laboratory*

Advanced Requirements, 4 courses

Either Biology 100 *Biochemistry* or *Biochemistry and Molecular Biology 100A-B Biochemistry*

Biomolecular Engineering 150/L *Molecular Biomechanics/Laboratory* (first offering 2008-09)

Physiology and Measurement 1 course: *Measurement and Instrumentation in Physiology* (planned); or prior to its first offering, Biology 130/L *Human Physiology/Laboratory* or Biology 131/L *Animal Physiology/Laboratory*

Computer Engineering 185 *Technical Writing for Computer Engineers*

Bioelectronics Concentration

Electrical Engineering 70/L *Introduction to Electronic Circuits/Laboratory*

Electrical Engineering 103 *Signals and Systems*

Four pre-approved upper-division courses selected with your faculty adviser in the area of bioelectronics. Courses may include Electrical Engineering 212 *Introduction to BioMEMS*, 230 *Implant Engineering*, and new courses in development.

Biomolecular Concentration

Biomolecular Engineering 5 *Introduction to Biotechnology*

Biomolecular Engineering 105 *Genetics*

Four pre-approved upper-division courses selected with your faculty adviser in the area of biomolecular engineering. Courses may include Biomolecular Engineering 140/L *Bioinstrumentation/Laboratory* (planned for 2008-9), 122 *Cell and Protein Engineering* (planned for 2008-9), 155 *Biotechnology and Drug Development*, and 110 *Computational Biology Tools*.

Rehabilitation Concentration

Students in the rehabilitation concentration must complete Computer Engineering 12/L, Computer Engineering 13/L, or Computer Science 12A/L, and Computer Science 12B/M.

Computer Engineering 80A *Universal Access: Disability, Technology, and Society*

Computer Engineering 131 *Human-Computer Interaction*

Four pre-approved upper-division courses selected with your faculty adviser in the area of rehabilitation engineering. Students may wish to focus on systems or software for rehabilitation. Courses may include Electrical Engineering 70/L *Introduction to Electronic Circuits/Laboratory*; or Computer Engineering 118/L *Mechatronics/Laboratory*, 167/L *Sensing and Sensor Technology/Laboratory*, and 232 *Human Factors*; or Computer Science 109 *Advanced Programming*.

Capstone Project, 2 courses

All bioengineering students complete a senior design project in bioengineering as part of a multidisciplinary team solving a current problem. Students may satisfy this requirement with research in a faculty laboratory, concurrent with 123A and 195, or by forming a student team to address a problem of interest and challenge within 123A and 123B. The project proposal must be approved by the bioengineering undergraduate director as a bioengineering project. (Satisfies the campus comprehensive requirement.)

Biomolecular Engineering, Computer Engineering, or Electrical Engineering 123A *Engineering Design Project I*; Biomolecular Engineering, Computer Engineering, or Electrical Engineering 123B *Engineering Design Project II*; or Biomolecular Engineering, Computer Engineering, or Electrical Engineering 195 *Senior Thesis Research*

Portfolio Exit Requirement

Students are required to submit a portfolio and exit interview. The portfolios must be turned in electronically at least seven days before the end of instruction in the quarter of graduation.

The portfolios will be reviewed quarterly by the bioengineering undergraduate committee and must include the following:

- the capstone project report
- a second project report of the student's selection
- a one- to two-page overview of the two projects, the student's contribution to them,
- and a narrative as specified at the submission site (<http://www.soe.ucsc.edu/programs/beng/>)
- an exit interview

Bioengineering Major Planners

The following sample academic plans show possible courses of study for a bioengineering major. Students should consider taking courses during the summer to ensure timely completion of the degree. Courses planned to be taken at institutions other than UC Santa Cruz require preapproval. The first plan follows the biomolecular concentration, the second plan follows the rehabilitation concentration and includes precalculus, and the third plan follows the bioelectronics concentration.

Plan One

Year	Fall	Winter	Spring
1st (frsh)	gen ed (C1) Math 19A Chem 1A	Empe 80A (T) Math 19B Chem 1B/M	gen ed (C2) BME 5 Chem 1C/N
2nd (soph)	Chem 108A/L gen ed (IH) BME 80G (T)	Phys 6A/L Biol 20A AMS7/L	Phys 6C/N Biol 20B Math 24
3rd (jr)	Empe 12/L Biol 100 Empe 185 (W)	BME 150/L BME 60/L or 160/L gen ed (IS)	Elective BME 155 (elec) gen ed (T)
4th (sr)	Biol 105 BME140/L(elec) gen ed (IS)	BME 123A Bio 130/L gen ed (IH)	EE 123B Elective

Plan Two

Year	Fall	Winter	Spring
1st (frsh)	gen ed (C1) AMS 3 BME 80G (T)	Empe 80A (T) Math 19A Cmps 12A/L	gen ed (C2) Math 19B Empe 12/L
2nd (soph)	Chem 1A Cmps 12B/M AMS 7/L	Chem 1B/M Empe 131 Gen ed (T)	Chem 1C/N Math 24 gen ed (IS)
3rd (jr)	Biol 20A Chem 108A/L gen ed (IS)	Biol 20B Elective Phys 6A/L	Biol 100 Empe 233 (elec) Phys 6C/N
4th (sr)	Biol 130/L Elective Empe 185 (W)	Empe 123A Bme 150/L gen ed (IH)	Empe 123B Elective gen ed (IH)

Plan Three

Year	Fall	Winter	Spring
1st (frsh)	gen ed (C1) Math 19A Empe 12/L	Empe 80A (T) Math 19A Phys 6A/L	gen ed (C2) Math 24 Phys 6C/N
2nd (soph)	Chem 1A EE 70/L gen ed (T)	Chem 1B/M EE 103 AMS 7/L	Chem 1C/N Cmps 12A/L Biol 20A
3rd (jr)	Biol 20B Chem 108A/L BME 80G (T)	Elective Biol 100 gen ed (IS)	Elective Elective gen ed (IH)
4th (sr)	Biol 130/L Empe 185 (W) gen ed (IS)	EE 123A BME 150/L gen ed (IH)	EE 123B elective

Biomolecular Engineering

Faculty and Professional Interests

PHILLIP BERMAN (Department Chair)
Drug development, vaccines, AIDS, monoclonal antibody therapeutics, immunology, molecular cell/biology, recombinant protein production (commercial scale)

DAVID HAUSSLER (Director, Institute for Quantitative Biomedical Research and the Center for Biomolecular Science and Engineering)
Molecular evolution, neurodevelopment, genomics, bioinformatics, computational molecular biology, statistical models, machine learning, neural networks

RICHARD HUGHEY (Biomolecular Engineering/Computer Engineering)
Computer architecture, parallel processing, computational biology

KEVIN KARPLUS
Protein structure prediction, protein design

Assistant Professor

CAMILLA FORSBERG
Hematopoietic stem cells, transcriptional regulation, chromatin, blood cell development, cell surface receptors, genomics

DIETLIND L. GERLOFF
Protein to protein interactions, protein function prediction, functional genomics, protein structure prediction

TODD LOWE
Experimental and computation genomics, ncRNA gene finders, DNA microarrays to study the biology of Archaea

NADER POURMAND
Biosensors, microarray, nanotechnology, pathogens, sequencing, genotyping, DNA fingerprinting

JOSHUA STUART
Computational functional genomics, comparative analysis of gene regulation, cross-species inference of gene networks, probabilistic graphical models

Research Professor

DAVID W. DEAMER (Biomolecular Engineering, Chemistry and Biochemistry)
Membrane biophysics, single molecule analysis

Adjunct Professor

MARK AKESON (Biomolecular Engineering)
DNA structure and dynamics, single molecule biophysics, bioethics

JONATHAN TRENT
Organic aggregates, marine snow, microbial physiology, microenvironments, robust proteins, genetic engineering for nanotechnology

Assistant Adjunct Professor

CAROL ROHL
Protein design, protein structure and function prediction; protein-protein interactions

Lecturer

WENDY ROTHWELL
Biotechnology, molecular genetics

**Professor**

MANUEL ARES (Molecular, Cell, and Developmental Biology)
RNA processing, structure and function of RNA

A. RUSSELL FLEGAL (Microbiology and Environmental Toxicology)
Anthropogenic perturbations of biogeochemical cycles, applications of isotopic tracers in anthropology and archaeology

SURESH LODHA (Computer Science)
Visualization, vision, innovation, entrepreneurship

MARC MANGEL (Applied Mathematics and Statistics)
Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

GLENN L. MILLHAUSER (Chemistry and Biochemistry)
Electron spin resonance; nuclear magnetic resonance, melanocortin receptor signaling, agouti proteins, prions, peptide synthesis

JOHN W. TAMKUN (Molecular, Cell, and Developmental Biology)
*Transcriptional regulation, molecular genetics of *Drosophila* development, regulation of gene expression*

MANFRED K. WARMUTH (Computer Science)
Online learning, machine learning, statistical decision theory, neural computation, analysis of algorithms

W. TODD WIPKE, Emeritus (Chemistry and Biochemistry)

ALAN M. ZAHLER (Molecular, Cell, and Developmental Biology)
Molecular biology, splice site selection, and alternative pre-mRNA processing

Assistant Professor

MANEL CAMPS (Microbiology and Environmental Toxicology)
Molecular mechanisms of reactive DNA methylation toxicity

WILLIAM DUNBAR (Computer Engineering)
Theory and application of feedback control, air traffic control, nanopore sensors, dynamics and control of biomolecules

ROBERT S. LOKEY (Chemistry and Biochemistry)
Organic chemistry; combinatorial synthesis, biotechnology, molecular cell biology

Associate Professor

KAREN OTTEMANN (Microbiology and Environmental Toxicology)
Environmental responses of pathogenic bacteria

HONGYUN WANG (Applied Mathematics and Statistics)
Molecular modeling and biophysics, numerical analysis, fluid mechanics, computer animation, partial differential equations, parallel computing, statistical physics, data structures, fast algorithms

FITNAT H. YILDIZ (Microbiology and Environmental Toxicology)
*Microbiology, molecular genetics, genomics; the mechanism of persistence of survival of *Vibrio cholerae**

Program Description

The Department of Biomolecular Engineering is an interdisciplinary department that combines expertise

from Biology, Mathematics, Chemistry, Computer Science, and Engineering to train students and develop technologies to address major problems at the forefront of biomedical and bio-industrial research. Students trained in the Department of Biomolecular Engineering can look forward to careers in Academia, the Information and Biotechnology Industries, Public Health, or Medical Sciences.

The department currently offers an undergraduate minor, B.S., M.S., and Ph.D. degrees in bioinformatics. The department co-sponsors the B.S. in Bioengineering program, described elsewhere in this catalog, with the Departments of Computer Engineering, Electrical Engineering, and Molecular, Cell, and Developmental (MCD) Biology.

Departmental faculty advise undergraduate and graduate researchers enrolled in the bioinformatics, bioengineering, and related degree programs. Members of the BME Department actively collaborate with faculty from other Baskin School of Engineering departments, such as Applied Mathematics and Statistics, Computer Engineering, Computer Science, and Electrical Engineering; and with the Physical and Biological Sciences departments of MCD Biology, Chemistry and Biochemistry, Microbiology and Environmental Toxicology, Ecology and Evolutionary Biology, and Ocean Sciences.

Bioinformatics

Bioinformatics combines mathematics, science, and engineering to explore and understand biological data from high-throughput experiments, such as genome sequencing, gene expression chips, and proteomics experiments. The program builds upon the research and academic strengths of the faculty in the Center for Biomolecular Science and Engineering, <http://cbse.ucsc.edu>.

The Human Genome Project, the international collaboration to determine the sequence of human DNA and understand its function, had its origin in a conference that took place at UCSC in 1985. One notable output from our research is that UCSC is the primary release site for the public version of the human genome: <http://genome.ucsc.edu>, as well as the repository for the ENCODE project, a national effort to annotate the entire human genome with multiple functional assays. We are also a major player in protein-structure prediction, and have a strong research group in DNA microarray analysis.

The undergraduate bioinformatics degree program prepares students for graduate school or a career in the pharmaceutical or biotechnology industries.

The immense growth of biological information stored in computerized databases has led to a critical need for people who can understand the languages, tools, and techniques of statistics, science, and engineering.

A classically trained scientist may be unfamiliar with the statistical and algorithmic knowledge required in this field. A classically trained engineer may be unfamiliar with the chemistry and biology required in the field.

Thus, this program strives for a balance of the two, an engineer focused on the problems of the underlying science or, conversely, a scientist focused on the use of engineering tools for analysis and discovery.

The undergraduate degree program in bioinformatics builds a solid foundation in the constituent areas of the field. Students complete core sequences in mathematics (including calculus, statistics, and discrete mathematics), science (including biology, chemistry, and biochemistry), and engineering (including pro-

gramming, algorithms, and databases). The core topics are brought together in two bioinformatics courses: BME 110, *Computational Biology Tools*, and BME 205, *Bioinformatics Models and Algorithms*. Students have two electives for specialization within the fields of bioinformatics and are required to take a bioethics course (either BME 80G, *Bioethics in the Twenty-First Century: Science, Business, and Society* or PHIL 145, *Brave New World: Ethical Issues in Genetics*) to study the ethical, legal, and social implications of this new technology. As a comprehensive requirement, all students complete a graduate project course: BME 210, *Experimental Systems Biology*, BME 211, *Computational Systems Biology*, BME 220/L, *Protein Bioinformatics*, or BME 230/L, *Computational Genomics*. Students who work on independent research projects with faculty (as all students are encouraged to do) may substitute a senior thesis, BME 195, for the graduate project course.

Courses for Nonmajors

Biomolecular Engineering 5, *Introduction to Biotechnology*, presents a broad overview of the impact of biotechnology on the diagnosis and treatment of disease.

Biomolecular Engineering 60 and 160, *Programming for Biologists and Biochemists*, provide an introductory programming class using Perl and BioPerl to analyze, transform, and publish biological data.

Biomolecular Engineering 80G, *Bioethics in the Twenty-First Century: Science, Business, and Society*, is particularly appropriate to all students interested in the societal issues surrounding the revolutions in bioinformatics and biotechnology.

Biomolecular Engineering 110, *Computational Biology Tools*, provides an introduction to the tools and techniques of bioinformatics from a user's view. It is intended for biologists and biochemists who need to use bioinformatics tools, but are not primarily interested in building new bioinformatics tools.

Biomolecular Engineering 109, *Resource-efficient Programming*, provides advice and practice for people working at the limits of their computer hardware. It is of use for bioinformaticians, game programmers, and embedded-system designers.

Biomolecular Engineering 155, *Biotechnology and Drug Development*, examines the science and process of discovering, testing, and manufacturing new drugs within the pharmaceutical industry.

Bioinformatics Policies**Admissions Policy**

Admission to the bioinformatics major is selective. First-year applicants may receive direct admission at the time they apply to UCSC, based on their high school record and test scores.

Admission to the bioinformatics major after a student has entered UCSC is based on performance in courses offered by the School of Engineering and the Division of Physical and Biological Sciences (the SOE GPA). Due to the required graduate courses in the senior years, a School of Engineering GPA of 2.9 or better is expected at the time of major declaration. After the first year, the following foundation courses must be completed before admission to the major: Computer Science 12A (or 5J and 11) and 12B, Chemistry 1A, 1B/M and 1C/N, and Mathematics 19A-B.

Courses Taken Elsewhere

Please refer to the School of Engineering section of the catalog for policies about taking courses at other institutions after enrolling at UCSC.

Disqualification Policy

Students who do not make adequate progress in the major (normally passing six required courses per year) may be disqualified from the major. All students not meeting the progress in the major or grade point average requirements must meet with the undergraduate director to discuss their options for continuing in the major. Please refer to the Engineering section of this catalog for the School of Engineering's Major Disqualification Policy.

Honors in the Major

Bioinformatics majors are considered for "Honors in the Major" and "Highest Honors in the Major" based on the School of Engineering GPA and on results of undergraduate research. Students with an SOE GPA of 3.7 in most cases receive Highest Honors. Students with an SOE GPA of 3.3 in most cases receive Honors. Students with particularly significant accomplishments in undergraduate research may be considered with a lower SOE GPA.

Transfer Students

Please refer to the School of Engineering section of the catalog for the policy regarding transfer students.

School of Engineering Policies

Please refer to the School of Engineering section of the catalog for additional policies that apply to all School of Engineering programs.

Preparation for the Major

Students applying for admission to the bioinformatics major should have completed four years of high school mathematics (through advanced algebra and trigonometry) and three years of science, including one year of chemistry and one year of biology. Comparable college mathematics and science courses completed at other institutions may be accepted in place of high school preparation. Students without this preparation may be required to take additional courses to prepare themselves for the program.

Bioinformatics Major Requirements

Every bioinformatics major must have a faculty adviser, assigned by the Baskin School of Engineering Undergraduate Advising office, and with that adviser must formulate a program of proposed course work that meets the major requirements. Because of the enormous breadth of requirements, bioinformatics majors are urged to take honors courses or sections whenever possible, to get as much as possible out of the courses they take in each field.

Lower-Division Requirements

Majors must complete the following lower-division courses:

Biology

20A, *Cell and Molecular Biology*

Biomolecular Engineering

80G, *Bioethics in the Twenty-First Century: Science, Business, and Society*; or
Philosophy 145, *Brave New World: Ethical Issues in Genetics*

Chemistry

1A, 1B/M, and 1C/N, *General Chemistry/Laboratory*

Computer Engineering

16, *Applied Discrete Mathematics*

Programming 1

Computer Science 12A/L, *Introduction to Programming/Laboratory*; or
Computer Science 5J, *Introduction to Programming in Java, and 11, Intermediate Programming*; or
Computer Engineering 12/L, *Computer Systems and Assembly Language/Laboratory*, and 13/L, *Computer Systems and C Programming/Laboratory*

Programming 2

Computer Science 12B/M, *Introduction to Data Structures/Laboratory*

Mathematics

20A-B, *Honors Calculus*; or
19A-B, *Calculus for Science, Engineering, and Mathematics* (Credit for one or both can be granted with adequate performance on the CEEB calculus AB or BC Advanced Placement examination.)
23A, *Multivariable Calculus*

Upper-Division Requirements

Majors must complete the following upper-division courses:

Applied Mathematics and Statistics

Computer Engineering 107, *Mathematical Methods of Systems Analysis: Stochastic*; or
Applied Mathematics and Statistics 131, *Introduction to Probability Theory*
Applied Mathematics and Statistics 206, *Bayesian Statistics*; or
Applied Mathematics and Statistics 132, *Statistical Inference*

Biochemistry and Molecular Biology

100A, *Biochemistry* (first in three-part sequence)

Bioinformatics

Biomolecular Engineering 110, *Computational Biology Tools*
Biomolecular Engineering 205, *Bioinformatics Models and Algorithms*
One of the following:
Biomolecular Engineering 210, *Experimental Systems Biology*; or
Biomolecular Engineering 211, *Computational Systems Biology*; or
Biomolecular Engineering 220/L, *Protein Bioinformatics/Laboratory*; or
Biomolecular Engineering 230/L, *Computational Genomics/Laboratory*; or
Biomolecular Engineering 195, *Senior Thesis Research*

Biology

105, *Genetics*
One of the following:
Biology 110, *Cell Biology*; or
Biology 115, *Eukaryotic Molecular Biology*; or
Biology 119, *Microbiology*; or
Biomolecular Engineering 155, *Biotechnology and Drug Development*

Chemistry

108A/L, *Organic Chemistry/Laboratory*; or
112A/L and 112B/M, *Organic Chemistry/Laboratory*

Computer Engineering

185, *Technical Writing for Computer Engineers*

Computer Science

One of the following:

182, *Introduction to Database Management Systems*, or
180, *Database Systems*. Note that CMPS 180 may require an additional course as a prerequisite, such as CMPS 101.

Advanced Programming

Computer Science 109, *Advanced Programming*

Required Electives

Students must select two additional courses as electives, justify their choices in writing, and get the choices approved by their faculty adviser. The following courses are typical of the ones chosen, but do not constitute a pre-approved list:

Applied Mathematics and Statistics 132, 162, 203, 205, 207, 215

Biochemistry 100B, 100C, 110

Biology 100L, 105, 105L, 105M, 109L, 110, 115, 115L, 117A, 117B, 119, 119L, 187L, 200A, 200B

Biomolecular Engineering 102, 109, 130, 210, 220, 230

Chemistry 103, 108B/M, 112C/N, 200A, 200B, 200C

Computer Engineering 108, 177

Computer Science 101, 104A, 105, 109, 115, 116, 130, 140, 142, 160/L

Information Systems Management 206, 250

Note: many of these courses are offered only once a year and have long prerequisite chains, so advance planning is necessary to make sure elective courses can be fit into the student's schedule.

Comprehensive Requirement

The bioinformatics comprehensive requirement can be met by taking Biomolecular Engineering 210, *Experimental Systems Biology*, or Biomolecular Engineering 211, *Computational Systems Biology*, or Biomolecular Engineering 220/L, *Protein Bioinformatics*, or Biomolecular Engineering 230/L, *Computational Genomics*, which include substantial projects; or Biomolecular Engineering 195, *Senior Thesis Research*. Students electing the senior thesis must submit a written thesis proposal to the undergraduate director of bioinformatics for approval one quarter prior to submitting the final thesis.

The Bioinformatics Minor

Where the bioinformatics major is intended for people who wish to become bioinformaticians and create the tools needed to solve new problems in computational biology, the bioinformatics minor is intended primarily for bioinformatics tool users who are majoring in a biological or chemical specialty. The bioinformatics minor is also appropriate for computer science or computer engineering majors who are considering graduate work in bioinformatics.

A bioinformatics minor consists of the following 15 courses:

Lower-division (10 courses)

Biology (2)

Biology: Molecular, Cell, and Developmental Biology 20A; and either
Biology: Ecology and Evolutionary Biology 20B; or
Biology: Molecular, Cell, and Developmental Biology 105

General chemistry (3)

Chemistry 1A, Chemistry 1B/M and Chemistry 1C/N

Single-Variable Calculus (2)

Mathematics 19A and Mathematics 19B—preferred; or Mathematics 11A and Mathematics 11B; or Mathematics 20A and Mathematics 20B

Programming 1 (1)

Computer Science 12A/L; or Computer Science 5C; or Computer Science 5J; or Computer Science 5P; or Computer Engineering 12/L and Computer Engineering 13/L

Programming 2 (1)

Biomolecular Engineering 160/L; or Computer Science 12B/M

Bioethics (1)

Biomolecular Engineering 80G; or Philosophy 145; or Biomolecular Engineering 247

Upper-division (5 courses)**Organic chemistry (1)**

Chemistry 108A; or Chemistry 112A and CHEM 112/B

Biochemistry (1)

Biochemistry 100A; or Biology 100

Statistics (1)

Computer Engineering 107; or Applied Mathematics and Statistics 131

Bioinformatics (1)

Biomolecular Engineering 110

Elective(1)

Applied Mathematics and Statistics 132; or Biochemistry 100B; or any other upper-division or graduate biomolecular engineering course

The bioinformatics minor requirements may satisfy the requirements of other majors or minors under the campus policy discussed in Major and Minor Requirements (see page 32). Majors with substantial overlap include biochemistry, bioengineering, all biology majors, chemistry, computer science, and computer engineering. Students pursuing one of these majors are particularly encouraged to consider the bioinformatics minor.

The Bioinformatics Combined B.S./Graduate Degree Program

Because our bioinformatics B.S. program provides excellent preparation for a graduate program in bioinformatics, we offer a combined B.S./grad program that allows our B.S. students to complete the M.S. (or Ph.D.) somewhat sooner than students with a less tailored preparation.

The current B.S. and graduate requirements have four courses in common:

Biomolecular Engineering 80G, *Bioethics in the 21st Century*; or Philosophy 145/245, *Brave New World: Ethical Issues in Genetics*

Biomolecular Engineering 205, *Bioinformatics Models and Algorithms*

Biomolecular Engineering 220, *Protein Bioinformatics*; or Biomolecular Engineering 230, *Computational Genomics*

Applied Mathematics and Statistics 206, *Bayesian Statistics*

Masters students take nine courses, two seminars (four credits), Biomolecular Engineering 200, and two independent project courses (such as Biomolecular Engineering 220L and Biomolecular Engineering 230L). The course work for Ph.D. students is essentially the same, except that eight credits of seminars are required and three research lab rotations are required in place of the two project courses.

The combined B.S./graduate degree program does not make any changes to the undergraduate program, except that students must pass the four overlapping courses listed above for a grade of B- or better.

The requirements at the graduate level are changed to remove the four courses that overlap with the B.S. and to add two graduate electives to be chosen by the students with the approval of their advisers. Thus, the total number of full courses required is reduced from nine to seven.

To apply for the combined program, students apply to the M.S. or Ph.D. program through the normal graduate admission process in the fall of their senior year. If admitted into the graduate program, they would automatically be included in the combined B.S./M.S. or B.S./Ph.D. program.

Bioinformatics Major Planners

Plan one is a suggested plan for students who are undecided between bioinformatics and another School of Engineering major. Plan two is suggested for students undecided between bioinformatics and some other field in biology or chemistry. As in all engineering and science programs, it is recommended that students spread their general education requirements out over all 12 quarters.

Four-year plans require individual design to fit in the desired electives, so only the first two years of the academic plan are presented here. It is recommended that students reserve the summer after the junior year for undergraduate research. One popular plan involves taking organic chemistry and the associated labs in the summer after completing general chemistry, so that biochemistry may be started in the junior year.

Most students find it easiest to take Biomolecular Engineering 205, *Bioinformatics Models and Algorithms*, after Biomolecular Engineering 110, *Computational Biology Tools*.

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Math 19A CMPE 16 core	Math 19B CMPS 12A/L gen ed	Math 23A CMPS 12B/M gen ed
2nd (soph)	Chem 1A CMPE 107 BME 80G	Chem 1B/M CMPS 109 gen ed	Chem 1C/N BIO 20A gen ed
Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Math 19A Chem 1A core	Math 19B Chem 1B/M gen ed	Math 23A Chem 1C/N gen ed
2nd (soph)	CMPE 16 Chem 108 A/L BME 80G	CMPS 12A/L Biol 20A gen ed	CMPS 12B/M BIO105 gen ed

Bioinformatics Graduate Program

The graduate program in bioinformatics offers both M.S. and Ph.D. degrees.

Course Requirements

Both masters and doctoral students must complete nine, 5-credit courses (seven core courses and two electives; see below) and a 3-credit research and teaching course. In addition, M.S. students must complete four seminar credits, while Ph.D. students must complete eight seminar credits. M.S. students must complete two (1-credit or 2-credit) research project courses (such as course 220L, 230L, 297F, or 297), and Ph.D. students must complete three research lab rotations (course 296) with different supervisors.

Core courses (5-credit)—seven are required**Biomolecular Engineering**

205, *Bioinformatics Models and Algorithms*

Two other graduate bioinformatics courses (courses in the range 210-239)

80G, *Bioethics in the Twenty-First Century: Science, Business, and Society*; or Philosophy 245, *Brave New World: Ethical Issues in Genetics*; or 247, *Stem Cell Research; Scientific, Ethical, Social and Legal Issues*

One graduate course, approved by the faculty, in each of the following three areas:

- Statistics (Applied Mathematics and Statistics 206 recommended)
- Biology (Biology 200B recommended)
- Chemistry (Chemistry 200B recommended)

Electives (5-credit)—two are required

The electives should be graduate-level courses selected with approval of the faculty to ensure a coherent, balanced program. For M.S. students, 5 credits of independent research (297) or thesis research (299) may count as electives toward the degree requirements upon approval of the faculty. For Ph.D. students, independent or thesis research cannot be counted as electives.

Students must choose their electives with faculty guidance and approval to balance their preparation and make up for deficiencies in background areas. In addition to fulfilling background needs, students may choose to emphasize one of the breadth areas: molecular biology, biochemistry, statistics, computational biology, genetics, computer science, computer engineering, applied mathematics, cell biology, and computer graphics/visualization or may take a cross-sampling of the electives to achieve a broad knowledge base.

Other Curriculum Requirements

Biomolecular Engineering 200, *Research and Teaching in Bioinformatics*, 3 credits

Seminars

M.S. students: a minimum of two seminar courses, including at least one quarter of the 2-credit Biomolecular Engineering seminar, 280B

Ph.D. students: a minimum of four seminar courses, including at least two quarters of the 2-credit Biomolecular Engineering Seminar, 280B

Research experience

M.S. students: a minimum of two research project courses. This requirement can be met by taking course 220L, 230L, and/or independent study (course 297F or course 297).

Ph.D. Students: three quarters of lab rotations (course 296), generally within the first 12 months. One of the lab rotations must be with a faculty supervisor who

does wet-lab research, though the student's rotation project may be purely computational.

Qualifying Exams

Ph.D. students are required to pass an oral qualifying exam by the end of their second year and to advance to candidacy by the end of their third year.

Adequate Progress

Graduate students receiving two or more U (unsatisfactory) grades or grades below B in courses relevant to the program are not making adequate progress and will be placed on academic probation for the next three quarters of registered enrollment.

Graduate students who fail (unsatisfactory or lower than B) a relevant course while on probation may be dismissed from the program. Students may appeal their dismissal. Graduate students who fail a relevant course after being removed from probation are immediately returned to academic probation.

Graduate students experiencing circumstances that may adversely affect their academic performance should consult with their adviser and the graduate director.

Thesis and Dissertation Requirements

In addition to completing the course requirements, students must fulfill the following thesis or dissertation requirements.

For M.S. students, a written thesis proposal must be submitted to a faculty member before the end of the fourth academic quarter. If the faculty member accepts the proposal, he or she will become the student's adviser and will be in charge of supervising the writing of the master's thesis. When the thesis is completed, it will be submitted to a faculty review committee consisting of the thesis adviser and at least two additional readers.

The committee must include a School of Engineering faculty member, may include participants from the Division of Physical and Biological Sciences and from industry as appropriate, and must be approved by the bioinformatics program director. Students are required to present their thesis project in a public seminar.

Ph.D. students must pass an oral qualifying exam by the end of the second year.

Ph.D. students must select a faculty research adviser by the end of the second year. A written dissertation proposal is required before the end of the third year. A qualifying committee is then formed, which consists of the adviser and three additional members, and approved by the bioinformatics program director and the campus graduate dean. The student must submit his or her written dissertation proposal to all members of the committee and the graduate assistant one month in advance of the examination. The dissertation proposal is publicly and formally presented in an oral qualifying examination given by the qualifying committee.

Ph.D. candidates will submit the completed dissertation to a reading committee at least one month prior to the dissertation defense. The reading committee, formed upon advancement to candidacy, consists of the dissertation supervisor and two readers appointed by the program director upon the recommendation of the dissertation supervisor. The candidate will present his or her research in a public seminar. The seminar will be followed by a defense of the dissertation to the reading committee and attending faculty, who will then decide whether the dissertation is acceptable or requires revision.

Transfer Limitations

Up to two courses may be transferred from other graduate institutions, with the approval of the faculty adviser and the graduate director.

Lower-Division Courses

5. Introduction to Biotechnology. W,S

Introduces the tools and applications of biotechnology in the fields of medicine, agriculture, the environment, and industry. (General Education Code(s): IN.) *The Staff, W. Rothwell*

60. Introductory Programming for Biologists and Biochemists. W

Lecture and lab-based course teaching programming skills needed by biologists and biochemists. No programming experience required, but basic computer skills assumed. Students without prior programming experience will be taught the basic proficiency in Perl, BioPerl, and other Perl libraries needed to analyze, transform, and publish biological data. Students cannot receive credit for this course and Biomolecular Engineering 160 or Biology 180. (Formerly *Programming for Biologists and Biochemists*.) Prerequisite(s): Biology 20A or 21A. Previous or concurrent enrollment in course 60L required. *The Staff, J. Stuart*

60L. Introductory Programming for Biologists and Biochemists Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 60. One two-hour laboratory per week. Concurrent enrollment in course 60 required. Students cannot receive credit for this course and Biomolecular Engineering 160L or Biology 180L. (Formerly *Programming for Biologists and Biochemists Laboratory*.) Prerequisite(s): Biology 20A or 21A. Previous or concurrent enrollment in course 60 is required. *The Staff, J. Stuart*

80G. Bioethics in the 21st Century: Science, Business, and Society. F

Serves science and non-science majors interested in bioethics. Guest speakers and instructors lead discussions of major ethical questions having arisen from research in genetics, medicine, and industries supported by this knowledge. (Also offered as Philosophy 80G. Students cannot receive credit for both courses.) (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *M. Akeson, The Staff*

80H. The Human Genome. F,S

Course will focus on understanding human genes. Accessible to non-science majors. Will cover principles of human inheritance and techniques used in gene analysis. The evolutionary, social, ethical, and legal issues associated with knowledge of the human genome will be discussed. (Also offered as Biology: Molecular Cell & Dev 80H. Students cannot receive credit for both courses.) (General Education Code(s): T2-Natural Sciences.) *The Staff, W. Rothwell, M. Ares*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

109. Resource-Efficient Programming. *

Writing programs that use computer resources efficiently. Learn to measure resource usage and modify programs to get better performance. Particularly appropriate for programmers working at limits of their hardware (bioinformaticians, game programmers, and embedded system programs). Prerequisite(s): Computer Science 12B and 12M or 13H and 13L, Computer Engineering 16 or 16H, and Mathematics 19A. Enrollment limited to 90. *K. Karplus*

110. Computational Biology Tools. W,S

Hands-on laboratory geared to teach basic tools used in computational biology (motif searching, primer selection, sequence comparison, multiple sequence alignment, genefinders, phylogenetics analysis, X-ray crystallography software). Web- and Unix-based tools/databases are used. Open to all science students; no prior Unix experience required. (Also offered as Biology: Molecular Cell & Dev 181. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20B and Chemistry 1C Enrollment limited to 25. *T. Lowe, D. Gerloff*

123A. Engineering Design Project I. F,W

First of a two-course sequence that is the culmination of the engineering program. Students apply knowledge and skills gained in elective track to complete a major design project. Students complete research, specification, planning, and procurement for a substantial project. Includes technical discussions, design reviews, and formal presentations; engineering design cycle, engineering teams, and professional practices. Formal technical specification of the approved project is presented to faculty. Prerequisite(s): Electrical Engineering 171 or Computer Engineering 121; previous or concurrent enrollment in Computer Engineering 185; permission of department and instructor. Students are billed a materials fee. (Also offered as Electrical Engineering 123A and Computer Engineering 123A. Students cannot receive credit for all courses.) *The Staff*

123B. Engineering Design Project II (7 credits). W,S

Second of two-course sequence in engineering system design. Students fully implement and test system designed and specified in course 123A. Formal written report, oral presentation, and demonstration of successful project to review panel of engineering faculty required. Students are billed a materials fee. (Also offered as Electrical Engineering 123B and Computer Engineering 123B. Students cannot receive credit for all courses.) Prerequisite(s): course 123A and Computer Engineering 185. Enrollment limited to 35. *The Staff*

130. Genomes. *

Advanced elective for biology majors, examining biology on the genome scale. Topics include genome sequencing; large scale computational and functional analysis; features specific to prokaryotic, eukaryotic, or mammalian genomes; proteomics; SNP analysis; medical genomics; and genome evolution. Prerequisite(s): Biology 100 or Biochemistry 100A and Biology 105, or approval of instructor. Enrollment limited to 30. *T. Lowe*

140. Bioinstrumentation. F

Introduction to theory, design, and application of bioinstrumentation in clinical, pharmaceutical, and

biotechnology laboratories. Highly recommended for students planning careers in the biomolecular industries. Typical topics and demonstrations include thermocycler, polymerase chain reaction (PCR), pyrosequencing, flabless nanofabrication, ion-sensitive measurements, microarray fabrication, and fluorescent-activated cell sorter (FACS). Prerequisite(s): course 5, or Biology 100, or Biochemistry and Molecular Biology 100A. *N. Pourmand*

150. Molecular Biomechanics. S

Considers how assemblies of macromolecules (molecular motors) convert chemical energy into mechanical work on the nanometer-to-Angstrom scale. Processes examined include ATP-dependent movement of organelles in the cytosol facilitated by kinesin; proton pumping by ATPases in the mitochondrial membrane; viral genome packaging; bacterial movement driven by flagella; processive addition of nucleotides by polymerases during replication and transcription; and protein synthesis by ribosomes. Cannot receive credit for this course and course 250. Prerequisite(s): Biology 20A; and Biology 20B or 105; and Biology 100 or Biochemistry 100A; and Physics 5C or 6C. Concurrent enrollment in course 150L required. *H. Wang, M. Akeson, W. Dunbar*

150L. Molecular Biomechanics Laboratory (2 credits). S

Students address a current scientific question about molecular motor function using techniques established in the UCSC Nanopore Laboratory. Specifically, students use recombinant DNA technology to produce an enzyme (e.g., a DNA polymerase) bearing a point mutation that is predicted to alter function in a defined manner. Students then use nanopore force spectroscopy to model the energy landscape for a mechanical or chemical step altered by the critical amino acid. Cannot receive credit for this course and course 250L. Prerequisite(s): Biology 20A; and Biology 20B or 105; and Biology 100 or Biochemistry 100A; and Physics 5C or 6C. Concurrent enrollment in course 150 required. *H. Wang, M. Akeson, W. Dunbar*

155. Biotechnology and Drug Development. W

Recommended for students interested in careers in the biopharmaceutical industry. Focuses on recombinant DNA technology and the drug-development process, including discovery research; preclinical testing; clinical trials; and regulatory review, as well as manufacturing and production considerations. Students may not receive credit for this course and course 255. (Also offered as Biology: Molecular Cell & Dev 179. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20A and Biology 100 or Biochemistry and Molecular Biology 100A. Enrollment limited to 15. *P. Berman*

160. Research Programming for Biologists and Biochemists. W

No programming experience required, but basic computer skills assumed. Students without prior programming experience taught basic proficiency in Perl, BioPerl, and other Perl libraries needed to analyze, transform, and publish biological data. Students required to solve a research problem as a final project. Lectures and labs are shared with Biomolecular Engineering 60. Students cannot receive credit for this course and Biomolecular Engineering 60. (Also offered as Biology: Molecular Cell & Dev 180. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20A or 21A. Previous or concurrent enrollment in course 160L is required. *The Staff, J. Stuart*

160L. Research Programming for Biologists and Biochemists Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 160. One two-hour laboratory per week. Students cannot receive credit for this course and Biomolecular Engineering 60L. (Also offered as Biology: Molecular Cell & Dev 180L. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20A or 21A. Previous or concurrent enrollment in course 160 is required. *The Staff, J. Stuart*

178. Stem Cell Biology. W

Basic concepts, experimental approaches, and therapeutic potential are discussed. Students gain experience in reading the primary scientific literature. (Also offered as Biology: Molecular Cell & Dev 178. Students cannot receive credit for both courses.) Prerequisite(s): Biology 110; Biology 115 recommended. *C. Forsberg*

193. Field Study. F,W,S

Provides for individual programs of study with specific aims and academic objectives carried out under the direction of a BME faculty member and a willing sponsor at a field site, using resources not normally available on campus. Credit is based upon written and oral presentations demonstrating the achievement of the objectives of the course. Students submit petition to sponsoring agency. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for individual programs of study with specific aims and academic objectives carried out under the direction of a BME faculty member and a willing sponsor at a field site, using resources not normally available on campus. Credit is based upon written and oral presentations demonstrating the achievement of the objectives of the course. Students submit petition to sponsoring agency. *The Staff*

194. Group Tutorial. F,W,S

A program of study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195. Senior Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to bioinformatics majors. May be repeated for credit. *The Staff*

195F. Senior Thesis or Research (2 credits). F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to bioinformatics majors. May be repeated for credit. *The Staff*

198. Individual Study or Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to bioinformatics majors. May be repeated for credit. *The Staff*

198F. Individual Study or Research (2 credits). F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to bioinformatics majors. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

For fourth-year students majoring in bioinformatics. Enrollment restricted to Bioinformatics majors. May be repeated for credit. *The Staff*

Graduate Courses

200. Research and Teaching in Bioinformatics (3 credits). F

Basic teaching techniques for teaching assistants, including responsibilities and rights of teaching assistants, resource materials, computer security, leading discussion or lab sessions, presentation techniques, maintaining class records, electronic handling of homework, and grading. Examines research and professional training, including use of library and online databases, technical typesetting, writing journal and conference papers, publishing in bioinformatics, giving talks in seminars and conferences, and ethical issues in science and engineering. Required for all teaching assistants. Enrollment restricted to graduate students. *T. Lowe, K. Karplus*

205. Bioinformatics Models and Algorithms. F

Covers bioinformatics models and algorithms: the use of computational techniques to convert the masses of information from biochemical experiments (DNA sequencing, DNA chips, and other high-throughput experimental methods) into useful information. Emphasis is on DNA and protein sequence alignment and analysis. Enrollment restricted to graduate students. Undergraduates may enroll with prerequisite(s): Computer Science 12B; and Computer Engineering 107 or Applied Math and Statistics 131; and Biology 20A; and concurrent enrollment in Biochemistry 100A. *K. Karplus*

207. Biomolecular Recognition. *

Course is the core biomolecular-engineering emphasis graduate course. Focuses on the molecular mechanism enabling the flow of information within and between cells in living systems, and its application to engineering new tools for high-throughput molecular-biology research, improving biomedical diagnostics, and aiding treatment of human disease. Prerequisite(s): Equivalent of one full year of undergraduate biochemistry. Enrollment restricted to graduate students. *T. Lowe, D. Gerloff, C. Forsberg, N. Pourmand*

210. Experimental Systems Biology. F

Topics include, but are not limited to, microarray production techniques, experimental strategies using microarrays, extraction and analysis of microarray data, DNA and protein arrays, SNP analysis, gene expression analysis, materials analysis, and advanced analysis of data using bioinformatic techniques. (Formerly *Application and Analysis of Microarrays*.) (Also offered as Biology: Molecular Cell & Dev 210. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; undergraduates by permission of instructor. *T. Lowe*

211. Computational Systems Biology. S

Teaches machine-learning methods relevant for the analysis of high-throughput molecular biology experiments. Students should be fluent in a programming language and should have taken basic molecular biology courses. Prerequisite(s): course 205. Enrollment restricted to graduate students; undergraduates may enroll if they have completed course 205, Computer Science 101, and any upper-division molecular biology or biochemistry course, such as Biochemistry 100 or 100A. *J. Stuart*

215. Applied Gene Technology. S

Detailed insight into the techniques and technological trends in genomics and transcriptomics, building the necessary foundations for further research in genetic association studies, population genetic association studies, population genetics, diagnostics, medicine, and drug development. Students should already have a deeper understanding of the basic tools of molecular biotechnology than acquired in introductory courses in biotechnology, biochemistry, and molecular biotechnology. Enrollment restricted to graduate students. *N. Pourmand*

220. Protein Bioinformatics. S

Covers the application of bioinformatics techniques to protein sequences and structures. Topics include protein sequence analysis, protein structure prediction, and sources of experimental data about proteins. Prerequisite(s): course 205, or Chemistry 200B; concurrent enrollment in course 220L, 296, or 297 is required. Enrollment restricted to graduate students; undergraduates may enroll if they have completed course 205 and Biochemistry 100A. *K. Karplus*

220L. Protein Bioinformatics Laboratory (1 credit). S

Project in protein bioinformatics. Prerequisite(s): course 205; concurrent enrollment in course 220 is required. *K. Karplus*

222. Applied Biotechnology: Protein and Cell Engineering. S

For students interested in careers in the biotech industry. Focus is applied technology, with particular emphasis on the application of cell engineering and protein engineering to solve problems encountered in the design and manufacturing of biopharmaceutical products and industrial enzymes produced by recombinant DNA technology. Prior course work in biochemistry, molecular biology, genetics, and cell biology highly recommended. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. *P. Berman*

225. Protein Function in Biology and Bioinformatics. F

Reviews functional roles of proteins and computational methods used to predict functional aspects of proteins. Focus is on molecular function and structure-function relationships. Wider-reaching notions of function (pathways, interaction networks) are considered peripherally, as the context in which molecular function occurs. Course includes lectures, (computational) lab work, and discussions of topical publications. Prerequisite(s): Biochemistry and Molecular Biology 100A (or equivalent knowledge) and courses 205 and 220, or by instructor's permission. Enrollment limited to 15. *D. Gerloff*

230. Computational Genomics. W

Genomics databases: analysis of high-throughput genomics datasets; BLAST and related sequence comparison methods; pairwise alignment of biosequences by dynamic programming; statistical methods to discover common motifs in biosequences; multiple alignment and database search using motif models; constructing phylogenetic trees; hidden Markov models for finding genes, etc.; discriminative methods for analysis of bioinformatics data, neural networks, and support vector machines; locating genes and predicting gene function, including introduction to linkage analysis and disease association studies using SNPs; and modeling DNA and RNA structures. Prerequisite(s): course 205; concurrent enrollment in course 230L, 296, or 297 is required. Enrollment

restricted to graduate students; undergraduates may enroll if they have completed course 205, Computer Science 101, and BIOC 100A. *J. Stuart, D. Haussler, T. Lowe*

230L. Computational Genomics Laboratory (1 credit). W

Project in computational genomics. Prerequisite(s): course 205; concurrent enrollment in course 230 is required. *J. Stuart, D. Haussler, T. Lowe*

247. Stem Cell Research: Scientific, Ethical, Social, and Legal Issues. *

Scientific, ethical, social, and legal dimensions of human embryonic stem-cell research, including the moral status of the embryo; the concept of respect for life; ethical constraints on oocyte procurement; creation of embryonic chimeras; federal policies; and political realities. (Also offered as Biology: Molecular Cell & Dev 288. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *E. Suckiel*

250. Molecular Biomechanics. S

Considers how assemblies of macromolecules (molecular motors) convert chemical energy into mechanical work on the nanometer-to-Angstrom scale. Processes examined in the course include ATP-dependent movement of organelles in the cytosol facilitated by kinesin; proton pumping by ATPases in the mitochondrial membrane; viral genome packaging; bacterial movement driven by flagella; processive addition of nucleotides by polymerases during replication and transcription; and protein synthesis by ribosomes. Cannot receive credit for this course and course 150. Enrollment restricted to graduate students. Concurrent enrollment in course 250L required. *H. Wang, M. Akeson, W. Dunbar*

250L. Molecular Biomechanics Laboratory (2 credits). S

Laboratory course taken in conjunction with course 250. Students address a current scientific question about molecular motor function using techniques established in the UCSC Nanopore Laboratory. Specifically, students use recombinant DNA technology to produce an enzyme (e.g., a DNA polymerase) bearing a point mutation that is predicted to alter function in a defined manner. Students then use nanopore force spectroscopy to model the energy landscape for a mechanical or chemical step altered by the critical amino acid. Cannot receive credit for this course and course 150L. Concurrent enrollment in course 250 required. Enrollment restricted to graduate students. *H. Wang, M. Akeson, W. Dunbar*

255. Biotechnology and Drug Development. W

Recommended for students interested in careers in the biopharmaceutical industry. Focuses on recombinant DNA technology and the drug-development process, including discovery research; preclinical testing; clinical trials; and regulatory review, as well as manufacturing and production considerations. Students may not receive credit for this course and Biomolecular Engineering 155. (Also offered as Chemistry and Biochemistry 255. Students cannot receive credit for both courses.) Enrollment limited to graduate students. Enrollment limited to 15. *P. Berman*

280B. Seminar on Bioinformatics (2 credits). F,W,S

Weekly seminar series covering topics of current research in computational biology or bioinformatics. Current research work and literature in these areas are discussed in weekly meetings. Enrollment restricted to graduate

students or permission of instructor. May be repeated for credit. *J. Stuart, D. Haussler, T. Lowe, K. Karplus, D. Gerloff, C. Forsberg, N. Pourmand*

281B. HIV Vaccine Research (2 credits). F,W,S

Weekly seminar series covering topics of HIV vaccine research. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *P. Berman*

281F. Blood Cell Development (2 credits). F,W,S

Weekly seminar covering topics in current research on blood cell development and stem cell biology. Current research and literature in these areas discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. Enrollment limited to 10. May be repeated for credit. *C. Forsberg*

281G. Seminar on Protein Structure and Function (2 credits). F,W,S

Weekly seminar series covering topics of current computational and experimental research in protein structure prediction and design, structure-function relationships and protein evolution. Current research work and literature in these areas discussed. Students lead some discussions and participate in all meetings. (Formerly course 281R.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *D. Gerloff*

281H. Seminar in Comparative Genomics (2 credits). F,W,S

Weekly seminar series covering topics of current computational and experimental research in comparative genomics. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *D. Haussler*

281K. Seminar on Protein Structure Prediction (2 credits). F,W,S

Weekly seminar series covering topics of current computational and experimental research in protein structure prediction. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *K. Karplus*

281L. Seminar in Computational Genetics (2 credits). F,W,S

Weekly seminar series covering topics and experimental research in computational genetics. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *T. Lowe*

281S. Seminar in Computational Functional Genomics (2 credits). F,W,S

Weekly seminar series covering topics of current computational and experimental research in computational functional genomics. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to

graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *J. Stuart*

293. Seminar in Biomolecular Engineering. *

Weekly seminar series covering topics of bioinformatics and biomolecular engineering research. Current research work and literature in this area discussed. Students lead some discussions and participate in all meetings. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. *The Staff*

296. Research in Bioinformatics. F,W,S

Independent research in bioinformatics under faculty supervision. Although this course may be repeated for credit, not every degree program accepts a repeated course towards degree requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study or Research. F,W,S

Independent study or research under faculty supervision. Although course may be repeated for credit, not every degree program accepts a repeated course towards degree requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297F. Independent Study or Research (2 credits). F,W,S

Independent study or research under faculty supervision. Although course may be repeated for credit, not every degree program accepts a repeated course towards degree requirements. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Thesis research conducted under faculty supervision. Although course may be repeated for credit, not every degree program accepts a repeated course towards degree requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Computer Engineering

Faculty and Professional Interests

Professor

ALEXANDRE BRANDWAJN

Computer architecture, performance modeling, queueing network models of computer systems, operating systems

F. JOEL FERGUSON

Fault diagnosis, failure analysis, logic fault modeling, digital test pattern generation, design-for-test of digital circuits and systems

J. JOAQUÍN GARCÍA-LUNA-ACEVES

*Baskin Professor of Computer Engineering
Wireless networks, Internet, multimedia information systems*

RICHARD HUGHEY, Chair

Computer architecture, parallel processing, computational biology

GLEN G. LANGDON JR., Emeritus

TRACY LARRABEE

Test-pattern simulation and generation, fault modeling, fault diagnosis, design verification, technical writing, logic simulation

PATRICK E. MANTEY

*Baskin Professor of Computer Engineering
Image systems, image processing, visualization, image and multimedia systems, digital signal processing, real-time control*

KATIA OBRACZKA

Computer networks, distributed systems, operating systems, Internet information systems, mobile computing, wireless networks

MARTINE D. F. SCHLAG

VLSI design tools and algorithms, VLSI theory, field-programmable gate arrays, FPGA-based computing engines

ANUJAN VARMA

Computer networking, computer architecture, optical networks

Associate Professor

LUCA DE ALFARO

Formal methods, game theory, embedded systems, software engineering

PAK K. CHAN

Placement and routing algorithms, field-programmable gate arrays, spectral-based partitioning, circuit theory, computer arithmetic

ROBERTO MANDUCHI

Sensor processing and image analysis with application to assistive technology and environmental modeling

JACOB ROSEN

Biorobotics; human-centered robotics; medical robotics, surgery and rehabilitation; wearable robotics (exoskeleton); teleoperation, haptics and virtual reality, biomechanics, neuromuscular control and human-machine interfaces

HAI TAO

Image and video processing, computer vision, vision-based graphics, and human-computer interaction

Assistant Professor

WILLIAM DUNBAR

Theory and application of feedback control, air traffic control, nanopore sensors, dynamics and control of biomolecules

GABRIEL ELKAIM

Embedded systems; robust software architectures for real-time reactive systems; sensor fusion; guidance, navigation, and control (GNC) system identification; robust and advanced control schemes; feedback control systems; robotics; unmanned autonomous vehicles (UAVs); and cooperative control

MATTHEW R. GUTHAUS

VLSI, systems-on-a-chip, design automation, design for variability/robustness, mixed-signal systems

SRI KURNIAWAN

Human-computer interaction; human factors and ergonomics; accessibility; assistive technology; usability; empirical studies; user-centered design

JOSE RENAU

Computer architecture, chip multiprocessors, energy/performance trade-offs, thread level speculation, interaction between architecture and compilers, Linux kernel

Assistant Adjunct Professor

BRADLEY SMITH

Computer communications, distributed systems, policy-based routine, routing protocols, security and trust in distributed systems

Lecturer

CYRUS BAZEGHI

Computer architecture, VLSI, FPGA, embedded systems, and system architecture

ANDREA DI BLAS

Parallel computer architectures, parallel applications and programming models, combinatorial optimization

GERALD MOULDS

Technical writing, professional communications

STEPHEN C. PETERSEN

Embedded controller systems, RF wireless systems, modulation and spectrum reuse, digital signal processing, circuit theory

PATRICK TANTALO

Graph theory, combinatorics, optimization, algorithms

LINDA WERNER

Software engineering testing, educational and societal issues of computer science



Professor

BENJAMIN FRIEDLANDER (Electrical Engineering)

Digital communications, wireless communication system, array processing, adaptive signal processing

CLAIRE GU (Electrical Engineering)

Fiber sensors for bio-applications, optical fiber communications, volume holographic data storage, liquid crystal displays, nonlinear optics, optical information processing

KEVIN KARPLUS (Biomolecular Engineering)

*Undergraduate and Graduate Director of Bioinformatics
Protein structure prediction, protein design*

SURESH K. LODHA (Computer Science)

Visualization, vision, innovation, entrepreneurship

DARRELL D. E. LONG (Computer Science)

Storage systems, distributed computing systems, operating systems, mobile computing, performance evaluation, fault tolerance, computer security, multimedia, and video-on-demand systems

DOMINIC W. MASSARO (Psychology)

Understanding language, speech perception and reading, language learning and speech technology, pattern recognition, psychology of interactive media, psychology of art and new media, human-machine interface

CHARLES E. MCDOWELL (Computer Science)

Programming languages, parallel computing, and computer science education

ETHAN L. MILLER (Computer Science)

Very-long-term data storage, file and storage systems, information retrieval and metadata management distributed systems, operating systems, computer security, reliability and fault tolerance

PEYMAN MILANFAR (Electrical Engineering)

Statistical signal image/video processing and reconstruction; modeling and inverse problems in imaging; detection and estimation theory; applied mathematics

ALEX T. PANG (Computer Science)

Uncertainty visualization, tensor visualization, scientific visualization, collaboration software, virtual reality interfaces

IRA POHL (Computer Science)

Artificial intelligence, programming languages, heuristic methods, educational and social issues, combinatorial algorithms

Associate Professor

HAMID SADJADPOUR (Electrical Engineering)

Wireless communication systems, coding and information theory, ad hoc and sensor networks

Assistant Professor

JOHN MUSACCHIO (Information Systems Management)

Control, analysis, and pricing of communications networks; applications of game theory in networking; wireless ad-hoc networks; and management of technology

KEVIN ROSS (Information Systems Management)

Service engineering and management; resource allocation; operations research, pricing, scheduling; queueing theory; networks

YI ZHANG (Information Systems Management)

Information retrieval, knowledge management, natural language processing, machine learning

Adjunct Professor

HARWOOD G. KOLSKY, Retired

Program Description

Computer engineering focuses on the design, analysis, and application of computers and on their applications as components of systems. The UCSC Department of Computer Engineering sustains and strengthens its teaching and research program to provide students with inspiration and quality education in the theory and practice of computer engineering. The department offers B.S., M.S. and Ph.D degrees as well as two undergraduate minors. A combined B.S./M.S. program allows students to complete both degrees in five years.

Undergraduate Program Description

The UCSC B.S. in computer engineering prepares graduates for a rewarding career in engineering. UCSC computer engineering graduates will have a thorough grounding in the principles and practices of computer engineering and the scientific and mathematical principles upon which they are built; they will be prepared for further education (both formal and informal) and for productive employment in industry.

Because computer engineering is so broad, we offer five specialized concentrations for completing the program: systems programming, computer systems, robotics and control, networks, and digital hardware. Descriptions of these concentrations follow in the section on major requirements.

The Department of Computer Engineering offers two undergraduate minors, described after the B.S. program below. The minor in computer technology provides a broad look at computer hardware, computer software, engineering design, and the interface between computer technology and society. This minor is particularly recommended for students interested in the use of computer technology in another discipline or in K-12 teaching. The minor in computer engineering focuses on the technical aspects of computer hardware, embedded system, and software design. This minor is

particularly recommended for students interested in the design of computer technology for use in another discipline.

The Department co-sponsors the B.S. in bioengineering with the Departments of Biomolecular Engineering, Electrical Engineering, and Molecular, Cell and Developmental Biology.

Beyond the extensive research, design, and development projects taking place within courses required for the major, many computer engineering students join faculty labs to take part in cutting-edge research. The department sponsors the summer undergraduate research fellowship in information technology (SURF-IT, <http://surf-it.soe.ucsc.edu>), as well as many other research opportunities. The department holds regular faculty-undergraduate lunches to discuss research and other issues of interest.

Many computer engineering students continue their education through the M.S. degree. The Department of Computer Engineering offers an accelerated combined B.S./M.S. degree in computer engineering that enables eligible undergraduates to move without interruption to the graduate program. Interested computer engineering majors should contact their adviser for more details. The graduate program of the Department of Computer Engineering also offers both the standard M.S. and the Ph.D. degrees.

The computer engineering B.S. program is accredited by the Engineering Accreditation Commission of ABET.

Courses for Nonmajors

The Department of Computer Engineering offers course 1, *Hands-on Computer Engineering*: a two-credit laboratory course designed to introduce students to computer engineering via many short fun projects; course 3, *Personal Computer Concepts: Software and Hardware*, providing students an introductory course on the design and use of computers from an engineering viewpoint; and course 8, *Robot Automation: Intelligence through Feedback Control*. Other computer engineering courses of interest to nonmajors include course 12, *Computing Systems and Assembly Language*, an introductory course on computer systems, system software, and machine-level programming; course 80N, *Introduction to Networking and the Internet*, an introduction to technological services of the Internet; course 80U, *Ubiquitous and Mobile Computing*; course 80E, *Engineering Ethics*; and course 80A, *Universal Access: Disability, Technology, and Society*.

Computer Engineering Policies

Admissions Policy

Lower-division students will be accepted into the computer engineering major on completion of the SOE major declaration process during any of their first three quarters at UCSC. See <http://www.soe.ucsc.edu/advising/undergraduate/> for quarterly deadlines and mandatory major declaration workshops. Students considering the computer engineering major among other possibilities are strongly encouraged to take course 1 (2 credits) or course 8 within the first two quarters, and course 12 within the first three quarters.

After the first three quarters, petitions to declare the major are reviewed individually. Students must have completed at least five courses required for the major, and are expected to have a GPA among School of Engineering and Division of Physical and Biological

Sciences courses (the SOE GPA) of 2.5. Progress in the major and ability to complete the major within campus limits will also be considered.

Transfer Students

Admission to the computer engineering major for transfer students is based on performance in all transferable science, math, and engineering courses. To be admitted, at least four courses required for the major must transfer for a student to be eligible for admission. Requirements are listed below. We recommend, in particular, substantial completion of the mathematics series, as well as programming or physics.

Advising

Every major and minor must have a computer engineering faculty adviser, assigned by the Baskin School of Engineering undergraduate advising office, and with that adviser must formulate a program of proposed course work that meets the major or minor requirements (see <http://www.soe.ucsc.edu/advising/undergraduate/>).

Honors in the Major

Computer engineering majors are considered for "Honors in the Major" and "Highest Honors in the Major" based on the School of Engineering GPA and on results of undergraduate research and other significant contributions to the School of Engineering. Students with an SOE GPA of 3.7, in most cases, receive Highest Honors. Students with an SOE GPA of 3.3, in most cases, receive Honors. Students with particularly significant accomplishments in undergraduate research or contributions to the School of Engineering may be considered with a lower SOE GPA. Computer engineering juniors and seniors may also be eligible for election to the UCSC chapter of Tau Beta Pi, the national engineering honor society founded in 1885.

Progress in the Major

Declared majors must complete courses required for the major in a manner that will enable graduation within campus limits. Students not making sufficient progress may be required to take a higher course load, complete courses during summer, or otherwise adjust their study plan, at the discretion of the faculty. Students who do not complete required changes to the study plan may be disqualified from the major.

Disqualification Policy

Please refer to the Engineering section of this catalog for the School of Engineering's Major Disqualification Policy.

Letter Grade Policy

The Computer Engineering Department requires letter grading for all courses applied to the degree with the exception of two lower-division courses, which students may elect to take Pass/No Pass. This policy includes courses required for the computer engineering major but sponsored by other departments.

School of Engineering Policies

Please refer to the School of Engineering section of the catalog for additional policies that apply to all School of Engineering programs.

Materials Fee and Miscellaneous Fees

Please see the section on fees under the School of Engineering.

Computer Engineering Major Requirements

All students in the computer engineering major take the same core courses, which give the fundamentals of programming and hardware design, supported by the physics and mathematics necessary to understand them. Students must complete all of the courses listed within their selected concentration, and they must complete the capstone sequence. The senior comprehensive requirement for computer engineering majors is satisfied by completion of the capstone course and the portfolio exit requirement.

Lower-Division Core Requirements

Applied Mathematics and Statistics 10 *Mathematical Methods for Engineers I*; or Mathematics 21 *Linear Algebra*

Applied Mathematics and Statistics 20, *Mathematical Methods for Engineers II*; or Mathematics 24 *Ordinary Differential Equations*

Computer Engineering 12/L, *Computer Systems and Assembly Language/Laboratory*

Computer Engineering 13/L *Computer Systems and C Programming/Laboratory* (recommended); or Computer Science 12A/L *Introduction to Programming/Laboratory*; and Computer Science 12B/M *Introduction to Data Structures/Laboratory*; or Computer Engineering 13H *Introduction to Programming and Data Structures (Honors)*

Computer Engineering 16 *Applied Discrete Mathematics*

Electrical Engineering 70/L *Introduction to Electronics/Laboratory*

Electrical Engineering 103 *Signals and Systems*

Mathematics 19A-B *Calculus for Science, Engineering, and Mathematics*

Mathematics 23A *Multivariable Calculus*

Physics 5A/L *Introduction Physics I/Laboratory I*; or Physics 6A/L, *Introductory Physics I/Laboratory*;

Physics 5C/N *Introduction Physics III/Laboratory*; or Physics 6C/N, *Introductory Physics III/Laboratory*;

Physics 5B/M *Introduction to Physics III/Laboratory*; or 6B/M, *Introductory Physics II/Laboratory*; or an upper-division elective from the approved list.

Computer Engineering 80E *Engineering Ethics*; or another approved ethics course. This course is required even for transfer students who have had their general education requirements waived.

Upper-Division Core Requirements

Computer Engineering 100/L *Logic Design/Laboratory*

Computer Engineering 121/L *Microprocessor System Design/Laboratory*

Computer Engineering 110 *Computer Architecture*

Computer Engineering 107 *Mathematical Methods of Systems Analysis: Stochastic*

Computer Engineering 185 *Technical Writing for Computer Engineers*

Computer Science 101 *Abstract Data Types*

Concentrations

The following concentrations are specializations for the computer engineering student. Students must complete all of the courses listed within their selected concentration.

Systems Programming Concentration

The systems programming concentration focuses on software systems: courses include operating systems, compilers, software engineering, and advanced programming. Students finishing this concentration are very well prepared for building large software systems of all types. This concentration is the closest one to a computer science major—the main differences are that it does not require computer science theory courses, but because of the core computer engineering requirements, includes more hardware and electronics than a computer science bachelor's degree.

- Computer Science 111, *Introduction to Operating Systems*
- Computer Science 115, *Software Methodology*
- Elective: Upper-division elective from the approved list
- Any two of the following courses:
 - Computer Engineering 113, *Parallel and Concurrent Programming*
 - Computer Engineering 117/L, *Embedded Software/Laboratory*
 - Computer Engineering 118/L *Introduction to Mechatronics/Laboratory*
 - Computer Engineering 156/L *Network Programming/Laboratory* (requires Computer Engineering 150)
 - Computer Science 104A *Fundamentals of Compiler Design I*
 - Computer Science 104B *Fundamentals of Compiler Design II*
 - Computer Science 116 *Software Design Project*

Computer Systems Concentration

The computer systems concentration provides a balance between software and hardware design. Students are prepared for a large variety of different design tasks, especially those requiring the integration of hardware and software systems, but may need further training for any particular specialization.

- Computer Engineering 125/L, *Logic Design with Verilog/Laboratory*; or 126/L, *Advanced Logic Design/Laboratory*
- Computer Science 111, *Introduction to Operating Systems*
- Elective: Two upper-division or graduate electives from approved list

Robotics and Control Concentration

This concentration covers the hardware, software, sensing, and control aspects of autonomous and embedded systems. Students receive training in the theory, design, and realization of complex systems such as mobile robots. The concentration emphasizes integration of embedded software with hardware systems that interact with the environment.

- Three out of the following four courses:
- Computer Engineering 117/L, *Embedded Software/Laboratory*
 - Computer Engineering 118/L, *Mechatronics/Laboratory*
 - Computer Engineering 167/L, *Sensing and Sensor Technologies/Laboratory*
 - Electrical Engineering 154, *Feedback Control Systems*

Elective (three possibilities):

- Completion of all four courses listed above,
- Computer Engineering 174, *Tools for Digital Systems Design Lab* and any approved School of Engineering upper-division elective; or
- Completion of one of the following courses
 - Computer Engineering 153, *Digital Signal Processing*
 - Applied Mathematics and Statistics 146, *Chaotic Dynamical Systems*
 - Applied Mathematics and Statistics 162, *Design and Analysis of Computer Simulation Experiments*
 - Computer Engineering 242, *Applied Feedback Control*
 - Computer Engineering 240, *Introduction to Linear Dynamical Systems*
 - Information Systems Management 206, *Optimization Theory and Applications*

Networks Concentration

The networks concentration focuses on communication between computers, covering both network hardware and protocols. Students finishing this concentration are well prepared for the design of wired and wireless network systems.

- Computer Engineering 150/L, *Introduction to Computer Networks/Laboratory*
- Computer Engineering 151, *Network Administration*; or 156/L, *Network Programming/Laboratory*
- Computer Science 111, *Introduction to Operating Systems*
- Electives: Upper-division or graduate elective from approved list.

Digital Hardware Concentration

The digital hardware concentration focuses on hardware design and includes more electronics than the other concentrations. Students finishing this concentration are well prepared for building hardware systems. This concentration is the closest one to an electronics major; the main differences are that it does not require as much electronics theory or analog electronic design, but because of the core computer engineering requirements, requires more software skills.

- Computer Engineering 125/L, *Logic Design with Verilog/Laboratory*; or 126/L, *Advanced Logic Design/Laboratory*
- Computer Engineering 173/L, *High-Speed Digital Design/Laboratory*
- Computer Engineering 174, *Introduction to the EDA Tools for PCB Design* (three credits)
- Electrical Engineering 171/L, *Analog Electronics/Laboratory*
- Elective: Upper-division or graduate elective from approved list

Capstone Requirement

All computer engineering students complete a two-quarter capstone project sequence. Working with students from different concentrations and majors, students apply the skills and techniques from their own chosen concentration to a major design problem.

- Computer Engineering 123A, *Computer Engineering Design Project I*
- Computer Engineering 123B, *Computer Engineering Design Project II*; or 195, *Senior Thesis Research*

Portfolio Exit Requirement

Students are required to submit a portfolio and exit survey. Students whose submissions are deemed inadequate, either in presentation or in content, may be required to revise and rewrite the portfolio or to complete an additional project course. The portfolios must be turned in electronically via <http://www.soe.ucsc.edu/programs/ce/undergraduate/portfolio.php> at least seven days before the end of instruction in the quarter of graduation.

The portfolios will be reviewed quarterly by the computer engineering undergraduate committee and must include the following:

- a hardware-oriented project report
- a software-oriented project report
- a third project report of the student's selection
- a one- to two-page overview of the three projects, the student's contribution to them, and a narrative as specified at <http://www.soe.ucsc.edu/programs/ce/undergraduate/portfolio.php>.
- an exit survey

If a project report is associated with a course, it must be an upper-division or graduate course. One of the reports must be the result of a multi-person project. One of the reports must be the result of an individual project. One of the reports must be the result of the student's capstone design project.

Computer Engineering Major Planners

The following are two sample academic plans for students to complete during their first two years as preparation for the computer engineering major. Plan One is suggested guidelines for students who are committed to the major early in their academic career. Plan Two is for students who are considering the major. Students who take precalculus at UCSC, or who have little programming experience, are strongly advised to take course 8, *Robot Automation* in the fall quarter.

Plan One

Year	Fall	Winter	Spring
1st (frsh)	Math 19A Cmps 12A/L core course	Math 19B Cmpe 12/L Cmpe 1 (2 credit) gen ed	Cmpe 80E Cmps 12B/M gen ed
2nd (soph)	Phys 5A/L AMS 10 gen ed	AMS 20 Cmpe 16 gen ed	Phys 5C/N Cmpe 100/L Cmpe 80E

Plan Two

Year	Fall	Winter	Spring
1st (frsh)	Math 3 (pre-calc) Cmpe 8 Cmpe 1 (2 credit) core course	Math 19A Cmpe 12/L gen ed	Math 19B Cmps 13/L gen ed
2nd (soph)	Phys 5A/L Cmps 12B/M gen ed	Cmpe 100/L Cmpe 16 gen ed	Phys 5C/N AMS 10 Cmpe 80E

Computer Engineering Minor

The computer engineering minor provides a solid foundation in digital hardware, electronics, and computer software, as well as the prerequisite material in mathematics and physics. The minor is well-suited to students who wish to take part in the design of computer and embedded systems in any discipline. Computer Engineering 121/L, *Microprocessor System Design and Laboratory*, provides a capstone engineering

design experience for students pursuing the computer engineering minor.

Computer Engineering Minor Requirements

Requirements for the minor in computer engineering are the following:

Applied Mathematics and Statistics 20A or 20, (Basic *Mathematical Methods for Engineers II* (requires prerequisite); or Mathematics 24, *Ordinary Differential Equations*

Computer Engineering 12/L, *Computer Systems and Assembly Language/Laboratory*

Computer Engineering 16, *Applied Discrete Mathematics*

Computer Engineering 100/L, *Logic Design/Laboratory*

Computer Engineering 110, *Computer Architecture*

Computer Engineering 121/L, *Microprocessor System Design/Laboratory*

Computer Engineering 13/L, *Computer Systems and C Programming* (recommended); or

Computer Science 12A/L, *Introduction to Programming/Laboratory*

Computer Science 12B/M, *Introduction to Data Structures/Laboratory*; or 13H/L, *Introduction to Programming and Data Structures (Honors)/ Laboratory*

Computer Science 101, *Abstract Data Types*

Electrical Engineering 70/L, *Introduction to Electronics/Laboratory*

Mathematics 19A-B, *Calculus for Science, Engineering, and Mathematics*

Physics 5A/L, *Introduction Physics I/Laboratory*; or

Physics 6A/L, *Introductory Physics I/Laboratory*

Physics 5C/N, *Introduction Physics III/Laboratory*; or

Physics 6C/N, *Introductory Physics III/Laboratory*

At most, two of the upper-division core courses and the lower-division electrical engineering course may be used to satisfy the requirements of another major or minor degree.

Computer Technology Minor

The computer technology minor provides a broad exposure to computer hardware and software technology. The minor is intended for non-engineering majors who would like to develop an understanding of the design and use of computer technology. The minor may be particularly valuable for students who expect to use computer technology in another discipline, who are interested in K-12 teaching, or who have a general interest in computer technology and how it works. The minor includes a required capstone essay.

The computer technology minor is not available to computer engineering, computer science, electrical engineering, or information systems management majors, or to computer engineering minors.

Computer Technology Minor Requirements

Computer Engineering 1, *Hands-On Computer Engineering*

Computer Engineering 8, *Robot Automation: Intelligence through Feedback Control*

Computer Engineering 12/L, *Computer Systems and Assembly Language/Laboratory*

Computer Engineering 100/L, *Logic Design/Laboratory*

Computer Engineering 80N, *Networking and the Internet*; or 80U, *Ubiquitous and Mobile Computing*; or 150/L, *Introduction to Computer Networks/Laboratory* (requires pre-requisites)

Computer Engineering 80E, *Engineering Ethics*; or 80A, *Universal Access: Disability, Technology, and Society*

Information Systems Management 101, *Management of Technology Seminar* (1 credit)

Two of the following courses:

- Biomolecular Engineering 60/L, *Programming for Biologists and Biochemists/Laboratory*
- Computer Engineering 13/L, *Computer Systems and C Programming/Laboratory*
- Computer Science 5C, *Introduction to Programming in C/C++*
- Computer Science 5J, *Introduction to Programming in Java*
- Computer Science 5P, *Introduction to Programming Python*
- Computer Science 11, *Intermediate Programming*
- Computer Science 12A/L, *Introduction to Programming/Laboratory*
- Computer Science 12B/M, *Introduction to Data Structures/Laboratory*

Elective Requirement

Two five-credit upper-division School of Engineering electives and any associated laboratories. Only one is required if Computer Engineering 150/L is used in satisfying the requirements above.

Capstone Requirement

194F, Group Tutorial (2 credits). A group tutorial completed during the winter quarter prior to graduation considering the impact of computer technology. Students will complete papers considering aspects of the impact of computer technology on the students' discipline. Contact the School of Engineering Undergraduate Advising office during fall quarter to join this course.

B.S./M.S. Undergraduate Program

The Department of Computer Engineering offers a combined bachelor and master of science degree program in computer engineering, providing the opportunity to earn both degrees in five years. The B.S./M.S. program offers a competitive edge to students who are completing their undergraduate degree at UCSC, by enabling those with advanced preparation to move directly from the undergraduate to the graduate program. The program assists qualified enrolled students with a simplified graduate application process and makes it possible to complete an M.S. degree with just seven courses beyond the B.S. program.

The program prepares students for engineering positions in industry, and it is particularly attractive for undergraduate students planning to engage in engineering research in industry or academia. The School of Engineering has many opportunities for undergraduate research, especially for honors-level students. B.S./M.S. students can continue their undergraduate research projects with the same research group. Upon advancement to graduate standing, B.S./M.S. students are eligible for support as graduate research assistants. The B.S./M.S. program provides knowledge and training in important and contemporary areas of computer engineering.

Particularly motivated B.S./M.S. students can complete the entire program in 14 quarters (or fewer with Advanced Placement credit); however, advance planning is essential. Interested students should contact

the department and their faculty adviser early in their college career—no later than the start of their junior year. B.S./M.S. students retain undergraduate status until the completion of all undergraduate requirements, but may begin graduate course work in advance of graduate standing.

Admission to the B.S./M.S. Program

The undergraduate degree requirements are the same as those for other computer engineering majors; however, the B.S./M.S. program capitalizes on graduate-level courses that may apply toward both degree requirements. B.S./M.S. candidates may apply (at most) two graduate courses taken as undergraduates toward both the M.S. degree and B.S. degree electives. At the time graduate status is achieved, no more than three graduate courses taken as an undergraduate may count toward the nine courses required for the M.S. degree. B.S./M.S. students may not apply undergraduate courses toward the M.S. degree.

Admission to the B.S./M.S. program is by formal application. Undergraduate applicants seeking admission as graduate students generally apply in their last quarter of junior standing. To qualify, applicants must have completed the following:

- Computer Engineering 100/L, *Logic Design/Laboratory*
- Computer Engineering 110, *Computer Architecture*; or 121/L, *Microprocessor System Design/Laboratory*
- Computer Science 101, *Abstract Data Types*
- Electrical Engineering 70/L, *Introduction to Electronics/Laboratory*
- at least one additional upper-division School of Engineering course

Applications will be considered until the student's first quarter of senior standing. This extension of the application period into the first quarter of the senior year is specifically geared to enable eligible transfer students to complete the courses required for admission.

Students who cannot meet the B.S./M.S. application requirements or who are not admitted into the program are encouraged to apply for admission to the standard M.S. or Ph.D. program during their senior year.

Additional information about this program can be found on the department's web pages at <http://www.soe.ucsc.edu/programs/undergraduate/>.

Graduate Programs

M.S. and Ph.D. Degree Programs

The graduate program in computer engineering accepts students for both the M.S. and the Ph.D. degrees. Graduate students in this program establish a solid foundation in computer algorithms and architectures and then proceed to a thorough study of recent developments in their selected area of specialization. This provides the basis for the M.S. degree and Ph.D. thesis work. The major areas of research concentration in computer engineering at UCSC are networks; embedded and autonomous systems; computer systems design and computer-aided design; and sensing and interaction.

The computer engineering program benefits from a close relationship with, among others, the computer science and electrical engineering programs at UCSC and ties to industry in the Silicon Valley and Monterey Bay areas. Graduates of the program are prepared for careers in teaching and research as well as for positions in industrial research and development.

While in the program, most graduate students are supported as research assistants on faculty-sponsored projects or as teaching assistants for undergraduate courses.

Additional information on the computer engineering M.S. and Ph.D. degrees, including degree requirements and applications for admission, can be found on the department's web pages at <http://www.soe.ucsc.edu/programs/graduate/>.

Requirements for the Master's Degree

Base Requirement

In their first year, graduate students must show proficiency in three fundamental subjects: 1. data structures; 2. computer architecture; and 3. one of the following three subjects—logic design, circuits, or software systems. Proficiency can be demonstrated by either completing one of the associated undergraduate courses, by establishing that an equivalent undergraduate course has been completed elsewhere, or by passing the final exam (or project when deemed appropriate by the faculty responsible) of an associated course. Students should obtain a computer engineering base worksheet for the list of associated courses and instructions on fulfilling this requirement.

The base requirement must be met by all graduate students (both M.S. and Ph.D.) by the end of the spring quarter of their first year in the program.

Course Requirements

Each student is required to complete a total of 48 credits. The course work must include

Computer Engineering 200, *Research and Teaching in Computer Science and Engineering*

Computer Science 201, *Analysis of Algorithms*

Computer Engineering 202, *Computer Architecture*

Up to 10 credits of Computer Engineering 297, *Independent Study or Research*; or Computer Engineering 299, *Thesis Research*

Up to 10 credits of either graduate courses (not seminars) in related disciplines outside the School of Engineering (requires adviser and computer engineering graduate committee approval) or upper-division undergraduate courses when necessary to strengthen the student's preparation for graduate studies (requires adviser approval)

All remaining credits must be graduate elective courses from computer engineering's list of approved graduate courses (available online or from the department)

In addition, the selection of graduate elective courses must show breadth by including a minimum of five credits in each of two categories from computer engineering's list of approved graduate electives. Computer Science 201 and Computer Engineering 202 cannot be used to satisfy the breadth requirement.

At least half of the credits from the graduate-level courses must be computer engineering graduate courses.

Thesis

Completion of a master's thesis is required for award of the master's degree. To fulfill this requirement, the student must submit a written proposal to a faculty member, usually by the third academic quarter. By accepting the proposal, the faculty member becomes the thesis adviser for the proposed thesis. In consultation with the adviser, the student must form a master's thesis reading committee with at least two additional faculty members, each of whom is provided a copy of the proposal. The student is required to present an expository talk on the thesis research, and the final thesis must be accepted

by the review committee before the award of the master of science degree.

Requirements for the Ph.D. Degree

Base Requirement

In their first year, graduate students must show proficiency in three of five fundamental subjects: 1. data structures; 2. computer architecture; and 3. one of the following three subjects—logic design, circuits, and software systems. Proficiency can be demonstrated by either completing one of the associated undergraduate courses, by establishing that an equivalent undergraduate course has been completed elsewhere, or by passing the final exam (or project when deemed appropriate by the faculty responsible) of an associated course. Students should obtain a computer engineering base work sheet for the list of associated courses and instructions on fulfilling this requirement.

The base requirement must be met by all graduate students (both M.S. and Ph.D.) by the end of the spring quarter of the first year in the program.

Course Requirements

A Ph.D. student is required to take a total of 58 credits of graduate courses, which must consist of

Computer Engineering 200, *Research and Teaching in Computer Science and Engineering*;

Computer Science 201, *Analysis of Algorithms*;

Computer Engineering 202, *Computer Architecture*;

A minimum of 20 credits of graduate computer engineering courses from computer engineering's list of approved graduate courses (available online or from the department);

Up to 10 credits of Computer Engineering 297, *Independent Study or Research*; or Computer Engineering 299, *Thesis Research*;

Up to 10 credits of graduate courses (not seminars) in related disciplines outside the School of Engineering (requires adviser and computer engineering graduate committee approval);

All remaining credits must be graduate elective courses from computer engineering's list of approved graduate courses.

The selection of elective courses must show breadth by including either 10 credits in each of two categories or five credits in each of three separate categories from computer engineering's list of approved graduate courses. Computer Science 201 and Computer Engineering 202 cannot be used to satisfy the breadth requirement.

Course selection should form a coherent plan of study and requires adviser approval. Undergraduate courses may not be used to satisfy Ph.D. course requirements.

Ph.D. students who have satisfied the requirements for the master's degree are eligible to receive a master's degree.

Examinations and Dissertation

To continue in the Ph.D. program, students must pass a preliminary examination in their chosen research area by the end of their third year. Preliminary examinations are held during the first three weeks of each spring quarter; students must petition the computer engineering graduate committee for an examination in their chosen area two weeks before the end of winter quarter. Examination committees consist of four faculty members, two chosen by the student and two by the computer engineering graduate committee. The format of this oral examination is up to the examination committee; the examination will typically evaluate both general

knowledge of the chosen area and specific understanding of selected technical papers. The preliminary examination requirement is waived for students who advance to candidacy by the end of their third year.

Each student must write a Ph.D. dissertation. The dissertation must show the results of in-depth research, by an original contribution of significant knowledge, and include material worthy of publication. As the first step, a student must submit a written dissertation proposal to a School of Engineering faculty member. By accepting the proposal, the faculty member becomes the student's dissertation supervisor. The student may choose a faculty member outside the Computer Engineering Department within the School of Engineering as adviser only with approval from the computer engineering graduate committee. The dissertation proposal is publicly and formally presented in an oral qualifying examination given by a qualifying exam committee, approved by the computer engineering graduate committee and the graduate council. The student must submit his or her written dissertation proposal to all members of the qualifying exam committee and the graduate assistant one month in advance of the examination.

Students are advanced to candidacy after they have completed the course requirements, passed both the preliminary and qualifying examinations (or just the qualifying examination if passed prior to the end of the student's third year in the program), cleared all Incomplete grades from their records, have an appointed dissertation reading committee, and paid the filing fee. Students who have not advanced to candidacy by the end of their fourth year will be placed on academic probation.

Each Ph.D. candidate must submit the completed dissertation to a reading committee at least one month prior to the dissertation defense. The appointment of the dissertation reading committee is made immediately after the qualifying exam and is necessary for advancing to candidacy. The candidate must present his or her research results in a public seminar sponsored by the dissertation supervisor. The seminar is followed by a defense of the dissertation to the reading committee and attending faculty who will then decide whether the dissertation is acceptable or requires revision. Successful completion of the dissertation fulfills the final academic requirement for the Ph.D. degree.

Transfer Credit

Up to three School of Engineering courses fulfilling the degree requirements of either the M.S. or Ph.D. degrees may be taken before beginning the graduate program through the concurrent enrollment program.

Ph.D. students who have previously earned a master's degree in a related field at another institution may substitute courses from their previous university with approval of the adviser and the computer engineering graduate committee. Courses from other institutions may not be applied to the M.S. degree course requirements. Petitions for course substitutions must designate a specific graduate-level course from the list of approved graduate courses. They should be submitted along with the transcript from the other institution or UCSC extension. For courses taken at other institutions, copies of the syllabi, exams, and other course work should accompany the petition. Such petitions are not considered until the completion of at least one quarter at UCSC.

Up to three courses may be transferred from concurrent enrollment and other institutions on approval of the petition for course substitution by the computer engineering graduate committee. Two additional

courses may be transferred if the student, in addition to submitting the petition, also takes the final examination and obtains a passing grade (B or better) in the computer engineering graduate course at UCSC equivalent to the course being transferred.

Review of Progress

Each year, the computer engineering faculty reviews the progress of every student in the graduate program. Students not making adequate progress towards completion of degree requirements (see UCSC Graduate Student Handbook for policy on satisfactory academic progress) are subject to dismissal from the program. Students with academic deficiencies may be required to take additional courses. Full-time students with no academic deficiencies are normally expected to complete the degree requirements at the rate of at least two courses per quarter. Full-time students must complete Computer Science 201 and Computer Engineering 202 within two years and normally must complete all course requirements within two years for the M.S. and three years for the Ph.D. program.

Students receiving two or more grades of U (Unsatisfactory) or below B in School of Engineering courses are not making adequate progress and will be placed on academic probation for the following three quarters of registered enrollment. Withdrawing or taking a leave of absence does not count as enrollment. Part-time enrollment is counted as a half of a quarter of enrollment.

Should any computer engineering graduate student fail a School of Engineering course while on probation, the Computer Engineering Department may request the graduate dean to dismiss that student from the graduate program. If, after being removed from probation, the student again fails a School of Engineering course, he or she will return immediately to academic probation.

Graduate students experiencing circumstances or difficulties that impact their academic performance should contact their adviser and the graduate director immediately. Students may appeal their dismissal.

Lower-Division Courses

1. Hands-On Computer Engineering (2 credits). F,W,S

Hands-on introduction to computer engineering practice and research, including computer hardware, robotics, and embedded systems. Encourages interaction with UCSC's School of Engineering community. Designed for students without previous background in computer engineering. Enrollment restricted to first-year students and sophomores. Enrollment limited to 20. *T. Larrabee, S. Petersen, R. Hughey*

3. Personal Computer Concepts: Software and Hardware. F,W,S

Provides an introduction to computers. Personal computing is emphasized, and students are introduced to word processing, spreadsheets, database management, graphics, and programming. Covers fundamentals of computing and current and future uses of computer technology, PC hardware, Windows operating system, applications software, networking and the Internet, and developments in the computer industry. Designed for students with little or no experience using computers. Students cannot receive credit for this course and Computer Science 2. (General Education Code(s): IN.) *The Staff*

8. Robot Automation: Intelligence through Feedback Control. F,S

Introduction to dynamical systems, feedback control, and robotics. Fundamental concepts in dynamical systems, modeling, stability analysis, robustness to uncertainty, feedback as it occurs naturally, and the design of feedback-control laws to engineer desirable static and dynamic response. Course includes an introduction to MATLAB and programming in MATLAB. Priority enrollment restricted to first-year students and sophomores. (General Education Code(s): IN, Q.) *W. Dunbar, G. Elkaim*

12. Computer Systems and Assembly Language. F,W

Introduction to computer systems and assembly language and how computers compute in hardware and software. Topics include digital logic, number systems, data structures, compiling/assembly process, basics of system software, and computer architecture. May include C language. Prerequisite(s): course 3 or 8, or Computer Science 10 or 12A or 5C or 5J or 5P, or Biomolecular Engineering 60, or suitable programming experience; previous or concurrent enrollment in course 12L required. (General Education Code(s): IN, Q.) *T. Larrabee, G. Elkaim, F. Ferguson, R. Hughey*

12L. Computer Systems and Assembly Language Laboratory (2 credits). F,W

Laboratory sequence in assembly language programming. The basics of logic design, both RISC and microcontroller programming. May include C language programming. Two two-hour laboratories per week. Prerequisite(s): course 3 or 8, or Computer Science 10 or 12A or 5C or 5J or 5P, or Biomolecular Engineering 60, or suitable programming experience; previous or concurrent enrollment in course 12 required. *T. Larrabee, G. Elkaim, F. Ferguson, R. Hughey*

13. Computer Systems and C Programming. S

Introduction to the C programming language as a means for controlling embedded and general computing systems. Continuing the exploration begun in course 12, students move to higher levels of abstraction in the control of complex computer systems. Prerequisite(s): courses 12 and 12L. Concurrent enrollment in course 13L is required. *R. Hughey*

13L. Computer Systems and C Programming Lab (2 credits). S

Laboratory sequence in C programming for embedded and general computing systems. Two 2-hour laboratories per week. Concurrent enrollment in course 13 is required. *R. Hughey*

16. Applied Discrete Mathematics. F,S

Introduction to applications of discrete mathematical systems. Topics include sets, functions, relations, graphs, trees, switching algebra, first order predicate calculus, mathematical induction, permutations, combinations, summation, and recurrences. Examples drawn from computer science and computer engineering. Prerequisite(s): eligibility to enroll in Mathematics 19A (completion of Mathematics 2B or 3 or Mathematics Placement Exam score of 40 or higher) or completion of Mathematics 19A or 11A. (General Education Code(s): Q.) *J. Garcia-Luna-Aceves, H. Tao, L. De Alfaro, M. Schlag, T. Larrabee*

80A. Universal Access: Disability, Technology, and Society. W,S

Overview of human-centered technology and of its potential for increasing the quality of life and independence of disabled individuals. A substantial portion of the

course is devoted to studying physical, psychological, and psychosocial aspects of disability. Topics include: diversity and integration, legislation, accessibility, and universal design. (Formerly *Assistive Technology and Universal Access*.) (General Education Code(s): T7-Natural Sciences or Social Sciences.) *S. Kurniawan, R. Manduchi*

80E. Engineering Ethics. S

Ethical theories, analysis, and their application to issues in the practice of engineering, such as safety and liability, professional responsibility to clients and employers, codes of ethics, legal obligations, environmental issues, and social issues. Emphasis on developing independent ethical analysis through the use of case studies. (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *The Staff*

80H. History of Modern Computing. *

Presents a history of the development of computing technologies (CPUs and I/O devices, operating systems, and languages) through the latter half of the 20th century in order to build an understanding of how today's computing environment evolved. (General Education Code(s): T2-Natural Sciences.) *D. Pease*

80N. Introduction to Networking and the Internet. F,W,S

Introduction to the evolution, technological basis, and services of the Internet, with descriptions of its underlying communications structure, routing algorithms, peer-to-peer hierarchy, reliability, and packet switching. Network security, mail, multimedia and data compression issues, HTML, and digital images. Students who have completed course 150 cannot receive credit for this course. (General Education Code(s): T2-Natural Sciences.) *R. Manduchi, A. Varma, K. Obraczka*

80U. Ubiquitous and Mobile Computing. W

Ubiquitous computing integrates computer and communication technology with day-to-day life. Ubiquitous and mobile technology includes: MP-3 players, camera cell phones, Bluetooth headsets, sensor networks, and new emerging technologies. Course provides an overview of the technology and economics of ubiquitous computing. (General Education Code(s): T2-Natural Sciences.) *R. Manduchi, H. Tao*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

100. Logic Design. W,S

Boolean algebra, logic minimization, finite-state machine design, sequential circuits, common logic elements, programmable logic devices, and an introduction to system

level design. The electrical behavior of circuits including three state outputs, propagation delay, logic levels, and fanout. Prerequisite(s): courses 12 and 12L; previous or concurrent enrollment in course 100L required. Enrollment limited to 60. *T. Larrabee, M. Guthaus, S. Petersen, M. Schlag*

100L. Logic Design Laboratory (2 credits). W,S

Laboratory sequence illustrating topics covered in course 100. One two-hour laboratory session per week. Weekly laboratory assignments which require the use of the oscilloscopes, TTL circuits, computer-aided design and simulation tools, and programmable logic. Students are billed a materials fee. Prerequisite(s): courses 12 and 12L; previous or concurrent enrollment in course 100 required. Enrollment limited to 60. *T. Larrabee, M. Guthaus, S. Petersen, M. Schlag*

107. Mathematical Methods of Systems Analysis: Stochastic. F,W

Introduction to fundamental tools of stochastic analysis. Probability, conditional probability, Bayes Theorem, random variables, independence, Poisson processes, Bernoulli trials, and Markov chains. Instructor's choice of additional topics, most likely drawn from confidence measures, difference equations, transform methods, stability issues, applications to reliability, queues, and hidden Markov models. Students cannot receive credit for this course and Applied Mathematics and Statistics 131. Prerequisite(s): course 16 or 16H and Mathematics 22 or 23A. *A. Brandwajn, R. Manduchi*

108. Data Compression. W

Basics of information theory, lossless coding (Huffman coding, arithmetic coding, dictionary coding), lossy coding (PCM, predictive coding, transform coding). Application to the compression of specific data set, which may include biological time series, DNA sequences, and multimedia streams. Prerequisite(s): course 107 or Applied Mathematics and Statistics 131; and Computer Science 101. *R. Manduchi*

110. Computer Architecture. W

Introduction to computer architecture including examples of current approaches and the effect of technology and software. Computer performance evaluation, basic combinatorial and sequential digital components, different instruction set architectures with a focus on the MIPS ISA and RISC paradigm. Evolution of CPU microarchitecture from single-cycle to multi-cycle pipelines, with overview of super-scalar, multiple-issue and VLIW. Memory system, cache, virtual memory and relationship between memory and performance. Evolution of PC system architecture. May include advanced topics, such as parallel processing, MIMD, and SIMD. Prerequisite(s): courses 12, 12L, and 16. *A. Di Blas, R. Hughey, J. Renau, A. Brandwajn, F. Ferguson*

112. Computer and Game Console Architecture. S

Introduces computer and game console architecture, including examples of current approaches and the effect of technology and software. Computer performance evaluation; instruction-set architectures; RISC CPU and pipelining; cache and memory; multi-core, system-level architecture; video card; special console architectures. Pre-requisite(s): course 12. *A. Di Blas*

113. Parallel and Concurrent Programming. *

Introduction to parallel and concurrent programming. Topics include types of parallel computers and programming platforms, basic and advanced programming techniques in C with MPI and OpenMP, performance

analysis and load balancing, and selected parallel algorithms. Students perform programming projects using clusters and shared memory platforms. Students must have a discrete working knowledge of the C programming language and a user-level familiarity with the Unix operating system. Prerequisite(s): Computer Science 12B. *A. Di Blas, L. De Alfaro, K. Obraczka, R. Hughey*

117. Embedded Software. *

Introduction to software design for embedded systems. Emphasis on real-time embedded systems as follows: fundamentals of scheduling for real-time systems, real-time operating systems, and real-time protocols for distributed real-time systems; time-triggered and event-triggered paradigms for embedded software development, their tradeoffs, and languages and tools for development of embedded software. Prerequisite(s): course 121 or Computer Science 111; previous or concurrent enrollment in course 117L required. Enrollment limited to 20. *L. De Alfaro*

117L. Embedded Software Laboratory (2 credits). *

Gain experience in the practical aspects of embedded programming by writing several programs for small robots. Emphasis is to provide experience in a spectrum of programming paradigms (even-triggered, time-triggered), communication paradigms (synchronous and asynchronous programming), and programming languages (both C/C++ and more specialized languages for embedded programming). Students are billed a materials fee. Concurrent enrollment in course 117 is required. Enrollment limited to 30. *L. De Alfaro*

118. Introduction to Mechatronics. W

Technologies involved in mechatronics (intelligent electro-mechanical systems) and techniques necessary to integrate these technologies into mechatronic systems. Topics include electronics (A/D, D/A converters, opamps, filters, power devices), software program design (event-driven programming, state machine-based design), DC and stepper motors, basic sensing, and basic mechanical design (machine elements and mechanical CAD). Combines lab component of structured assignments with a large and open-ended team project. Prerequisite(s): Electrical Engineering 70/L and course 12/L or equivalent. Concurrent enrollment in course 118L is required. Enrollment limited to 36. *G. Elkaim*

118L. Introduction to Mechatronics Laboratory (2 credits). W

Laboratory sequence illustrating topics covered in course 118. Two 2-hour laboratory sessions per week. Taught in conjunction with course 218L. Students are billed a materials fee. Prerequisite(s): Electrical Engineering 70/L and course 12/L or equivalent. Concurrent enrollment in course 118 is required. Enrollment limited to 36. *G. Elkaim*

121. Microprocessor System Design. F,S

The design and use of microprocessor-based systems. Covers microprocessor and microcontroller architecture, programming techniques, bus and memory organization, DMA, timing issues, interrupts, peripheral devices, serial and parallel communication, and interfacing to analog and digital systems. Prerequisite(s): courses 12/L and 100/L; Electrical Engineering 70/L; previous or concurrent enrollment in course 121L required. Enrollment limited to 40. *P. Chan, S. Petersen, R. Hughey*

121L. Microprocessor System Design Laboratory (2 credits). F,S

Laboratory sequence illustrating topics covered in course 121. One two-hour laboratory session per week. Students

design, build, program, debug, document, and demonstrate a microprocessor-based system. Students are billed a materials fee. Prerequisite(s): courses 12C/L and 100/L; Electrical Engineering 70/L; previous or concurrent enrollment in course 121 required. Enrollment limited to 40. *P. Chan, S. Petersen, R. Hughey*

123A. Engineering Design Project I. F,W

First of a two-course sequence that is the culmination of the engineering program. Students apply knowledge and skills gained in elective track to complete a major design project. Students complete research, specification, planning, and procurement for a substantial project. Includes technical discussions, design reviews, and formal presentations; engineering design cycle, engineering teams, and professional practices. Formal technical specification of the approved project is presented to faculty. Prerequisite(s): Electrical Engineering 171 or Computer Engineering 121; previous or concurrent enrollment in Computer Engineering 185; permission of department and instructor. Students are billed a materials fee. (Also offered as Biomolecular Engineering 123A and Electrical Engineering 123A. Students cannot receive credit for all courses.) *J. Vesecky, The Staff*

123B. Engineering Design Project II (7 credits). W,S

Second of two-course sequence in engineering system design. Students fully implement and test system designed and specified in course 123A. Formal written report, oral presentation, and demonstration of successful project to review panel of engineering faculty required. Students are billed a materials fee. (Also offered as Biomolecular Engineering 123B and Electrical Engineering 123B. Students cannot receive credit for all courses.) Prerequisite(s): courses 123A and 185. Enrollment limited to 35. *J. Vesecky, The Staff*

125. Logic Design with Verilog. F,W

Verilog digital logic design with emphasis on ASIC and FPGA design. Students design and verify large-scale systems. Assignments and project use the Verilog Hardware Description Language with emphasis on verification and high-frequency ASIC/FPGA targets. Prerequisite(s): courses 100 and 100L; and Electrical Engineering 70 and 70L. Concurrent enrollment in course 125L required. Enrollment limited to 40. *P. Chan, A. Varma, M. Guthaus, J. Renau, M. Schlag*

125L. Logic Design with Verilog Laboratory (2 credits). F,W

Laboratory sequence illustrating topics covered in course 125. One two-hour laboratory session per week. Students are billed a materials fee. Prerequisite(s): courses 100 and 100L; Electrical Engineering 70 and 70L. Concurrent enrollment in course 125 is required. Enrollment limited to 40. *P. Chan, A. Varma, M. Guthaus, J. Renau, M. Schlag*

126. Advanced Logic Design. *

Digital logic and system-level design using state-of-the-art FPGA tools. Students design large-scale logic circuits from fundamental building blocks and methods using design-automation tools. All examples and assignments use the Verilog Hardware Description Language with emphasis on FPGA systems. Prerequisite(s): courses 100 and 100L; Electrical Engineering 70 and 70L. Concurrent enrollment in course 126L is required. Enrollment limited to 20. *P. Chan, A. Varma, M. Guthaus, J. Renau, M. Schlag*

126L. Advanced Logic Design Laboratory (2 credits). *

Laboratory sequence illustrating topics in course 126. One four-hour laboratory session per week. Students use computer-aided design tools for the specification, design, and verification of digital systems. Students implement and realize a digital system using field-programmable gate arrays. Students are billed a materials fee. Prerequisite(s): courses 100 and 100L; Electrical Engineering 70 and 70L. Concurrent enrollment in course 126 is required. Enrollment limited to 20. *P. Chan, A. Varma, M. Guthaus, J. Renau, M. Schlag*

131. Human-Computer Interaction. F

Theory and hands-on practice to understand what makes user interfaces usable and accessible to diverse individuals. Covers human senses and memory and their design implications, requirement solicitation, user-centered design and prototyping techniques, and expert and user evaluations. Interdisciplinary course for social science and engineering majors. Students cannot receive credit for this course and Computer Engineering 231 or Psychology 223. (Also offered as Psychology 131. Students cannot receive credit for both courses.) Prerequisite(s): Computer Science 12B or Psychology 3. *S. Kurniawan*

150. Introduction to Computer Networks. W

Addresses issues arising in organizing communications among autonomous computers. Network models and conceptual layers; Internet-working; characteristics of transmission media; switching techniques (packet switching, circuit switching, cell switching); medium access control (MAC) protocols and local area networks; error-control strategies and link-level protocols; routing algorithms for bridges and routers; congestion control mechanisms; transport protocols; application of concepts to practical wireless and wireline networks and standard protocol architectures. Students who have completed course 80N can take this course for credit. Students are billed for a materials fee. Prerequisite(s): course 16, and either courses 12 and 12L or Computer Science 12B and Computer Science 12M. *J. Garcia-Luna-Aceves, P. Mantey, A. Varma, K. Obraczka*

150L. Introduction to Computer Networks Laboratory (2 credits). W

Illustrates the concepts covered in course 150 and provides students with hands-on experience in computer networks. Prerequisite(s): courses 12, 12L, and 16. Concurrent enrollment in course 150 is required. *B. Smith, P. Mantey, K. Obraczka, J. Garcia-Luna-Aceves*

151. Network Administration. S

Projects include installing and configuring (client and server) machines, configuring network routing, setting up firewalls and network appliances, and setting up and using wireless networks. Includes lectures, projects presented, and discussions. Requires formal written reports, oral presentations, and demonstrations of projects. Students are billed a materials fee. Prerequisite(s): course 150. Enrollment limited to 30. *K. Obraczka*

153. Digital Signal Processing. *

Introduction to the principles of signal processing, including discrete-time signals and systems, the z-transform, sampling of continuous-time signals, transform analysis of linear time-invariant systems, structures for discrete-time systems, the discrete Fourier transform, computation of the discrete Fourier transform, and filter design techniques. Taught in conjunction with Electrical Engineering 250. Students cannot receive credit for this course and Electrical Engineering 250. (Also offered as

Electrical Engineering 153. Students cannot receive credit for both courses.) Prerequisite(s): Electrical Engineering 103. *The Staff*

156. Network Programming. *

Methods and tools used for network programming. Topics include inter-process communication (IPC), facilities such as pipes, shared memory, semaphores, sockets, and remote procedure call (RPC); design of client and server sides of network applications; CGI programming; and programming projects. Prerequisites: course 150 and Computer Science 111. Concurrent enrollment in course 156L required. *A. Varma, K. Obraczka*

156L. Network Programming Laboratory (2 credits). *

Laboratory sequence illustrating concepts taught in course 156. Learn use of network programming tools and methods via programming exercises. Students are billed a materials fee. Prerequisites: course 150 and Computer Science 111. Concurrent enrollment in course 156 required. *A. Varma, K. Obraczka*

167. Sensing and Sensor Technologies. *

Introduces the fundamental issues in sensing and various sensor technologies including motion sensors, velocity sensors, GPS sensors, acoustic sensors, light and image sensors, and range sensors. Also demonstrates sensor technologies using a system approach to show how they can be integrated into a complete digital system. Prerequisite(s): course 100 and Electrical Engineering 70. Concurrent enrollment in course 167L is required. *G. Elkaim, H. Tao*

167L. Sensing and Sensor Technologies Lab (2 credits). *

Lab assignments reinforce the concepts and techniques learned in course 167. Assignments include measurement and estimation techniques, experiments with various sensors, and a course project in which students build digital sensing systems. Students are billed a materials fee. Prerequisite(s): course 100 and Electrical Engineering 70. Concurrent enrollment in course 167 is required. *G. Elkaim, H. Tao*

173. High-Speed Digital Design. W

Studies of analog circuit principles relevant to high-speed digital design: signal propagation, crosstalk, and electromagnetic interference. Topics include electrical characteristics of digital circuits, interfacing different logic families, measurement techniques, transmission lines, ground planes and grounding, terminations, power systems, connectors/ribbon cables, clock distribution, shielding, electromagnetic compatibility and noise suppression, and bus architectures. Prerequisite(s): Electrical Engineering 70, 70L and course 174. Electrical Engineering 171 and course 121 recommended. Previous or concurrent enrollment in course 173L required. Enrollment limited to 30. *S. Petersen, P. Chan*

173L. High-Speed Digital Design Laboratory (2 credits). W

Laboratory sequence illustrating topics covered in course 173. One two-hour laboratory session per week. Students are billed a materials fee. Prerequisite(s): Electrical Engineering 70, 70L and course 174. Electrical Engineering 171 and course 121 recommended. Previous or concurrent enrollment in course 173 required. Enrollment limited to 30. *S. Petersen, P. Chan*

174. Introduction to EDA Tools for PCB Design (3 credits). F

Focus on EDA tools for design of printed-circuit boards. Elements of design flow covered: schematic capture and simulation to final PCB layout. Final project is required. Students are billed a materials fee. Prerequisite(s): Electrical Engineering 70 or consent of instructor. *S. Petersen*

177. Applied Graph Theory and Algorithms. *

Basic concepts and algorithms are reviewed including trees, Eulerian and Hamiltonian graphs, and graph transversal. Algorithms are explored to solve problems in connectivity, routing, matching, and embedding of graphs. Graph theory and algorithms are developed around applications in computer engineering. Prerequisite(s): Computer Science 101. *M. Schlag*

185. Technical Writing for Computer Engineers. F,W

Writing by engineers and computer scientists, not to general audiences, but to engineers, engineering managers, and technical writers. Exercises include job application and resume, in-code documentation, algorithm description, naive-user documentation, library puzzle, survey article, proposal, progress report, formal technical report, and oral presentation. Offered in alternate quarters. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; Computer Science 12B or 13H or Computer Engineering 12. Enrollment restricted to School of Engineering majors. Enrollment limited to 60. (General Education Code(s): W.) *T. Larrabee, G. Moulds*

193. Field Study. F,W,S

Provides for individual programs of study with specific academic objectives carried out under the direction of a faculty member of the Computer Engineering Department and a willing sponsor at the field site using resources not normally available on campus. Credit is based on the presentation of evidence of achieving the objectives by submitting a written and oral presentation. May not normally be repeated for credit. Students submit petition to sponsoring agency. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for individual programs of study with specific academic objectives carried out under the direction of a faculty member of the Computer Engineering Department and a willing sponsor at the field site using resources not normally available on campus. Credit is based on the presentation of evidence of achieving the objectives by submitting a written and oral presentation. May not normally be repeated for credit. Students submit petition to sponsoring agency. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195. Senior Thesis Research. F,W,S

Students submit petition to sponsoring agency. Prerequisite: course 123A. *The Staff*

195F. Senior Thesis Research (2 credits). F,W,S

Students submit petition to sponsoring agency. Consent of instructor required. Prerequisite: course 123A. *The Staff*

198. Individual Study or Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Individual Study or Research (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

For fourth-year students majoring in computer engineering. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

For fourth-year students majoring in computer engineering. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Graduate Courses***200. Research and Teaching in Computer Science and Engineering (3 credits). F**

Basic teaching techniques for teaching assistants including responsibilities and rights of teaching assistants, resource materials, computer security, leading discussion or lab sessions, presentation techniques, maintaining class records, electronic handling of homework, and grading. Examines research and professional training, including use of the library and online databases, technical typesetting, writing journal and conference papers, publishing in computer science and computer engineering, giving talks in seminars and conferences, and ethical issues in science and engineering. Required for all T.A.s. Enrollment restricted to graduate students. *T. Larrabee, M. Schlag, A. Brandwajn, S. Brandt*

202. Computer Architecture. F

Provides a thorough and fundamental treatment of the art of computer architecture. Topics include concepts of von Neumann architectures, methods of evaluating CPU performance, instruction-set design and examples, compiler issues, instruction pipelining, superscalar processors, methods for reduction of branch penalty, memory hierarchies, I/O systems, floating-point arithmetic, and current issues in parallel processing. Prerequisite(s): course 110 or 112. Enrollment restricted to graduate students; undergraduates may enroll if they have completed course 110 or 112 and with consent of instructor. Enrollment limited to 30. *P. Chan, J. Renau, A. Varma, R. Hughey*

218. Mechatronics. W

Introduction to intelligent electro-mechanical systems, combining aspects of computer, electrical, mechanical, and software engineering. Students become proficient in all aspects of mechanical, electrical, computer system design, analysis, prototyping, presentation and team mentorship. Taught in conjunction with course 118. Prerequisite(s): concurrent enrollment in course 218L. Enrollment restricted to graduate students. Enrollment limited to 36. *G. Elkaim*

218L. Mechatronics Lab (2 credits). W

Laboratory sequence illustrating topics covered in course 218. Two 2-hour laboratory sessions per week. Taught in conjunction with course 118L. Students are billed a

materials fee. Prerequisite(s): concurrent enrollment in course 218. Enrollment restricted to graduate students. Enrollment limited to 36. *G. Elkaim*

220. Advanced Parallel Processing. W

Introduction to programming advanced parallel computer architecture. Topics may include: SIMD massively parallel processor arrays; streaming parallel coprocessors, such as graphics cards used for general-purpose processing (GPGPU); or other hybrid MIMD/SIMD architectures. Course has programming lab component, a project, and student presentation on related topics. (Formerly *Parallel Processing*.) Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. *R. Hughey, A. Di Blas*

221. Advanced Microprocessor Design. W

Introduction to latest advances in computer architecture. Focuses on processor core design. Topics include simultaneous multithreading, thread level speculation, trace caches, novel out-of-order mechanisms, and energy-efficient processor core designs. Final project is modification/enhancement of an out-of-order processor on an FPGA development system. Prerequisite(s): course 202; and course 125, 225, or equivalent Verilog experience. Concurrent enrollment in course 221L required. Enrollment restricted to graduate students. Enrollment limited to 20. *J. Renau*

221L. Advanced Microprocessor Design Laboratory (3 credits). W

Laboratory sequence illustrating topics covered in course 221. Prerequisite(s): course 202; and course 125, 225, or equivalent Verilog experience. Concurrent enrollment in course 221 required. Enrollment restricted to graduate students. Enrollment limited to 20. *J. Renau*

222. VLSI Digital System Design. F

Introduction to Very Large Scale Integrated (VLSI) design, focusing on custom integrated circuits. Topics include logic families, FETs, interconnect models, simulation, and RC timing. Course covers the design flow from logic design to layout, with a focus on high performance and low power. Students should be familiar with RC circuit analysis. Enrollment restricted to seniors and graduate students. Undergraduates may enroll with permission of instructor. *M. Guthaus, The Staff*

223. VLSI System-on-a-Chip Design. *

Design methodologies for Application Specific Integrated Circuits (ASICs). Topics include: behavioral specification; logic synthesis; standard-cell libraries; advanced timing analysis; and physical design automation tools. Familiarizes students with real-world tools during the design of a small system-on-a-chip project. Students are encouraged to fabricate and test their chips in an independent study. Prerequisite(s): course 222 or permission of instructor. Enrollment restricted to graduate students. *M. Guthaus, The Staff*

224. Testing Digital Circuits. *

An introduction to the theory and practice of testing. Topics are chosen from fault and defect models, test generation for combinational and sequential circuits, fault simulation, scan-design and built-in self-test. Enrollment restricted to graduate students; undergraduates may enroll if they have completed Computer Science 101. *F. Ferguson, T. Larrabee*

225. Introduction to ASIC Systems Design. *

Introduction to system prototyping using field-programmable gate arrays (FPGAs). Topics include architectures of FPGAs, behavioral design specification, system partitioning, synthesis tools, design verification, and studies of novel systems implemented with FPGAs. Intended to familiarize students with the techniques and tools in ASIC designs. Final project is the complete design of a small system using FPGAs. Enrollment restricted to graduate students; undergraduates may enroll if they have completed courses 100/L and 202. Enrollment limited to 10. Offered in alternate academic years. *P. Chan*

229. Field-Programmable Gate Arrays Computer-Assisted Design. F

Design methods for Field-Programmable Gate Arrays (FPGAs), including algorithms for technology mapping, routability estimation, placement, and routing. The relationship between FPGA architectures and their computer-aided design tools. Course project involves the modification and analysis of an FPGA tool. Enrollment restricted to graduate students or by consent of instructor. Courses 100, 125, 126, 222, 225, or other digital design experience recommended. Enrollment limited to 20. *M. Schlag*

230. Computer Performance Evaluation. W

Introduction to methods of analysis of computer system performance. Predictive performance models with emphasis on queuing models; exact and appropriate solution methods, discrete-event simulation, and numeric iterative approaches; analytical solutions and their computation; separable queuing networks, decomposition approaches; examples of practical application; and performance measurement, model validation, robustness of models, and operational analysis. Enrollment restricted to graduate students. Enrollment limited to 20. Offered in alternate academic years. *A. Brandwajn*

231. Human-Computer Interaction. F

Theory and hands-on practice to understand what makes user interfaces usable and accessible to diverse individuals. Covers human senses and memory and their design implications, requirement solicitation, user-centered design and prototyping techniques, and expert and user evaluations. Individual research project. Interdisciplinary course for social science and engineering graduate students. Students cannot receive credit for this course and course 131. (Also offered as Psychology 223. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *S. Kurniawan*

232. Arithmetic Processors. *

Concept of number systems: binary additions, multiplications, divisions; elementary function evaluations; algorithm acceleration; floating-point and significant arithmetics; IEEE standards; technology related issues; algorithm evaluation by implementation with gate arrays. Prerequisite(s): course 202. Enrollment restricted to graduate students. Enrollment limited to 15. *P. Chan*

233. Human Factors. W

Course focuses on theories, practices, and design of systems to optimize human well-being and system performance through consideration of psychological, social, physical, and biological factors. Covers human sensory systems and memory, workload management, error and reliability, performance measurement, and ergonomic design. Interdisciplinary course for social science and engineering graduate students. Enrollment restricted to graduate students; undergraduates may enroll if they have completed course 131. *S. Kurniawan*

240. Introduction to Linear Dynamical Systems. F

Introduction to applied linear algebra and linear dynamical systems with applications to circuits, signal processing, communications, and control systems. Topics include the following: Least-squares approximations of over-determined equations and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm and singular value decomposition. Eigenvalues, left and right eigenvectors, and dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-input multi-output systems, impulse and step matrices; convolution and transfer matrix descriptions. Control, reachability, state transfer, and least-norm inputs. Observability and least-squares state estimation. Enrollment restricted to graduate students; undergraduates may enroll if they have completed Electrical Engineering 103 and Applied Math and Statistics 147. *G. Elkaim, W. Dunbar, K. Ross*

241. Introduction to Feedback Control Systems. W

Graduate-level introduction to control of continuous linear systems using classical feedback techniques. Design of feedback controllers for command-following error, disturbance rejection, stability, and dynamic response specifications. Root locus and frequency response design techniques. Extensive use of MATLAB for computer-aided controller design. Course has concurrent lectures with Electrical Engineering 154. (Also offered as Electrical Engineering 241. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *P. Milanfar, P. Mantey, J. Rosen, W. Dunbar, G. Elkaim*

242. Applied Feedback Control. *

Sequel to Electrical Engineering 154. After reviewing control design techniques examined in EE 154, this course explores state space control, discrete time control, and two case studies in control design. Students design and implement feedback controllers on an inverted pendulum experiment. Prerequisite(s): Electrical Engineering 154 or course 241. Enrollment restricted to juniors, seniors, and graduate students. *W. Dunbar*

243. System Identification. *

Course provides introduction to the construction of linear dynamical models from experimental data using parametric and non-parametric identification techniques. Theoretical and practical aspects of these techniques addressed. Prerequisite(s): course 240, or by permission of instructor. *W. Dunbar, G. Elkaim*

248. Games in Design and Control. *

Graduate-level introduction to game theory and its applications to system design, verification, analysis, and optimal control. Enrollment restricted to graduate students. Computer Science 101, 201, or equivalent recommended. *L. De Alfaro*

250. Multimedia Systems. F

Study of state-of-the-art technology for networked multimedia systems. Topics include audio, image, and video acquisition and compression standards (JPEG, MPEG, and ITU families); networking for multimedia; and digital television. Proficiency in C or C++ required. Prerequisite(s): Enrollment restricted to graduate students. *R. Manduchi*

251. Error-Control Coding. *

Overview of coding to protect messages against error during transmission or storage. Topics include channel models, linear algebra over finite fields, linear block codes and bounds, cyclic codes (BCH and RS), decoding

algorithms, spectral analysis, codes on graphs, and low-complexity algorithms. Enrollment restricted to graduate students or consent of instructor. *H. Sadjadpour*

252A. Computer Networks. F

Issues resulting from organizing communication among autonomous computers. Includes network models and switching techniques; medium access control protocols and local area networks; error control and retransmission strategies; routing algorithms and protocols; congestion control mechanisms and end-to-end protocols; application-level protocols; and application of concepts to wireless and wireline networks, with emphasis on the Internet. Enrollment restricted to graduate students. *A. Varma, J.J. Garcia-Luna-Aceves*

252B. Modeling of Communications Protocols. *

Theory and practice of computer communication networks. Emphasis is on verification and performance analysis of network control processes. Topics include protocols for channel access, point-to-point and multi-point reliable transmission, routing, congestion control, network management, multicasting, and ATM networks. Prerequisite(s): courses 107 and 252A. *A. Varma, J.J. Garcia-Luna-Aceves*

253. Network Security. *

Fundamental mechanisms for network security and their application in widely deployed protocols. In-depth treatment of security mechanism at the data-link, network, and transport layers for both wired and wireless networks. Covers mechanisms for privacy and integrity, and methods for intrusion detection. Prerequisite(s): course 252A and Computer Science 201. Enrollment restricted to graduate students. *A. Varma*

254. High Speed Computer Networks. *

Fiber-optic technology; fiber-optic link design; network protocol concepts; coding and error control; high-speed local area and metropolitan area networks; gigabit networks; error and congestion control; photonic networks; research topics. Prerequisite(s): course 252B. Offered in alternate academic years. *A. Varma*

256. Design Project in Computer Networks. F

Students develop a working implementation of a network protocol with the goal of obtaining hands-on experience in implementing real-world network protocols. Prerequisite(s): course 252A; enrollment restricted to graduate students. *A. Varma*

257. Wireless and Mobile Networks. S

An interdisciplinary course on wireless communication and mobile computing. Covers the physical aspects of wireless communication but emphasizes higher protocol layers. Topics include cellular networks, packet radio and ad hoc networks, wireless transport protocols, security, and application-level issues. Prerequisite(s): course 252A or permission of instructor. Enrollment limited to 20. *K. Obraczka, J.J. Garcia-Luna-Aceves*

258. Unix Networking Internals. *

In-depth treatment of the implementation of network protocols in typical open-source Unix systems. Topics include implementation of send and receive functions, buffer management, interrupt handling, locking, scheduling and timer management. Major implementation project required. Prerequisite(s): course 252A. Computer Science 111 recommended. Enrollment restricted to graduate students. *A. Varma*

259. Sensor Networks. W

Focus is on the networking aspects of sensor networks: protocols at the various layers and how they answer the specific requirements posed by these networks (e.g., data driven, energy efficient, etc.) and their applications (monitoring, tracking, etc.). Explore how physical layer and hardware issues may influence protocol design. Courses 252A and 257 recommended. *K. Obraczka*

263. Data Compression. W

Introduction to information theory and data compression. Lossless coding (Huffman, arithmetic, dictionary codes). Lossy coding (scalar and vector quantization, differential coding, transform coding). Applications to the compression of real data sets (DNA sequences, biological time series, multimedia streams). Concurrent lectures with course 108. Students cannot receive credit for both this course and course 108. Students must have basic knowledge of probability theory. Enrollment restricted to graduate students. *R. Manduchi*

264. Image Analysis and Computer Vision. S

Brief review of image processing. Binary images, thresholding, morphological operations; edge detection and segmentation; contours: digital curves and curve fitting; statistical texture analysis, shape from texture; depth cues, stereo matching, depth from stereo; color perception and segmentation; and shading and image radiance, surface orientation, and shape from shading. Electrical Engineering 264 encouraged, but not required. Undergraduate students who are interested in enrolling should meet with the instructor first. *H. Tao*

276. Software Engineering. *

Introduction to the general principles of software engineering. Covers current and classical topics from both practical and theoretical viewpoints. Topics include software evolution, project management, software inspections, design methods, requirements analysis and specification, software testing, maintenance, software implementation, human interfaces, and software engineering experimentation. Enrollment restricted to graduate students; undergraduates may enroll in this course if they have completed Computer Science 115. *L. De Alfaro, The Staff*

277. Graph Algorithms. S

Explores graph theory and algorithms for solving problems in engineering. A review of basic graph concepts and algorithms is followed by topics in network flow, partitioning, spectral analysis of graphs, graph isomorphism, and intractability. Prerequisite(s): Computer Science 101 and 102; or course 177; or Computer Science 201; or equivalent. Enrollment restricted to graduate students. Enrollment limited to 20. *M. Schlag*

278. Introduction to the Theory of Discrete Systems. *

Introduction to methods for modeling, analyzing, and reasoning about discrete systems, such as hardware and software designs. First part of course presents basic models for hardware and software systems and introduces methods for system specification, verification, abstraction, and stepwise refinement of a design into an implementation. Second part discusses role of structure: hierarchy, system composition, and interface specification. Prerequisite(s): some mathematical background is assumed. Enrollment restricted to graduate students or by permission of instructor. *L. De Alfaro*

280C. Seminar on Control (2 credits). F,W,S

Weekly seminar series covering topics of current research in theory and application of control to engineering sys-

tems. Current research work and literature in these areas discussed. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. May be repeated for credit. *G. Elkaim, J. Rosen, W. Dunbar, K. Ross*

280G. VLSI/CAD Seminar (2 credits). F,W,S

Weekly seminar on advanced topics in VLSI and computer-aided design (CAD). Students present and discuss modern issues in semiconductor design, fabrication, and CAD. Frequent guest speakers present pertinent results from industry and academia. Enrollment limited to 20. May be repeated for credit. *M. Guthaus*

280N. Seminar on Networks (2 credits). F,W,S

Weekly seminar series covering topics of current research in networks and networked systems. Current research work and literature in these areas are discussed. Prerequisite(s): permission of instructor. Enrollment restricted to graduate students. May be repeated for credit. *K. Obraczka, J.J. Garcia-Luna-Aceves*

280P. Seminar on Parallel Processing (2 credits). F,W,S

Weekly seminar series covering topics of current research in parallel systems, architectures, and algorithms. Current research work and literature in these areas are discussed. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *R. Hughey, M. Guthaus, J. Renau*

280T. Seminar on New Technologies (2 credits). *

Weekly seminar series in which distinguished speakers from industry, universities, and government discuss current developments in networking and computer technology. The emphasis is on open research questions that may lead to collaborative work with faculty and graduate students. *The Staff*

280V. Seminar on Computer Vision (2 credits). F,W,S

Weekly graduate-level seminar series discussing advanced topics in computer vision and image analysis. Current research and literature presented during each meeting. Enrollment limited to 20. May be repeated for credit. *R. Manduchi, H. Tao*

285. Technical Writing for Engineering Graduates. S

Writing skills development for graduate engineers. Students produce a major writing project with many subtasks. Exercises includes fellowship application; mathematical and algorithmic description; use of tables and graphs; experiment description; and producing technical web sites, presentations, and posters. Enrollment restricted to graduate biomolecular engineering, computer engineering, computer science, and electrical engineering majors. (Open to all School of Engineering graduate students.) Enrollment limited to 20. *T. Larrabee, The Staff*

290L. Advanced Topics in VLSI Computer-Aided Design. *

A graduate course on a research topic in VLSI computer-aided design. Topic varies according to instructor. Possible topics include, but are not limited to specification languages and formal verification, logic minimization, testing and verification, electrical simulation, layout synthesis, and behavioral synthesis. Course 100, 125, 126, 222, or 225 recommended. Offered in alternate academic years. *P. Chan, M. Schlag, F. Ferguson, T. Larrabee*

290M. Topics in Parallel Computation. *

Investigates selected topics in applied parallel computation. Topics may include numerical methods, artificial intelligence and machine learning algorithms, graphics and image processing, systolic algorithms, and the interplay between hardware and algorithms. Students are encouraged to investigate and discuss the parallelization of their own research. Enrollment restricted to graduate students. *R. Hughey*

290N. Topics in Computer Performance. *

Selected topics of current interest in the area of computer system performance. Subjects may include aspects of large systems, performance, computer networks, storage subsystems, and nontraditional approaches and are subject to periodic revision. Enrollment restricted to graduate students. Offered in alternate academic years. *A. Branduvajn*

290V. Advanced Topics in Visual Computing. *

Advanced course in image analysis and computer vision. Topics include motion analysis, multiple view geometry, 3D reconstruction, image-based rendering, vision-based graphics, face detection and recognition, tracking, image and video retrieval, and human-computer interface. Enrollment restricted to seniors and graduate students. Enrollment limited to 20. *S. Lodha, H. Tao*

293. Advanced Topics in Computer Engineering. S

A graduate seminar on a research topic in computer engineering which varies according to instructor. Possible topics include, but are not limited to, communication networks, data compression, special-purpose architectures, computer arithmetic, software reliability and reusability, systolic arrays. *J. Rosen*

297. Independent Study or Research. F,W,S

Independent study or research under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

299. Thesis Research. F,W,S

Thesis research conducted under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

299F. Thesis Research (2 credits). F,W,S

Independent study or research under faculty supervision. Enrollment restricted to graduate students. Recommended for part-time students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Computer Science

*Faculty and Professional Interests***Professor**

MARTÍN ABADI

Computer and network security, principles of programming languages, specification and verification methods

SCOTT A. BRANDT

Operating systems, storage systems, real-time systems

DAVID P. HELMBOLD

Machine learning, computational learning theory, analysis of algorithms

HARRY D. HUSKEY, Emeritus

PHOKION G. KOLAÏTIS
Logic in computer science, automated deduction, computational complexity, database theory

ROBERT A. LEVINSON
Artificial intelligence, machine learning, heuristic search, associative pattern retrieval, hierarchical reinforcement learning, semantic networks

SURESH K. LODHA
Visualization, vision, innovation, entrepreneurship

DARRELL D. E. LONG
Storage systems, distributed computing systems, operating systems, mobile computing, performance evaluation, fault tolerance, computer security, multimedia, and video-on-demand systems

CHARLES E. MCDOWELL
Programming languages, parallel computing, and computer science education

ETHAN L. MILLER
Very long-term data storage, file and storage systems, information retrieval and metadata management, distributed systems, operating systems, computer security, reliability and fault tolerance

ALEX T. PANG
Uncertainty visualization, tensor visualization, scientific visualization, collaboration software, virtual reality interfaces

IRA POHL
Artificial intelligence, programming languages, heuristic methods, educational and social issues, combinatorial algorithms

R. MICHAEL TANNER, Emeritus

ALLEN VAN GELDER
Logic programming algorithms, parallel algorithms, complexity, programming languages, automated theorem proving, scientific visualization

MANFRED K. WARMUTH
Online learning, machine learning, statistical decision theory, neural computation, analysis of algorithms

Associate Professor

DIMITRIS ACHLIOPTAS
Analysis of algorithms, machine learning, random structures

JAMES E. DAVIS
Computer graphics and computer vision, methods for acquiring and manipulating complex graphical models from the real world

CORMAC FLANAGAN
Programming languages, type systems, specification and verification methods, software engineering, concurrency

MICHAEL MATEAS
Artificial Intelligence (AI) for art and entertainment, game AI, AI and creativity, AI-based interactive storytelling, autonomous characters

WANG-CHIEW TAN
Database systems: data provenance, information integration, scientific databases, database query languages, combinatorial optimization of database problems

E. JAMES WHITEHEAD JR.
Software engineering, software evolution, software bug prediction, automated software construction, video game level design

Assistant Professor

NEOKLIS POLYZOTIS
Synopses for XML data, visual query interfaces, query processing, and optimization

NOAH WARDRIIP-FRUIIN
Digital media, computer games, electronic literature, software studies

Adjunct Professor

DON CHAMBERLIN (Regents' Professor)
Database languages and systems, document processing

MARTIN GRISS
Software Engineering

JAMES KING
Adobe technology, digital publishing, program verification

Assistant Adjunct Professor

JOHN D. FUNGE
Artificial intelligence (AI); game AI; computer games; machine learning; knowledge representation and democratic methods

CARLOS MALTZAHN
Scalable file system data and metadata management; very long-term data preservation; network intermediaries; machine learning; information retrieval; cooperation dynamics

Lecturer

DELBERT (DEAN) BAILEY
Artificial intelligence, pattern recognition, computational complexity, analysis of algorithms

PAULO FRANCA
Computer programming teaching methodology; web-based development techniques, office automation, and paperless document management

WESLEY MACKAY
Compiler construction, programming languages

PATRICK TANTALO
Graph theory, combinatorics, optimization, algorithms

LINDA WERNER
Software engineering, testing, educational and societal issues of computer science



Professor

ALEXANDRE BRANDWAJN (Computer Engineering)
Computer architecture, performance modeling, queuing network models of computer systems, operating systems

F. JOEL FERGUSON (Computer Engineering)
Fault diagnosis, failure analysis, logic fault modeling, digital test pattern generation, design-for-test of digital circuits and systems

J. JOAQUÍN GARCÍA-LUNA-ACEVES (Computer Engineering)
(Baskin Professor of Computer Engineering) Wireless networks, Internet, multimedia information systems

JORGE HANKAMER (Linguistics)
Syntax, semantics, morphology, computational linguistics, Turkish

DAVID HAUSSLER (Biomolecular Engineering; Director, Institute for Quantitative Biomedical Research and the Center for Biomolecular Science and Engineering)
Molecular evolution, neurodevelopment, genomics, bioinformatics, computational molecular biology, statistical models, machine learning, neural networks

RICHARD HUGHEY (Biomolecular Engineering and Computer Engineering)
Computer architecture, parallel processing, computational biology

KEVIN KARPLUS (Biomolecular Engineering)
Protein structure prediction, protein design

TRACY LARRABEE (Computer Engineering)
Test-pattern simulation and generation, fault modeling, fault diagnosis, design verification, technical writing, logic simulation

PATRICK E. MANTEY (Computer Engineering) (Baskin Professor of Computer Engineering)
Image systems, image processing, visualization, image and multimedia systems, digital signal processing, real-time control

KATIA OBRACZKA (Computer Engineering)
Computer networks, distributed systems, operating systems, Internet information systems, mobile computing, wireless networks

GEOFFREY K. PULLUM (Linguistics)
Syntax, English grammar, mathematical and computational linguistics, philosophy of linguistics

MARTINE D. F. SCHLAG (Computer Engineering)
VLSI design tools and algorithms, VLSI theory, field-programmable gate arrays, FPGA-based computing engines

BARRY SINERVO (Ecology and Evolutionary Biology)
Animal behavior, evolution, physiological ecology

ANUJAN VARMA (Computer Engineering)
Computer networking, computer architecture, optical networks

W. TODD WIPKE, Emeritus (Chemistry and Biochemistry)

Associate Professor

PAK K. CHAN (Computer Engineering)
Placement and routing algorithms, field-programmable gate arrays, spectral-based partitioning, circuit theory, computer arithmetic

LUCA DE ALFARO (Computer Engineering)
Formal methods, game theory, embedded systems, software engineering

WARREN SACK (Film and Digital Media)
Software design and media theory

HAI TAO (Computer Engineering)
Image and video processing, computer vision, vision-based graphics, and human-computer interaction

Assistant Professor

GABRIEL ELKAIM (Computer Engineering)
Embedded systems; robust software architectures for real-time reactive systems; sensor fusion; guidance, navigation, and control (GNC) system identification; robust and advanced control schemes; feedback control systems; robotics; unmanned autonomous vehicles (UAVs); and cooperative control

Program Description

Computer science is the study of the theoretical and practical aspects of computer technology and computer usage. The Computer Science Department offers courses on a wide range of topics, many of which include a mathematical component, and offers undergraduate bachelor of arts and bachelor of science degrees in computer science, a bachelor of science in computer science: computer game design, as well as the master of science and doctor of philosophy degrees. Besides offering instructional courses, the department engages in a substantial research program in which both advanced undergraduates and graduate students participate.

The bachelor of arts program at UCSC is designed to give students a solid grounding in both theoretical

and practical topics in computer science, computer engineering, and mathematics while leaving flexibility for a broad program of study, including many courses outside of science and engineering, or even for a double major in another discipline. The bachelor of science program is appropriate for students desiring a somewhat stronger concentration in the sciences, with more courses in computer science and computer engineering, as well as courses in physics or chemistry; this program also allows for electives outside of science and engineering.

The bachelor of science in computer game design builds on a rigorous core program of study in computer science, adding interdisciplinary study on the artistic, dramatic, and narrative elements of computer game design; a year-long game design project acts as a capstone learning experience. Because many courses in all three programs have prerequisites, students leaning toward any of these programs will enjoy greater scheduling flexibility if they begin some preparatory courses in their first year. The specific course requirements for each undergraduate degree are given below.

Applications of computer science are found in many other areas of study, from art and music to business and science. Thus, interdisciplinary activities are encouraged. For those students whose primary interest is in another area, a minor in computer science is offered.

Courses for Nonmajors

The Computer Science Department offers a wide range of courses intended for nonmajors as well as majors. These include course 2, *Computer Literacy*; course 10, *Introduction to Computer Science*; course 80B, *Systems and Simulation*; course 80C, *Computer Arts and Graphics*; course 80J, *Technology Targeted at Social Issues*; course 80S, *From Software Innovation to Social Entrepreneurship*; and course 80K, *Foundations of Interactive Game Design*. Course 10, *Introduction to Computer Science*, may be beneficial to students who are considering the major but have a limited background in computer science. There are also introductory programming classes intended for nonmajors: courses 5C, 5J, 5P, *Beginning Programming*.

Computer Science Policies

Admissions Policy

Admission to the computer science majors is selective. First-year applicants may receive direct admission at the time they apply to UCSC based on their high school record and test scores. Admission to the major after a student has entered UCSC is based on performance in all School of Engineering and Physical and Biological Sciences courses attempted at UCSC. Please refer to the School of Engineering section of the catalog for the full admissions policy.

Foundation Courses

The foundation courses for each computer science major are as follows:

Computer Science BS and BA: Computer Science 12A and 12B (or 13H); Computer Engineering 16; and Mathematics 19A-B, or 20A-B

Computer Game Design: Computer Science 12A and 12B, Computer Engineering 16; and Mathematics 19A-B, or 20A-B.

UCSC students that have completed three or more quarters at UCSC must complete the foundation courses before they can declare a computer science major.

Disqualification and Satisfactory Progress in the Major

Students who do not make adequate progress in the computer science major may be disqualified from the major. Adequate progress normally means passing a minimum of three courses required for the major over every three consecutive quarters. (For part-time students, 15 credits attempted equals one full term.) Students who do not expect to meet this requirement should consult their faculty adviser and/or the undergraduate director for their major beforehand.

Students who receive a total of three grades of D, F, or No Pass in the key courses, Computer Science 12A, 12B, 13H, 101; and Computer Engineering 12 and 16, may, at the discretion of the department, be disqualified from the major.

The department may, at its sole discretion, disqualify from the major any student making two unsuccessful attempts in any one of the following principal courses commonly used to satisfy degree requirements:

- Computer Science 12A, 12B, 13H, 101, 102, 104A, 104B, 105, 111, 112, 115, 116, 130, 132, 140, 160, 161, 180, 181, and 183;
- Computer Engineering 12, 16, 100, 107, and 110;
- Applied Mathematics and Statistics 10, 131, and 147;
- Physics 5A, 5B, 5C, 6A, 6B, and 6C;
- Chemistry 1B and 1C;
- Mathematics 19A-B or Mathematics 20A-B, and 23A.

Each grade of D, F, or No Pass counts as one unsuccessful attempt; each grade of W counts as one-half of an unsuccessful attempt.

The School of Engineering section contains additional disqualification policies, such as maintaining a 2.0 School of Engineering GPA and the ethics requirement, that apply to computer science majors.

Students at risk of disqualification must meet with an undergraduate adviser to discuss their options for continuing in the major.

Letter Grade Policy

The Computer Science Department requires letter grades for all courses applied toward the B.A., B.S., Computer Game Design, and minor in computer science with the exception of two lower-division courses which students may elect to take Pass/No Pass. This policy includes courses required for the computer science majors but sponsored by other departments.

Transfer Students

Most courses in the computer science program at UCSC have a strong theoretical component to prepare the student for designing, as opposed to simply using, computer systems. Often, courses taken at other institutions which emphasize applications of current languages and computers do not count toward the computer science major at UCSC.

At UCSC, students are first introduced to programming using the programming language Java. The core programming sequence, courses 12A/L and 12B/M (or 13H/L, which covers both 12A/L and 12B/M), exposes students to both Java and C. Many upper-division courses that involve programming use the C and C++ programming languages. Transfer students who are not familiar with both Java and C may need to take a remedial course. Students familiar with C++ and Unix should find the transition to Java and C relatively simple.

Please refer to the School of Engineering section of the catalog for the policy regarding transfer students.

School of Engineering Policies

Please refer to the School of Engineering section of the catalog for additional policies that apply to all School of Engineering programs. These policies include admission to the major, limits on the number of times courses can be attempted, and the need for computer science students to obtain preapproval before taking courses elsewhere.

Preparation for the Major

It is recommended that high school students intending to apply to the computer science major have completed four years of mathematics (through advanced algebra and trigonometry) and three years of science in high school. Comparable college mathematics and science courses completed at other institutions also serve to properly prepare a student for the computer science major.

B.A. Major Requirements

The aim of this program is to expose students to a rigorous curriculum in computer science while maintaining sufficient flexibility so that students can take courses outside computer science, pursue a minor in another discipline, or complete a double major. Every student must complete a minimum of 17 courses, eight lower-division and nine upper-division. Out of these, the eight lower-division courses and the first upper-division course are required preparatory courses for every student. Once these preparatory courses are completed, students tailor their own program by choosing eight additional upper-division elective courses. To provide an adequate balance in subject matter, these additional courses must be divided between those that emphasize the theoretical aspects of the field and those that have a more practical focus. To provide a depth of study in one aspect of computer science, students must complete one of the approved depth sequences.

Lower-Division Requirements

Each student must successfully complete the following nine required preparatory courses:

Computer Science

12A/L, *Introduction to Programming/Computer Programming Laboratory* (or 5J, *Introduction to Programming in Java* and 11 *Intermediate Programming*);

12B/M, *Introduction to Data Structures/Laboratory*;

Computer Engineering

12/L, *Computer Systems and Assembly Language/Laboratory*

16 (or 16H), *Applied Discrete Mathematics* (or *Honors Applied Discrete Mathematics*)

Mathematics

19A-B, *Calculus for Science, Engineering, and Mathematics* (credit for one or both may be granted with adequate performance on the CEEB calculus AB or BC Advanced Placement exam); or Mathematics 20A-B, *Honors Calculus*

23A, *Multivariable Calculus*

Applied Mathematics and Statistics

10, *Mathematical Methods for Engineers I* or Mathematics 21, *Linear Algebra*

Upper-Division Requirements

101, *Algorithms and Abstract Data Types*

In addition to the above nine required courses, students must complete eight upper division electives, by completing the requirements for one depth sequence. At least 50 percent of these upper-division courses must be completed at UCSC.

Depth Sequence Requirements

For the following depth sequences, students must take at least seven courses from the theory and practice course lists, as follows:

- a minimum of three courses from the theory course list and a minimum of three courses from the practice course list;
- the seven courses from the theory and practice course lists must include all of the courses of one of the depth sequences;
- the eighth upper-division elective must be selected from any upper-division (5-credit) School of Engineering course.

The depth sequence courses are:

- *Compilers and language theory*: Computer Science 104A, 112, and 104B or 130;
- *Operating systems and hardware*: Computer Engineering 100/L, Computer Science 111, and Computer Engineering 110 or 121/L;
- *Theory*: Computer Science 102, 130, and 132;
- *Software methodology*: Computer Science 115 and two of the following: Computer Science 104A, 112, and 116;
- *Graphics*: Computer Science 160/L, 161/L, and Applied Mathematics and Statistics 147;
- *Databases*: Computer Science 180, 181, and 183

For the interactive game design depth sequence only, students must satisfy the following requirements:

- *Core courses*: students must take Computer Science 130, 105, 140, 160/L, and 115.
- *Game design electives*: students must take two courses from the game design electives list.
- *Free elective*: any course from the theory and practice course lists.

Theory Course List

Computer Science

- 102 *Introduction to Analysis of Algorithms*
 130 *Computational Models*
 132 *Computability and Computational Complexity*
 142 *Machine Learning and Data Mining*

Computer Engineering

- 107 *Mathematical Methods of Systems Analysis: Stochastic*
 108 *Data Compression*
 154 *Data Communications*
 177 *Applied Graph Theory and Algorithms*

Electrical Engineering

- 103 *Signals and Systems*
 153 *Digital Signal Processing* (formerly Computer Engineering 153)

Applied Mathematics and Statistics

- 131 *Introduction to Probability Theory*
 146 *Introduction to Dynamical Systems*
 147 *Computational Methods and Applications*
 162 *Design and Analysis of Computer Simulation Experiments*

Mathematics

- 115 *Graph Theory*
 117 *Advanced Linear Algebra*
 126 *Mathematical Control Theory*
 148 *Numerical Analysis*

Practice Course List

Computer Science

- 104A *Fundamentals of Compiler Design I*
 104B *Fundamentals of Compiler Design II*
 105 *Systems Programming*
 109 *Advanced Programming*
 111 *Introduction to Operating Systems*
 112 *Comparative Programming Languages*
 115 *Software Methodology*
 116 *Software Design Project*
 122 *Computer Security*
 128 *Distributed Systems: File Sharing, Online Gaming, and More*
 129 *Data Storage Systems*
 140 *Artificial Intelligence*
 146 *Game Artificial Intelligence*
 148 *Interactive Storytelling*
 160/L *Introduction to Computer Graphics/Laboratory*
 161/L *Visualization and Computer Animation/Laboratory*
 164/L *Game Engines/Laboratory*
 180 *Database Systems I*
 181 *Database Systems II*
 183 *Hypermedia and the Web*
 190X *Methods of Cryptography*
 204 *Compiler Design*

Computer Engineering

- 100/L *Logic Design/Laboratory*
 110 *Computer Architecture*
 112 *Computer and Game Console Architecture*
 113 *Parallel and Concurrent Programming*
 117/L *Embedded Software/Laboratory*
 118/L *Introduction to Mechatronics/Laboratory*
 121/L *Microprocessor System Design/Laboratory*
 123A *Computer Engineering Design Project I*
 123B *Computer Engineering Design Project II*
 125/L *Logic Design with Verilog/Laboratory*
 126/L *Advanced Logic Design/Laboratory*
 150 *Introduction to Computer Networks*
 152 *Analysis and Design of Communication Protocols*
 155/L *Computer Networks Project/Laboratory*
 167/L *Sensing and Sensor Technologies/Laboratory*

Electrical Engineering

- 130/L *Introduction to Optoelectronics and Photonics/Laboratory*

Game Design Electives

Computer Science

- 102 *Introduction to Analysis of Algorithms*
 116 *Software Design Project*
 128 *Distributed Systems: File Sharing, Online Gaming, and More*
 146 *Game Artificial Intelligence*
 148 *Interactive Storytelling*
 161/L *Visualization and Computer Animation/Laboratory*
 164/L *Game Engines/Laboratory*
 180 *Database Systems I*

Computer Engineering

- 112 *Computer and Game Console Architecture*
 150 *Introduction to Computer Networks*
 167/L *Sensing and Sensor Technologies/Laboratory*

Film and Digital Media

- 170A *Introduction to Digital Media Production*
 171D *Social Information Spaces*
 177 *Digital Media Workshop: Computer as Medium*

B.S. Major Requirements

This program is designed for students who wish to maximize exposure to computer science concepts and methods by taking a larger selection of upper-division computer science courses, as well as additional courses in the sciences and mathematics. A minimum of 22 courses must be completed for the B.S. in computer science, whereas a minimum of 17 courses must be completed for the B.A. in computer science. Out of the 22 courses, 10 are lower-division courses (including two science courses), and 12 are upper-division courses. The B.S. is more structured than the B.A.; 18 specific courses are required, and the remaining four are elective upper-division computer science or computer engineering courses.

Lower- and Upper-Division Requirements

Students are required to take the following 18 courses:

Computer Science

- 12A/L *Introduction to Programming/Laboratory* (or 5J *Introduction to Programming in Java and 11 Intermediate Programming*)
 12B/M *Introduction to Data Structures/Laboratory*
 101 *Algorithms and Abstract Data Types*
 102 *Introduction to Analysis of Algorithms*
 104A *Fundamentals of Compiler Design I*
 111 *Introduction to Operating Systems*
 112 *Comparative Programming Languages*
 130 *Computational Models*

Computer Engineering

- 12/L *Computer Systems and Assembly Language/Laboratory*
 16 *Applied Discrete Mathematics*
 107 *Mathematical Methods of Systems Analysis: Stochastic*, or AMS 131, *Introduction to Probability Theory*
 110, *Computer Architecture*, or 112, *Computer and Game Console Architecture*

Mathematics

- 19A-B *Calculus for Science, Engineering, and Mathematics*, or Mathematics 20A-B, *Honors Calculus*
 23A *Multivariable Calculus*

Applied Mathematics and Statistics

- 10 *Mathematical Methods for Engineers I*; or Mathematics 21, *Linear Algebra*
 131 *Introduction to Probability Theory*; or Computer Engineering 107, *Mathematical Methods of Systems Analysis: Stochastic*

Physics or Chemistry

Either two physics or two chemistry courses, with their associated laboratories, from the following:

- Physics 5A/L, *Introduction to Physics II/Laboratory* (or 6A/L);
 and either Physics 5B/M, *Introduction to Physics III/Laboratory* (or 6B/M);
 or Physics 5C/N, *Introduction to Physics III/Laboratory* (or 6C/N)
 Chemistry 1B/M, *General Chemistry/Laboratory*
 Chemistry 1C/N, *General Chemistry/Laboratory*

The remaining four courses must be upper-division computer science or computer engineering electives selected from the theory and practice course lists (see B.A. Major Requirements reference above). One of these courses may be replaced by an upper-division mathematics course from the theory course list.

Comprehensive Requirement

In addition to the above B.A. or B.S. requirements, students in the computer science majors must satisfy one of the following three exit requirements: pass one of the capstone courses (see Capstone Courses below); obtain a scaled score of 600 or above on the graduate record examination (GRE) advanced computer science subject test; or successfully complete a senior thesis.

Capstone Courses

Students may choose from one of the following capstone courses to satisfy their exit requirement:

- 104B *Fundamentals of Compiler Design II*
- 116 *Software Design Project*
- 140 *Artificial Intelligence*
- 161/L *Visualization and Computer Animation/Laboratory*
- 181 *Database Systems II*
- 183 *Hypermedia and the Web*

Students taking one of the capstone courses will enroll normally. Students need to pass the capstone course to pass the exit requirement. No course may be attempted more than twice without prior approval from the chair of the department offering the course. W's count as an attempted class for this purpose. If a student fails to receive a passing score during these two attempts, he or she may still take the GRE Advanced Computer Science Subject Test and achieve a scaled score of 600 or above to satisfy the exit requirement.

The senior thesis consists of a self-contained project within the broad scope of computer science, but one that is not available in the regular course offerings. A student wishing to complete a senior thesis must successfully complete a minimum of 5 credits in course 195, Senior Thesis Research; submit a written thesis proposal; and have it accepted by a faculty supervisor. The supervision of a senior thesis student is always at the discretion of the faculty member. A written report and an oral presentation to a faculty examining committee are required.

Students who elect to use the GRE advanced computer science subject test as their senior exit requirement must arrange to take the GRE test and have scores submitted to the department before graduation deadlines. Contact the UCSC Career Center for GRE information and application forms.

Honors in the Major

Students must obtain a GPA of 3.8 or higher in the courses in the major to be considered for the distinction of "Highest Honors in the Major." Students must obtain a GPA of 3.5 or higher in the courses in the major to be considered for the distinction of "Honors in the Major." The School of Engineering reserves the right to withhold honors based on other criteria, such as an incident of academic dishonesty.

Computer Science Major Planners

The following are four sample academic plans for first-year students as preparation for the computer science major. Plans One A and Two A are suggested guidelines for students who have some prior experience with programming. Plans One B and Two B are for students

who are considering the major and have no prior programming experience. Students who plan carefully can still have several openings free to take other breadth courses they find interesting.

Plan One A, B.A. Degree			
Year	Fall	Winter	Spring
1st (frsh)	Cmps 10 Math 19A	Cmps 12A/L Math 19B	Cmps 12B/M Math 23A
2nd (soph)	Cmpe 16	Cmpe 12/L	Cmps 101 AMS 10

Plan One B, B.A. Degree			
Year	Fall	Winter	Spring
1st (frsh)	AMS 3 Cmps 10	Math 19A Cmps 5J	Math 19B Cmps 11
2nd (soph)	Math 23A	Cmpe 16 or 16H/L Cmps 12B/M	Cmps 101 AMS 10

Plan Two A, B.S. Degree			
Year	Fall	Winter	Spring
1st (frsh)	Cmps 12A/L Math 19A	Cmps 12B/M Math 19B	Cmpe 12/L Math 23A
2nd (soph)	Cmpe 16 AMS 10	Cmpe 100/L Phys 6A/L	Cmps 101 Phys 6C/N

Plan Two B, B.S. Degree			
Year	Fall	Winter	Spring
1st (frsh)	Cmps 10	Math 19A Cmps 5J	Cmps 11 Math 19B
2nd (soph)	Math 23A	Cmps 12B/M Cmpe 16	Cmps 11 Math 19B Cmpe 12/L Cmps 101 or AMS 10

B.S. Computer Science: Computer Game Design Major Requirements

The goal of this degree is to provide students a deep understanding of the technical aspects of computer game engineering, and a broad background in the artistic, narrative, and dramatic elements of game design. The core of the degree program is a strong grounding in computer science and computer engineering, preceded by a foundation in math and physics. Classes in ethics, as well as courses in art, film, music, theater arts, and economics provide breadth in topics of special relevance to computer game design. In their upper division courses, students gain depth by taking upper division electives in computer science and computer engineering. Two advanced courses in digital media give students the ability to view computer software from an artistic framework. A year-long capstone game design studio class allows students to develop substantial computer games, and integrate materials from the rest of the program.

The curriculum has 124-141 credits in 24-25 courses (depending on whether a student enters as a transfer student). 12 of the courses are upper division. Students interested in the major should pay special attention to the overlap between general education requirements and major requirements, as the major covers up to six general education requirements.

Lower- and Upper-Division Requirements

Course requirements are divided into six conceptual areas:

Mathematics and Physics

Complete all of the following courses:

Mathematics 19A-B, *Calculus for Science, Engineering, and Mathematics* (students can alternately take, Mathematics 20A-B, *Honors Calculus*. Credit for one or both Mathematics 19A-B may be granted with adequate performance on the CEEB calculus AB or BC advanced placement exams).

Mathematics 21, *Linear Algebra*, or Applied Mathematics and Statistics 10, *Mathematical Methods for Engineers I*

Computer Engineering 16, *Applied Discrete Mathematics* (or 16H, *Honors Applied Discrete Mathematics*)

Physics 5A/L, *Introduction to Physics II/Laboratory* (or 6A/L)

Computational Foundations

Complete all of the following courses:

Computer Science 12A/L, *Introduction to Programming/Laboratory* (or 5J *Introduction to Programming in Java*, and 11 *Intermediate Programming*)

Computer Science 12B/M, *Introduction to Data Structures/Laboratory*

Computer Engineering 12/L, *Computer Systems and Assembly Language/Laboratory*

Computer Science 109, *Advanced Programming*

Computer Science 101, *Algorithms and Abstract Data Types*

Game Design

Complete all of the following courses. Course 20, *Game Design Experience* is waived for transfer students.

Computer Science 20, *Game Design Experience*

Computer Science 170, *Game Design Studio I*

Computer Science 171, *Game Design Studio II*

Computer Science 172, *Game Design Studio III*

Computer Game Engineering

Complete five courses from the following list:

Computer Science 160/L, *Introduction to Computer Graphics/Laboratory*

Computer Science 161/L, *Visualization and Computer Animation/Laboratory*

Computer Science 164/L, *Game Engines/Laboratory*

Computer Science 140, *Artificial Intelligence*

Computer Science 146, *Game Artificial Intelligence*

Computer Science 148, *Interactive Storytelling*

Computer Engineering 110, *Computer Architecture*

Computer Science 128, *Distributed Systems, File Sharing, Online Gaming, and More*

Computer Science 105, *Systems Programming*

Computer Science 111, *Introduction to Operating Systems*

Computer Engineering 112, *Computer and Game Console Architecture*

Computer Engineering 150, *Introduction to Computer Networks*

Computer Engineering 152, *Analysis and Design of Communication Protocols*

Computer Engineering 113, *Parallel and Concurrent Programming*

Computer Engineering 118/L, *Introduction to Mechatronics/Laboratory*

Computer Science 180, *Database Systems I*
 Computer Science 181, *Database Systems II*
 Computer Science 183, *Hypermedia and the Web*
 Computer Science 102, *Introduction to Analysis of Algorithms*
 Computer Science 130, *Computational Models*
 Computer Engineering 117/L, *Embedded Software/Laboratory*
 Applied Mathematics and Statistics 131, *Introduction to Probability Theory*
 Applied Mathematics and Statistics 147, *Computational Methods and Applications*
 Applied Mathematics and Statistics 162, *Design and Analysis of Computer Simulation Experiments*

Digital Media

Complete two courses from the following list,
 Film and Digital Media 170A, *Introduction to Digital Media Production*
 Film and Digital Media 177, *Digital Media Workshop, Computer as Medium*
 Film and Digital Media 171D, *Social Information Spaces*
 Any course offered in the digital arts new media (DANM) curriculum (requires approval of professor)
 Art 118, *Computer Art: Theories, Methods, and Practices* (may require approval of instructor)

Theater Arts 157, *Playwriting*

Art and Social Foundations

Complete the ethics requirement and three of the following electives.

Ethics Requirement

One of:
 Computer Engineering 80E, *Engineering Ethics*
 Philosophy 22, *Introduction to Ethical Theory*
 Philosophy 24, *Introduction to Ethics, Contemporary Moral Issues*
 Philosophy 28, *Environmental Ethics*
 Biomolecular Engineering 80G, *Bioethics in the 21st Century: Science, Business, and Society* (crosslisted as Philosophy 80G)

Art Elective

One of:
 Art 10G, *2D Foundation*
 Art 10H, *3D Foundation*
 Art 80A, *Introduction to Drawing*
 Art 80F, *Introduction to Issues in Digital Media*

Film Elective

One of:
 Film and Digital Media 20A, *The Film Experience*
 Film and Digital Media 20C, *Introduction to Digital Media*
 Film and Digital Media 20P, *Introduction to Production Technique*

Theater Elective

One of:
 Theater Arts 10, *Introduction to Theater Design and Technology*
 Theater Arts 18, *Drafting for Theatrical Production*
 Theater Arts 19, *Design Studio, Lighting Studio*
 Theater Arts 20, *Introductory Studies in Acting*
 Theater Arts 30, *Introduction to Modern Dance Theory and Technique*
 Theater Arts 40, *Introduction to Directing*
 Theater Arts 80E, *Stand-Up Comedy*
 Theater Arts 80L, *Muppet Magic: Jim Henson's Art*

Music Elective

One of:
 Music 11A, *Introduction to Western Art Music*
 Music 11B, *Introduction to Jazz*
 Music 11C, *Introduction to American Popular Music*
 Music 11D, *Introduction to World Music*
 Music 80C, *History, Literature, and Technology of Electronic Music*
 Music 80L, *Artificial Intelligence and Music*
 Music 80M, *Film Music*
 Music 80R: *Music and the World Wide Web*

Economics Elective

One of:
 Economics 1, *Introductory Microeconomics, Resource Allocation and Market Structure*
 Economics 2, *Introductory Macroeconomics, Aggregate Economic Activity*
 Economics 80H, *Wall Street and the Money Game*

Comprehensive Requirement

Students satisfy the senior comprehensive requirement by either receiving a passing grade in all three courses of the game design studio sequence or performing a senior thesis.

Computer Science: Computer Game Design Major Planners

The following are three sample academic plans that students can use to plan their sequence of courses in the major. Plans one and two are suggested guidelines for students who begin their studies in their freshman year. Such students, if they plan carefully will have several openings free to take other breadth courses they find interesting. Plan one is for a student entering UCSC in their freshman year who is prepared to go directly into Mathematics 19A/20A and Computer Science 12A. Plan two is for a student entering UCSC their freshman year who needs to take preparatory courses prior to Mathematics 19A or Computer Science 12A to ensure a successful outcome in those courses. Plan three is for students that transfer to campus at the beginning of their junior year.

Plan One—Enter UCSC Freshman Year

Year	Fall	Winter	Spring
1st (frsh)	Core	Cmps 20 (Game Design Experience)	Art/Social Elective I
	Math 19A or 20A Cmps 12A/L	Math 19B or 20B Cmps 12B/M	Cmpe 12/L Composition (C, or gen ed)

Plan One—Enter UCSC Freshman Year

2nd (soph)	Phys 5A/L or 6A/L gen ed Math 21 or AMS 10	Art/Social Elective II Cmps 109 Cmpe 16	Art/Social Elective III Ethics Requirement Cmps 101
3rd (jr)	gen ed Game Engineering Elective I Game Engineering Elective II	gen ed Game Engineering Elective III Game Engineering Elective IV	gen ed Game Engineering Elective V Cmps 172 (Game Design Studio III) Digital Media Elective II
4th (sr)	gen ed Cmps 170 (Game Design Studio I) Digital Media Elective I	gen ed gen ed Cmps 171 (Game Design Studio III)	gen ed Cmps 172 (Game Design Studio III) Digital Media Elective II

Plan Two—Enter UCSC Freshman Year, Need Math and Computer Science Preparation Classes (Mathematics 3, Computer Science 10)

Year	Fall	Winter	Spring
1st (frsh)	Core Math 3 Cmps 10	Writing (C, or gen ed) Math 19A Cmps 12A/L	Math 19B Cmps 12B/M Art/Social Elective I
2nd (soph)	Art/Social Elective II Cmpe 12/L Phys 6A/L	Cmps 20 (Game Design Experience) Cmpe 16 Cmps 109	Math 21 or AMS 10 Ethics Requirement Art/Social Elective III
3rd (jr)	Cmps 101 Digital Media Elective I gen ed	Game Engineering Elective I Game Engineering Elective II gen ed	gen ed Game Engineering Elective III Digital Media Elective II
4th (sr)	gen ed Cmps 170 (Game Design Studio I) Game Engineering Elective IV	gen ed Cmps 171 (Game Design Studio II) Game Engineering Elective V	gen ed Cmps 172 (Game Design Studio III)

Plan Three—Transfer Student

Year	Fall	Winter	Spring
1st (frsh)	Cmps 101 Cmpe 12/L Art/Social Elective I	Cmps 109 Game Engineering Elective I Digital Media Elective I	Ethics Requirement Game Engineering Elective II Digital Media Elective II
2nd (soph)	Art/Social Elective II Cmps 170 (Game Design Studio I) Game Engineering Elective III	Art/Social Elective III Cmps 171 (Game Design Studio II) Game Engineering Elective IV	gen ed Cmps 172 (Game Design Studio III) Game Engineering Elective V

Minor Requirements

Courses required for the computer science minor are Mathematics 19A-B or 20A-B, and 23A; Applied Mathematics and Statistics 10; Computer Science courses 12A/L and 12B/M (or 13H/L can be taken to cover both 12A/L and 12B/M) and course 101; Computer Engineering 12/L and 16; and four additional upper-division computer science courses from a list of approved electives (see the department's checklist for the computer science minor at www.soe.ucsc.edu/programs/cs/undergraduate/). In selecting the four upper-division courses, students may elect to focus on one subdiscipline of computer science by completing the courses in a B.A. depth sequence. Upper-division computer engineering and mathematics courses that generally apply toward the computer science major may not be applied toward the computer science minor. In addition, some upper-division computer science courses may not be applied toward the computer science minor. There is no comprehensive examination or senior thesis requirement for the minor.

Graduate Programs

Program Description

The Computer Science Department at UCSC offers both a master's program and a doctoral program. The goal of these programs is to help students develop into independent scholars who are prepared for productive careers in research, teaching, and industry. The master's degree may be used as a terminal degree or as the first step toward the Ph.D. degree. The student-faculty ratio is five to one, making it possible for students to receive individual attention and to pursue programs that fit their individual needs. The intellectual atmosphere is enriched by regular colloquia and seminars presented by eminent contributors to the field, many of whom are associated with other major universities and industrial research centers in the San Francisco Bay Area.

The Computer Science Department enjoys a close relationship with the Computer Engineering and Electrical Engineering Departments, the Bioinformatics Department, and the new Applied Mathematics and Statistics Department.

Most computer science graduate students are hired as teaching assistants helping with undergraduate courses, hired as research assistants working for computer science and other School of Engineering faculty, or awarded fellowships to pursue their research.

Additional information on the computer science graduate programs can be found on the department's web pages at www.soe.ucsc.edu.

Requirements for the Master's Degree:

Project Track

Course Requirements

Each student is required to take 50 credits as follows: Computer Science

- 200, *Research and Teaching in Computer Science and Engineering*, 3 credits;
- 201, *Analysis of Algorithms*, 5 credits;
- 203, *Programming Languages*, 5 credits;
- 296, *Master's Project*, 2 credits;
- a base requirement in computer architecture must be met by taking Computer Engineering 110 or Computer Engineering 202 or equivalent elsewhere (approval required);

- one course each from three different breadth categories for a total of three courses (15 credits). See www.soe.ucsc.edu/programs/cs/graduate/;
- all remaining credits must be graduate elective courses from the list of approved graduate courses. See www.soe.ucsc.edu/programs/cs/graduate/;
- two upper-division undergraduate computer science courses (other than course 101) or a graduate course (not seminar) in related disciplines outside the list of approved graduate courses may be substituted for one graduate course, when necessary to strengthen a student's preparation for graduate studies, with prior approval from the adviser and the graduate director.

Project

Completion of a master's project is required for the master's degree. In consultation with the adviser, the student forms a master's project reading committee of at least two faculty members, each of whom is provided a copy of the project report. The final project must be accepted by the review committee before the award of the master of science degree.

Requirements for the Master's Degree:

Thesis Track

Course Requirements

Each student is required to take 48 credits as follows: Computer Science

- 200, *Research and Teaching in Computer Science and Engineering*, 3 credits;
- 201, *Analysis of Algorithms*, 5 credits;
- 203, *Programming Languages*, 5 credits;
- a base requirement in computer architecture must be met by taking Computer Engineering 110 or Computer Engineering 202 or equivalent elsewhere (approval required);
- one course each from three different breadth categories for a total of 3 courses (15 credits)—see www.soe.ucsc.edu/programs/cs/graduate/;
- up to 10 credits of course 297, *Independent Study or Research*; or course 299, *Thesis Research*;
- all remaining credits must be graduate elective courses from the list of approved graduate courses—see www.soe.ucsc.edu/programs/cs/graduate/;
- two upper-division undergraduate computer science courses (other than course 101) or a graduate course (not seminar) in related disciplines outside the list of approved graduate courses may be substituted for one graduate course, when necessary to strengthen a student's preparation for graduate studies, with prior approval from the adviser and the graduate director.

Thesis

Completion of a master's thesis is required for the master's degree. To fulfill this requirement, the student submits a written proposal to a faculty member, usually by the third academic quarter. By accepting the proposal, the faculty member becomes the thesis adviser. In consultation with the adviser, the student forms a master's thesis reading committee with at least two additional faculty members, each of whom is provided a copy of the proposal. The student presents an expository talk on the thesis research, and the final thesis must be accepted by the review committee before the award of the master of science degree.

Requirements for the Ph.D. Degree

Course Requirements

Each student is required to take 58 credits as follows: Computer Science

- 200, *Research and Teaching in Computer Science and Engineering*, 3 credits;
- 201, *Analysis of Algorithms*, 5 credits;
- 203, *Programming Languages*, 5 credits;
- a base requirement in computer architecture must be met by taking Computer Engineering 110 or Computer Engineering 202 or equivalent elsewhere (approval required);
- one course each from three different breadth categories for a total of 3 courses (15 credits)—see www.soe.ucsc.edu/programs/cs/graduate/;
- up to 10 credits of course 297, *Independent Study or Research*; or course 299, *Thesis Research*;
- at least 33 units must be in computer science;
- all remaining credits must be graduate elective courses from the list of approved graduate courses—see www.soe.ucsc.edu/programs/cs/graduate/;
- graduate courses (not seminars) in related disciplines outside the list of approved graduate courses may be substituted, when necessary to strengthen a student's preparation for graduate studies, with prior approval from the adviser and the graduate director. Course selection should form a coherent plan of study and requires adviser approval. Undergraduate courses may not be used to satisfy Ph.D. course requirements;
- each student is required to complete at least one quarter of teaching assistantship. This requirement can be met after advancement to candidacy. Certain exceptions may be permitted for those with extensive prior teaching experience or those who are not allowed to be employed due to visa regulations.

Ph.D. students who have satisfied the requirements for the master's degree are eligible to receive a master's degree.

Dissertation

Each student writes a Ph.D. dissertation. The dissertation must show the results of in-depth research, be an original contribution of significant knowledge, and include material worthy of publication. Where appropriate, research internships with companies, government labs, or elsewhere are recognized (and may be required) as an integral part of the research leading to the dissertation. As the first step, a student submits a written dissertation proposal to a School of Engineering faculty member. By accepting the proposal, the faculty member becomes the dissertation supervisor. The dissertation proposal is publicly and formally presented in an oral qualifying examination given by a qualifying exam committee, approved by the graduate committee and the Graduate Council. The student must submit his or her written dissertation proposal to all members of the committee and the graduate assistant one month in advance of the examination.

Students are advanced to candidacy after they have completed the course requirements, passed the qualifying examination, cleared all Incompletes from their records, have an appointed dissertation reading committee, and paid the filing fee. Students who have not advanced to candidacy by the end of their fourth year will be placed on academic probation.

Each Ph.D. candidate submits the completed dissertation to a reading committee at least one month

prior to the dissertation defense. The appointment of the dissertation reading committee is made immediately after the qualifying exam and is necessary for advancing to candidacy. The candidate presents his or her research results in a public seminar sponsored by the dissertation supervisor. The seminar is followed by a defense of the dissertation to the reading committee and attending faculty, who will then decide whether the dissertation is acceptable or requires revision. Successful completion of the dissertation fulfills the final academic requirement for the Ph.D. degree.

Transfer Credit

Up to three School of Engineering courses fulfilling the degree requirements of either the M.S. or Ph.D. degrees may be taken before beginning the graduate program through the concurrent enrollment program.

Ph.D. students who have previously earned a master's degree in a related field at another institution may substitute courses from their previous university with approval of the adviser and the graduate committee.

Courses from other institutions may not be applied to the M.S. degree course requirements.

Petitions should be submitted along with the transcript from the other institution or UCSC extension. For courses taken at other institutions, copies of the syllabi, exams, and other course work should accompany the petition. Such petitions are not considered until the completion of at least one quarter at UCSC.

At most, a total of three courses may be transferred from concurrent enrollment and other institutions.

Review of Progress

Each year, the faculty reviews the progress of every student. Students not making adequate progress toward completion of degree requirements (see Graduate Handbook for policy on satisfactory academic progress) are subject to dismissal from the program. Students with academic deficiencies may be required to take additional courses. Full-time students with no academic deficiencies are normally expected to complete the degree requirements at the rate of at least two courses per quarter. Full-time students must complete course 201, Computer Engineering 202, and course 203 within two years and normally must complete all course requirements within two years for the M.S. and three years for the Ph.D.

Students receiving two or more grades of below B or U (fail) in the School of Engineering (SoE) courses are not making adequate progress and will be placed on academic probation for the following three quarters of registered enrollment. Withdrawing or taking a leave of absence does not count as enrollment. Part-time enrollment is counted as a half quarter of enrollment.

Should any computer science graduate student fail an SoE course while on probation, the Computer Science Department may request the graduate dean to dismiss that student from the graduate program. If after being removed from probation, the student again fails a SoE course, he or she will return immediately to academic probation.

Graduate students experiencing circumstances or difficulties that impact their academic performance should contact their adviser and the graduate director immediately. Students may appeal their dismissal. See www.soe.ucsc.edu/programs/cs/graduate/CSCurrentReq.html#progress for more information on this policy.

Lower-Division Courses

2. Computer Literacy. F,W,S

Introduction to how computers work and how to use them. Topics covered include network information systems, text editors, formatting, file and directory system, spreadsheets and databases. Computers as symbol manipulation devices. Introduction to programming concepts and computer languages. Impact of computers on society. Designed for students with little or no experience using computers. Preference is given to students who have not taken other computer engineering or computer science courses. Students cannot receive credit for this course and Computer Engineering 3. (General Education Code(s): IN.) *P. Franca*

5C. Introduction to Programming in C/C++. W

Introductory programming for students who have no prior programming experience. Students learn programming and documentation skills as well as algorithmic problem-solving and programming methodologies. Introduces computers, compilers, and editors. Students write medium-sized programs. This course and course 5J cover the same material, but use different programming languages. (Formerly course 60N.) (General Education Code(s): IN.) *S. Brandt, C. McDowell*

5J. Introduction to Programming in Java. W,S

Introductory programming for School of Engineering majors who have no prior programming experience. Students learn programming and documentation skills, as well as algorithmic problem-solving and programming methodologies. Introduces computers, compilers, and editors. Students write medium-sized programs. The two-quarter sequence courses 5J and 11 cover in two quarters the same material as the accelerated introductory course and lab 12A/L cover in one quarter. (Formerly course 60G.) (General Education Code(s): IN.) *C. McDowell, D. Helmbold*

5P. Introduction to Programming in Python. F

Introduction to programming for engineering or science students who have no prior programming experience. Students learn programming and documentation skills, as well as algorithmic problem-solving and programming methodologies. Introduces students to computers, programming tools, and editors. Students write medium-sized programs to solve web-based and scientific problems. This course and course 5J cover largely the same material, but use different programming languages. (General Education Code(s): IN.) *E. Miller*

10. Introduction to Computer Science. F,W

An overview of the theory, foundations, and practice of computer science with emphasis on what computers can and cannot do, now and in the future. Topics include algorithms and data, correctness and efficiency of algorithms, hardware, programming languages, limitations of computation, applications, and social issues. No programming skills are required as a prerequisite. Major concepts and open problems in computer science are presented without reliance on sophisticated mathematical tools. (General Education Code(s): IN.) *P. Tantalo, I. Pohl*

11. Intermediate Programming. S

Continuation of course 5J. Covers basic object-oriented programming, event-driven programming, graphical user interface (GUI) creation, recursion, two-dimensional arrays, and introduces programming in C and Java. The two-quarter sequence courses 5J and 11 cover in two quarters the same material as the accelerated introductory course and lab 12A/L cover in one quarter.

Students cannot receive credit this course and course 12A. Prerequisite(s): course 5J and one of the following: eligibility to enroll in Mathematics 19A (Mathematics 2B or 3, or 40 or higher on mathematics placement exam), or Mathematics 19A or 11A, or Economics 11A, or Applied Mathematics and Statistics 11A. *C. McDowell*

12A. Introduction to Programming (Accelerated). F,W,S

Accelerated introduction to programming. Students write medium-sized programs. Topics include: functions; conditionals and loops; classes; event-driven programming and graphic user interfaces (GUIs); recursion; and arrays. Students who have no or very limited programming experience should consider courses 5J and 11 which cover the same material in two quarters. Students may not receive credit for both this course and course 11. Some prior programming experience in a language such as C, C++, Java, or C# strongly recommended. Prerequisite(s): eligibility to enroll in Mathematics 19A (Mathematics 2B or 3 or 40 or higher on mathematics placement exam) or completion of Mathematics 11A or 19A or Economics 11A or AMS 11A. Concurrent enrollment in 12L required. (General Education Code(s): IN.) *The Staff, D. Bailey, P. Tantalo, W. Mackey, D. Long, C. Flanagan, C. McDowell*

12B. Introduction to Data Structures. F,W,S

Teaches students to implement common data structures and the algorithms associated with each data structure, through progressively difficult exercises. Topics include big "O" notation; pointers, recursion (induction), and dynamic allocation; linked lists and list processing; stacks, queues, binary trees and binary search trees; simple sorting techniques and simple search techniques. Students will gain a working knowledge of the elements of the Java and C programming languages. Prior experience with Unix is assumed. Prerequisite(s): course 11 or 12A. Concurrent enrollment in course 12M required. Enrollment limited to 150. (General Education Code(s): IN.) *P. Tantalo, W. Mackey*

12L. Computer Programming Laboratory (2 credits). F,W,S

Laboratory sequence complementing topics taught in course 12A by providing training and exposure to several software development tools and practices not covered in course 12A. In addition, the lab provides an initial exposure to a second programming language to reinforce concepts from course 12A. Prerequisite(s): eligibility to enroll in Mathematics 19A (Mathematics 2B or 3 or 40 or higher on mathematics placement exam) or completion of Mathematics 11A or 19A or Economics 11A or AMS 3 or 11A. Previous or concurrent enrollment in 12A required. *The Staff, D. Bailey, P. Tantalo, W. Mackey, D. Long, C. Flanagan, C. McDowell*

12M. Data Structures Laboratory (2 credits). F,W,S

Complements course 12B, gaining additional competence with a number of important software development tools, languages, and techniques. Included are advanced Unix features and utilities such as grep, find, diff, the shell, and pipes; C programs utilizing I/O, arrays, pointers, and structures; a scripting language to perform simple text and file manipulation; and the make utility. Prerequisite(s): courses 12A and 12L. Concurrent enrollment in course 12B required. *P. Tantalo, W. Mackey*

13H. Introduction to Programming and Data Structures (Honors). *

Provides an accelerated introduction to programming and data structures. Includes a review of basic programming, including loop and conditional control structures, procedures and parameter passing, and arrays. Course goes on to cover same material as course 12B. Students cannot receive credit for this course and course 12A or 12B. Prerequisite(s): interview only; students must have completed a high school or college level programming course in Java, C, or C++. A short oral examination given to ascertain programming level. Concurrent enrollment in course 13L required. Enrollment limited to 25. (General Education Code(s): IN.) *S. Brandt, D. Long*

13L. Introduction to Programming and Data Structures Laboratory (2 credits). *

Provides accelerated introduction to practical aspects of programming and data structures. Covers three areas: 1) common programming tools, including Unix commands, compilers and linkers, editors, debuggers, and Makefiles; 2) basic programming techniques, including design, testing, and debugging; and 3) C programming, focusing on the major differences between C and Java. Previous or concurrent enrollment in course 13H required. Prerequisite(s): interview only; students must have completed a high school or college level programming course in Java, C, or C++. A short oral examination given to ascertain programming level. *S. Brandt, D. Long*

20. Game Design Experience. W

Surveys history, technology, narrative, ethics, and design of interactive computer games. Covers the interplay of narrative, graphics, rule systems, and artificial intelligence in the creation of interactive games. Intended as an introduction to computer game design with a game programming focus for computer game design majors. Students cannot receive credit for this course and course 80K. Prerequisite(s): course 12A, or equivalent programming experience and permission of instructor. *E. Whitehead, M. Mateas*

60M. Scientific Computation with Matlab and Maple. *

Basic concepts from calculus visualized using Matlab and Maple; plotting data and functions, integration, differentiation, limits; solving systems of equation; linear regression; and example applications from science and engineering. Prerequisite(s): Mathematics 19B, or 20B, or by consent of instructor. Enrollment limited to 60. *M. Warmuth*

80B. Systems and Simulation. *

An introduction to systems analysis as an approach to understanding and solving complex problems. The use of simulation as an aid in this problem solving. Examples are taken from ecology, economics, physics, computer science, and other fields. Intended as a generally accessible undergraduate course in which students can develop and explore computer simulation models matched to their individual interests. (General Education Code(s): T2-Natural Sciences, Q.) *R. Levinson*

80C. Computer Arts and Graphics. *

Covers the design and use of various computer graphics programs for painting, drawing, computer-aided design, modeling, and animation. Students create graphical images using available software and design programs. Exposure to peripherals such as mice, laser printers, and possibly video and experimental peripherals. Use of SGI graphics workstations. Includes discussion of computer art and its development over time, and includes slides and

videos of computer graphics. Not intended for computer science or computer engineering majors, who are advised to take course 160. (General Education Code(s): T2-Natural Sciences.) *S. Lodha*

80G. Introduction to Unix. *

Introduction to computing, the Internet, and the World Wide Web through the language of the Unix operating system. Oriented to the beginner, the course presupposes no previous acquaintance with any particular sort of computer. It covers the basic concepts of text editing and formatting, writing Web pages in basic HTML, and promotes a rigorous understanding of Unix commands and shell scripts. Views communication with a computer as a matter of learning a few simple though powerful languages. (Also offered as Linguistics 80G. Students cannot receive credit for both courses.) (General Education Code(s): T2-Natural Sciences.) *A. Van Gelder*

80J. Technology Targeted at Social Issues. *

Introduces the idea that engineering can be a means for addressing social issues. Case studies and guest speakers. Issues might include: economic development, privacy, activism, safe drinking water, inexpensive shelters, sustainable energy, education, and waste disposal. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *S. Lodha, J. Davis*

80K. Foundations of Interactive Game Design. W

Surveys history, technology, narrative, ethics, and design of interactive computer games. Work in teams to develop novel game-design storyboards. Intended as a generally accessible undergraduate course in which students can explore the interplay of narrative, graphics, rule systems, and artificial intelligence in the creation of interactive games. Programming experience not required. Students cannot receive credit for this course and course 20. Enrollment limited to 150. (General Education Code(s): T2-Natural Sciences.) *E. Whitehead, N. Wardrip-Fruin*

80S. From Software Innovation to Social Entrepreneurship. S

Emerging software innovations with emphasis on social software. Web 2.0 companies and services. Software that has social impact in a global context. Entrepreneurial plan including social, economic, and innovation value. Final group project on innovative software design and entrepreneurship plan. (General Education Code(s): T7-Natural Sciences or Social Sciences, E.) *S. Lodha*

80V. Creating Virtual Worlds on the Web. F

Project-oriented course about creating and publishing interactive 3D content on the web. Focuses on the creation of static and dynamic objects, such as characters, terrain, accessories, and works of art. Also covers inclusion of animation and sound effects with these objects. The objects created can be used in a stand-alone setting (e.g., a 3D document) or incorporated into existing virtual worlds (e.g., as part of a level design in a computer game or assets in massively multiplayer online games). Uses 3D authoring tools (pending availability of resources) like VRML, Second Life, Alice, and/or Acrobat 3D. (Formerly *VRML 3D Worlds on the Web*.) (General Education Code(s): T2-Natural Sciences.) *A. Pang*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***101. Algorithms and Abstract Data Types. F,W,S**

Studies basic algorithms and their relationships to common abstract data types. Covers the notions of abstract data types and the distinction between an abstract data type and an implementation of that data type. The complexity analysis of common algorithms using asymptotic (big "O") notation is emphasized. Topics include sorting and searching techniques, basic graph algorithms, and algorithm design techniques. Abstract data types covered include priority queues, dictionaries, disjoint sets, heaps, balanced trees, and hashing. Familiarity with C, Java, and Unix is assumed. Prerequisite(s): course 12B or 13H; CMPE 16 or 16H; MATH 19B; and one course from the following: MATH 21, 22, 23A, or AMS 10. Enrollment restricted to School of Engineering and mathematics majors and computer science and computer engineering minors. *P. Tantalo, A. Van Gelder, D. Helmbold*

102. Introduction to Analysis of Algorithms. W,S

Methods for the systematic construction and mathematical analysis of algorithms. Order notation, the RAM model of computation, lower bounds, and recurrence relations are covered. The algorithm design techniques include divide-and-conquer, branch and bound, and dynamic programming. Applications to combinatorial, graph, string, and geometric algorithms. Prerequisite(s): course 101. *M. Warmuth, A. Van Gelder, S. Lodha, D. Helmbold, D. Achlioptas*

104A. Fundamentals of Compiler Design I. F

An introduction to the basic techniques used in compiler design. Topics include compiler structure, symbol tables, regular expressions and languages, finite automata, lexical analysis, context-free languages, LL(1), recursive descent, LALR(1), and LR(1) parsing; and attribute grammars as a model of syntax-directed translation. Students use compiler building tools to construct a working compiler. Prerequisite(s): course 101 and Computer Engineering 12 and 12L. *W. Mackey*

104B. Fundamentals of Compiler Design II. *

Advanced study of compiler implementation. Topics include compiler structure back end, run-time environments, storage management, garbage collection, register allocation, code generation, basic blocks, control flow, data flow, local and global optimization, interpretation, and machine-code generation. Students may not receive credit for this course and course 204. Taught in conjunction with course 204. Prerequisite(s): course 104A. *W. Mackey*

105. Systems Programming. *

Covers fundamentals of systems programming including standard tools, shell programming, file I/O, files and directories, system data files and information, Unix processes, process control, synchronization, signals, event-driven programming, terminal I/O, daemons, in-

terprocess communication, basic network programming, and basic user-interface programming. Prerequisite(s): course 101 and Computer Engineering 12 and 12L. Enrollment restricted to School of Engineering majors. *E. Miller, W. Mackey, S. Brandt, D. Long*

109. Advanced Programming. W

An introduction to object-oriented techniques of software development including data abstraction, inheritance, polymorphism, and object-oriented design. Extensive practice using a computer to solve problems, including construction of graphical user interfaces and a multi-threaded client/server applications. Prerequisite(s): course 12B/M. *The Staff, D. Bailey, I. Pohl, W. Mackey, C. McDowell*

111. Introduction to Operating Systems. F,S

Fundamental principles of operating systems: process synchronization, deadlocks, memory management, resource allocation, scheduling, storage systems, and study of several operating systems. A major programming project will be required. Prerequisite(s): course 101, and Computer Engineering 110 or Computer Engineering 112. *E. Miller, W. Mackey, S. Brandt, D. Long*

112. Comparative Programming Languages. W

Covers several programming languages and compares styles, philosophy, and design principles. Principles underlying declarative, functional, and object-oriented programming styles are studied. Students write programs emphasizing each of these techniques. Prerequisite(s): course 101 or 109. *W. Mackey, M. Abadi, D. Long, C. Flanagan, A. Van Gelder, C. McDowell*

115. Software Methodology. W

Emphasizes the characteristics of well-engineered software systems. Topics include requirements analysis and specification, design, programming, verification and validation, maintenance, and project management. Practical and research methods are studied. Imparts an understanding of the steps used to effectively develop computer software. Prerequisite(s): course 101. Enrollment restricted to computer science, computer engineering, and information systems management majors. Enrollment limited to 25. *E. Whitehead, C. Flanagan, L. Werner*

116. Software Design Project. S

Students in teams specify, design, construct, test, and document a complete software system in a specialized application domain. Class time is spent in technical discussions and ongoing design reviews. A formal presentation and demonstration of each project is required. An organizational meeting will be held during the preceding quarter. Projects may be drawn from industry and campus research groups. Prerequisite(s): course 115. *E. Whitehead, The Staff*

122. Computer Security. *

Introduction to computer security (including selected topics in network security). Access control. Security in programming languages. Basic cryptography. Security protocols. Prerequisite(s): course 111 or permission of instructor. Enrollment restricted to School of Engineering majors. Enrollment limited to 100. *E. Miller, M. Abadi*

128. Distributed Systems: File Sharing, Online Gaming, and More. *

Covers topics in distributed computing including communication, naming, synchronization, consistency and replication, fault tolerance, and security. Examples drawn from peer-to-peer systems, online gaming, the World Wide Web; other systems also used to illustrate approaches to these topics. Students implement simple distributed

systems over the course of the quarter. Prerequisite(s): course 101 or Computer Engineering 150. Course 111 or 105 recommended. *E. Miller, S. Brandt, D. Long*

129. Data Storage Systems. *

Covers all aspects of storage systems technology from magnetic media up through system software, including principles of magnetic recording, hard drive technology and evolution, performance measurement, file systems, storage networking, disk arrays, network-attached storage, and alternative storage technologies. Prerequisite(s): course 101, 111, and Physics 5A or 6A. *E. Miller, S. Brandt, D. Long*

130. Computational Models. F,S

Various representations for regular languages, context-free grammars, normal forms, parsing, pushdown automata, pumping lemmas, Turing machines, the Church-Turing thesis. Prerequisite(s): course 101. *D. Bailey, M. Warmuth, R. Levinson, P. Kolaitis*

132. Computability and Computational Complexity. *

Turing machines, general phase-structure grammars, the Chomsky hierarchy, recursive functions, diagonalization, the Halting problem, computability and unsolvability, computational complexity, time and space bounds, NP-completeness with emphasis on reductions between problems from various areas. Prerequisite(s): course 130. *M. Warmuth, A. Van Gelder, P. Kolaitis, D. Helmbold*

140. Artificial Intelligence. S

Introduction to the contemporary concepts and techniques of artificial intelligence, including any or all of: machine perception and inference, machine learning, optimization problems, computational methods and models of search, game playing and theorem proving. Emphasis may be on any formal method of perceiving, learning, reasoning, and problem solving which proves to be effective. This includes both symbolic and neural network approaches to artificial intelligence. Issues discussed include symbolic versus nonsymbolic methods, local versus global methods, hierarchical organization and control, and brain modeling versus engineering approaches. Lisp or Prolog may be introduced. Involves one major project or regular programming assignments. Prerequisite(s): course 101 and one of the following: course 130, Computer Engineering 177, or Mathematics 115. *I. Pohl, R. Levinson*

142. Machine Learning and Data Mining. *

Introduction to machine learning algorithms and their applications. Topics include classification learning, density estimation and Bayesian learning regression, and on-line learning. Provides introduction to standard learning methods such as neural networks, decision trees, boosting, and nearest neighbor techniques. Prerequisite(s): course 101 and one of Applied Mathematics and Statistics 5, 7, 113, 131, or Computer Engineering 107. Enrollment limited to 50. *M. Warmuth, D. Helmbold*

146. Game AI. F

Course provides a comprehensive introduction to the use of artificial intelligence (AI) in computer games. Building on fundamental principles of AI, course explains how to create non-player characters (NPCs) with progressively more sophisticated capabilities. Prerequisite(s): course 101; familiarity with C++. Enrollment restricted to sophomores, juniors, seniors, and graduate students. Enrollment limited to 50. *The Staff, I. Pohl, J. Funge, M. Mateas*

148. Interactive Storytelling. W

Covers a range of design approaches and technologies including storytelling in games, interactive fiction, interactive drama, and artificial intelligence-based story generation. Through a mixture of readings, assignments, and project work, students explore the theoretical positions, debates, and technical and design issues arising from these approaches. Students may not receive credit for this course and course 248. Prerequisite(s): course 101. Enrollment restricted to juniors and seniors. Enrollment limited to 40. *M. Mateas*

160. Introduction to Computer Graphics. F

Introduces different techniques of modeling, transformation, and rendering to obtain computer generated imagery. Topics include 2D and 3D graphical primitives, line drawings, curves and surface modeling, projections, matrix composition, hidden surface removal, and shading algorithms. Several intensive programming assignments on bit-mapped raster scan displays and a major programming project are required. Prerequisite(s): course 101 and Mathematics 21 or Applied Mathematics and Statistics 10. Concurrent enrollment in course 160L required. Enrollment limited to 50. *A. Pang, S. Lodha, J. Davis*

160L. Introduction to Computer Graphics Laboratory (2 credits). F

Complements course 160, gaining additional competence with a number of important software development tools, graphics libraries, and graphical user interfaces. Included are OpenGL program, utilizing rubberbanding, picking, trackballing, display lists, double buffering, lighting, shading, materials and textures; and FLTK program, utilizing sliders, buttons, and dialog boxes. Prerequisite(s): course 101 and Mathematics 21 or Applied Math 10. Concurrent enrollment in course 160 required. Enrollment restricted to all engineering majors. Enrollment limited to 50. *A. Pang, S. Lodha, J. Davis*

161. Visualization and Computer Animation. W

Introduction to standard techniques of computer animation and data visualization. Topics include mathematical foundations; creature and behavioral animation; scalar, vector and tensor visualization methods. Involves programming exercises, instruction in available software, and a project. Prerequisite(s): course 160 and 160L or equivalent. Enrollment restricted to students majoring in computer sciences, computer engineering, or electrical engineering. Concurrent enrollment in course 161L required. Enrollment limited to 35. *A. Pang, S. Lodha*

161L. Visualization and Computer Animation Laboratory (2 credits). W

Complements course 161, gaining additional competence with a number of important software development tools and techniques. Included are Visualization Toolkit (vtk) and Insight Toolkit (ITK); C, OpenGL, and FLTK programs utilizing visualization techniques of isosurfacing, transfer function, volumetric rendering, streamlines visualization; video capture for facial animation and pose estimation, group and behavioral animations. Prerequisite(s): courses 160 and 160L; concurrent enrollment in course 161 required. Enrollment restricted to all engineering majors. Enrollment limited to 35. *A. Pang, S. Lodha*

164. Game Engines. S

Covers the graphic elements in computer games. Topics include modifying, optimizing, adding components, and building a game engine. Course evaluation based on exams and several programming projects, including a game built

using the student's game engine. Prerequisite(s): courses 160 and 160L. Concurrent enrollment in course 164L required. *A. Pang*

164L. Game Engines Lab (2 credits). S

Provides hands-on experience in using, designing, and building game engines. Students also explore different special effects, such as particle systems, spring systems, and game physics. Prerequisite(s): courses 160 and 160L. Concurrent enrollment in course 164 required. *A. Pang*

170. Game Design Studio I. F

First of a three-course capstone sequence for the computer game design program. Students work in teams to develop a comprehensive game design for a substantial computer game, including detailed storyline, level design, artistic approach, implementation technologies, and art-asset pipeline. Emphasis placed on creating novel, artistic game design concepts. Includes design reviews and formal presentations. Companion lectures cover advanced topics in game design, game programming, and software project management. Enrollment restricted to senior computer game design majors. Enrollment limited to 50. *E. Whitehead, M. Mateas*

171. Games Design Studio II. W

Second of a three-course capstone sequence for the computer game design program. Students work in teams on the software design, implementation, and testing of the computer game designed in course 170. Includes design reviews, progress reviews, and formal presentations. Companion lectures cover topics in software engineering, including design, testing, and project management. Game design and game programming also covered. Enrollment restricted to senior computer game design majors. Enrollment limited to 50. *E. Whitehead, M. Mateas*

172. Game Design Studio III. S

Third of a three-course capstone sequence for the computer game design program. Students work in teams on the software design, implementation and testing of the computer game designed in courses 170 and 171. Includes progress reviews and formal presentations. Companion lectures cover topics in software engineering, including user and software testing, release engineering and project management; also covered are game design and game programming. Prerequisite(s): course 171. Enrollment restricted to senior computer game design majors. Enrollment limited to 50. *The Staff, E. Whitehead, M. Mateas*

180. Database Systems I. W

Introduction to the concepts, approaches, tools, and methodology of database design. Covers the entity-relationship model, the relational model, relational algebra, relational calculus, commercial languages (such as SQL and QBE), functional dependencies, normal forms, and design theory. Other topics may include knowledge-bases, constraint databases, and alternative database models. Prerequisite(s): course 101. *W. Tan, N. Polyzotis, P. Kolaitis*

181. Database Systems II. S

Introduction to the architecture and implementation of database systems. Topics covered include data storage, tree and hash indexes, storage management, query evaluation and optimization, transaction management, concurrency control, recovery, and XML data management. Prerequisite(s): course 180. Enrollment limited to 50. *W. Tan, N. Polyzotis*

182. Introduction to Database Management Systems. F

Concepts, approaches, tools, and methodology of database design. Topics include the entity-relationship model; the relational data model; normal forms; commercial languages such as SQL (SQL constraints, SQL triggers, and update languages); query-by-example (QBE); XML data model, and XML query language (XQuery); as well as relational database-management support for XML and object-relational features in database-management systems. Involves a database-application development project. Prerequisite(s): course 12B. *W. Tan, N. Polyzotis*

183. Hypermedia and the Web. *

An introduction to the construction of hypermedia systems and large-scale web applications. Topics covered include pre-web hypertext systems, hypermedia data models, namespaces, system architecture of the web, design of large linked information spaces, design and development of database-backed web applications, web site load testing, and web collaboration technologies. Students work in teams over the term to develop a significant web application. Prerequisite(s): course 180. Enrollment limited to 40. *E. Whitehead*

190X. Methods of Cryptography. *

Theory and practice of encryption and decryption. Classic ciphers. Shannon's information-theoretic approach. Block and stream ciphers. The DES standard. Public key systems: Diffie-Hellman key exchange, RSA, digital signatures. Elliptic curve cryptography. Authentication protocols. Prerequisite(s): Mathematics 19B, 21, and Computer Engineering 16, or equivalent courses. Applied Mathematics and Statistics 10 or equivalent may be substituted for Mathematics 19B and 21. Consult with instructor regarding a course equivalent. *J. Yellin*

191. Computer Science and Technology Seminar (2 credits). F,W

Weekly talks by industry experts, university researchers, field practitioners, and video presentations provide an in-depth exposure to a specific or a broad area of computer science and technology. Topics include emerging ideas, opportunities, challenges, and future of the industry. May be repeated for credit. *S. Lodha*

193. Field Study. F,W,S

Provides for individual programs of study with specific academic objectives carried out under the direction of a member of the Computer Science Department and using resources not normally available on campus. Credit is based on the presentation of evidence of achieving the objectives, usually a term paper or project. Cannot normally be repeated for credit. Students submit petition to sponsoring agency. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for individual programs of study with specific academic objectives carried out under the direction of a faculty member of the Computer Science Department and a willing sponsor at the field site. Uses resources not normally available on campus. Credit is based on the presentation of evidence of achieving the objectives by submitting a written and oral presentation. Cannot normally be repeated for credit. Intended for students majoring in computer science. Students submit petition to sponsoring agency. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty member. Intended for students majoring in computer science. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195. Senior Thesis Research. F,W,S

Students submit petition to sponsoring agency. *The Staff*

195F. Senior Thesis Research (2 credits). F,W,S

Intended for majors. Students submit petition to sponsoring agency. *The Staff*

198. Individual Study or Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Individual Study or Research (2 credits). F,W,S

Intended for majors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

For fourth-year students majoring in computer science. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

For fourth-year students majoring in computer science. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Research and Teaching in Computer Science and Engineering (3 credits). F

Basic teaching techniques for teaching assistants, including responsibilities and rights of teaching assistants, resource materials, computer security, leading discussion or lab sessions, presentation techniques, maintaining class records, electronic handling of homework, and grading. The course examines research and professional training, including use of the library and online databases, technical typesetting, writing journal and conference papers, publishing in computer science and computer engineering, giving talks in seminars and conferences, and ethical issues in science and engineering. Required for all teaching assistants. Enrollment restricted to graduate students. *S. Brandt, S. Lodha*

201. Analysis of Algorithms. F,S

Rigorous analysis of the time and space requirements of important algorithms, including worst case, average case, and amortized analysis. Techniques include order-notation, recurrence relations, information-theoretic lower bounds, adversary arguments. Analysis of the key data structures: trees, hash tables, balanced tree schemes, priority queues, Fibonacci and binomial heaps. Algorithmic paradigms such as divide and conquer, dynamic programming, union-find with path compression, augmenting paths. Selected advanced algorithms. Introduction to NP-completeness. Enrollment restricted to graduate students; undergraduate students may enroll in this course if they have completed either course 102 or Computer Engineering 177 and have the consent of the instructor. *The Staff, P. Tantalo, A. Van Gelder, M. Schlag, D. Helmbold, D. Achlioptas*

203. Programming Languages. W

Covers current issues in programming languages. Language topics include object oriented, concurrent, functional, and logic programming, and other programmable

applications such as symbolic manipulators and simulation. Enrollment restricted to graduate students; undergraduate students may enroll for this course if they have completed course 112 and have the consent of the instructor. *C. Flanagan, A. Van Gelder, C. McDowell*

204. Compiler Design. *

Advanced study of compiler implementation. Topics include compiler structure back end, run-time environments, storage management, garbage collection, register allocation, code generation, basic blocks, control flow, data flow, local and global optimization, interpretation, machine code generation. Students may not receive credit for this course and course 104B. Taught in conjunction with 104B. Prerequisite(s): course 104A or equivalent. Enrollment restricted to graduate students. Offered in alternate academic years. *W. Mackey*

210. Computational Models and Complexity. *

Finite automata and regular expressions, universal models of computation, computability and unsolvability, relations between complexity classes, hierarchy theorems, reductions, complete problems for the major complexity classes (L, NL, P, NP, PSPACE). Other topics may include complexity of counting and enumeration problems, complexity of approximation, randomized complexity classes. Prerequisite(s): course 201. *M. Warmuth, P. Kolaitis, D. Helmbold*

211. Combinatorial Algorithms. *

Fundamental combinatorial algorithms, graph algorithms, flow problems, matching problems, linear programming, integer programming, NP-completeness, approximation algorithms for optimization problems. Prerequisite(s): course 201. Offered in alternate academic years. *P. Kolaitis, D. Achlioptas*

217. Logic in Computer Science. F

The applications and uses of formal systems to computer science. Covers the syntax and semantics of propositional logic and first-order logic, normal forms, soundness and completeness theorems, Herbrand's theorem, unification and resolution, foundations of logic programming, automated theorem proving. Other topics may include deductive databases, database query languages, non-monotonic reasoning. Enrollment restricted to graduate students. Offered in alternate academic years. *A. Van Gelder, P. Kolaitis*

221. Advanced Operating Systems. W

A detailed study of the issues involved in operating systems design and implementation. Readings cover current research topics and systems of historical significance. Topics include (but are not restricted to) process and memory management, protection, security, synchronization, performance evaluation, file systems, distributed systems. Enrollment restricted to graduate students; undergraduates by interview only. *E. Miller, S. Brandt, D. Long*

223. Advanced Computer Security. *

Overview of research topics in computer and network security. Topics may include cryptographic operations, security properties and policies, authentication and access control, attacks on computer systems and defenses against them, security in programming languages, and network protocols for security. Enrollment restricted to graduate students or consent of instructor. *E. Miller, M. Abadi, D. Long*

229. Storage Systems. S

Topics include storage devices, storage architectures, local file systems, high-performance file systems, and next-generation storage devices and architectures; covers

issues of performance, reliability, scalability, robustness, and security. Prerequisite(s): course 221 or permission of instructor. *E. Miller, S. Brandt, D. Long*

232. Distributed Systems. *

Overview of research topics in distributed computer systems. Topics may include communication paradigms, process management, naming, synchronization and coordination, consistency and replication, fault tolerance, and security. Examples include distributed operating systems, distributed file and object systems, distributed document systems, and peer-to-peer systems. Prerequisite(s): course 221 or permission of instructor. *E. Miller, D. Long*

240. Artificial Intelligence. F

Prepares students for doing research in artificial intelligence. Major topics covered are search and heuristics, knowledge representation, planning, deduction and inference, reinforcement learning, associative pattern retrieval, and adaptive search. Discussion includes current research issues in AI problem-solving methods. Individualized projects. Undergraduates may enroll in this course if they have completed course 140. Enrollment limited to 30. *I. Pohl, R. Levinson*

241. Knowledge Engineering. W

Introduction to the acquisition, representation, and application of knowledge in expert systems. Topics include production systems, backward and forward chaining, dependency-directed backtracking, reasoning with uncertainty, certainty factors, fuzzy systems, knowledge representation (rules, frames, and semantic nets), inference engines, and metaknowledge. Discussion includes current research issues in adaptive expert systems. Involves one major project. Undergraduates may enroll in this course if they have completed course 140. Offered in alternate academic years. *R. Levinson*

242. Machine Learning. W

Introduction to machine learning algorithms. Covers learning models from fields of statistical decision theory and pattern recognition, artificial intelligence, and theoretical computer science. Topics include classification learning and the Probably Approximately Correct (PAC) learning framework, density estimation and Bayesian learning, EM, regression, and online learning. Provides an introduction to standard learning methods such as neural networks, decision trees, boosting, nearest neighbor, and support vector machines. Requirements include one major experimental learning project or theoretical paper. Enrollment restricted to graduate students. Enrollment limited to 30. *M. Warmuth, D. Helmbold*

244. Artificial Intelligence in Games. *

Artificial intelligence has long used game-playing as a metric for progress. Key algorithms such as alpha-beta and HPA search studied. Computer algorithms for backgammon, poker, and chess examined. There will be individualized projects. Prerequisite(s): course 201; and course 211 or 240 or 242. Enrollment limited to 20. *I. Pohl, M. Mateas*

248. Interactive Storytelling. W

Covers wide range of practices including hypertext, interactive fiction, embedded narratives in games, interactive drama, and artificial intelligence-based story generation. Through a mixture of readings, assignments, and project work, explores the theoretical positions, debates, and technical and design issues arising from these different approaches. Students may not receive credit for this course and course 148. (Formerly *Interactive Narrative*.) Enrollment restricted to graduate students. Enrollment limited to 20. *M. Mateas*

250. Introduction to Information Theory. W

An introduction to information theory including topics such as entropy, relative entropy, mutual information, asymptotic equipartition property, channel capacity, differential entropy, rate distortion theory, and universal source coding. (Also offered as Electrical Engineering 253. Students cannot receive credit for both courses.) Prerequisite(s): Computer Engineering 107, or Applied Mathematics and Statistics 131 or equivalent course, or permission of instructor. Enrollment restricted to graduate students. *H. Sadjadpour*

253. Advanced Programming Languages. S

Covers issues in the design, implementation, analysis, and specification of programming languages. Topics include formal semantics (including operational, axiomatic, and denotational semantics), advanced type systems, program analysis (including abstract interpretation and model checking), specification, and verification. Prerequisite(s): course 203 or equivalent. *C. Flanagan*

260. Computer Graphics. W

Advanced course in computer graphics. Topics may vary depending on interests of students and research directions in the field. Main topics include in-depth study of curves and surface modeling, deformations, advanced ray tracing, and radiosity methods. Enrollment restricted to graduate students; undergraduates by interview only. Enrollment limited to 20. *A. Pang, S. Lodha*

262. Computer Animation. *

An in-depth treatment of computer animation, including its origins in conventional animation, 2-D animation, in-betweening, motion control, morphing, graphical motion editors, animation languages, motion blur, simulation of articulated body motion, realtime animation, and special-purpose animation hardware. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Davis*

272. Evolutionary Game Theory. *

Reviews static equilibrium concepts, games of incomplete information, and the traditional theory of dynamic games in discrete time. Develops recent evolutionary game models, including replicator and best reply dynamics, and applications to economics, computer science, and biology. Prerequisite(s): upper-division math courses in probability theory are strongly recommended. (Formerly Biology 274.) (Also offered as Biology:Ecology & Evolutionary 274. Students cannot receive credit for both courses.) *M. Warmuth, D. Friedman, B. Sinervo*

277. Principles of Database Systems. F

Advanced course on principles of database systems. Main topics include overview of the relational data model and relational query languages; recursive queries, datalog, and fixed-points; query processing and optimization; database design, dependencies, normal forms, and the chase procedure. Additional topics may include information integration, complex objects, semistructured data, and XML. (Formerly *Database Systems I*.) Prerequisite(s): course 180 (or equivalent) or consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. Offered in alternate academic years. *W. Tan, N. Polyzotis, P. Kolaitis*

278. Design and Implementation of Database Systems. W

Advanced course in implementation techniques for database systems. Topics include transaction management, locking protocols for tables, and locking for index structures; query optimization, database statistics, and query processing; access methods for multidimensional data; and database recovery in centralized and distributed sys-

tems. Additional topics may include objects in databases, parallel database systems, advanced query optimization techniques, and data mining. (Formerly *Database Systems II*.) Prerequisite(s): course 277 or 181 (or equivalent) or consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. *W. Tan, N. Polyzotis*

279. Software Reuse and Component-Based Software Engineering. *

Detailed study of interlocking business, organizational, and technical issues in large-scale software reuse and component-based software engineering. Topics include architecture, design for reuse, domain engineering, model-driven development, domain-specific kits, components, frameworks, software agents, generators, problem-oriented languages, library design, reuse tools, patterns, and aspects. Assumes prior exposure to software engineering topics. Prerequisite(s): computer engineering 276 or consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. *C. McDowell*

280A. Seminar in Computer Science Research (2 credits). *

Weekly seminar covering topics of current research in computer science. Enrollment by permission of instructor. Enrollment limited to 30. May be repeated for credit. *The Staff*

280D. Seminar in Database Systems (2 credits). *

Covers advanced research topics from the recent literature in database systems and related fields. Involves presentations from UCSC students and faculty, and guest talks from researchers in industry and other academic institutions. Enrollment by permission of instructor. Enrollment by permission of instructor. Enrollment limited to 30. May be repeated for credit. *W. Tan, N. Polyzotis, P. Kolaitis*

280G. Seminar on Software Engineering (2 credits). *

Weekly seminar covering topics of current research in software engineering. Prerequisite(s): permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 30. May be repeated for credit. *N. Whitehead, C. Flanagan, L. De Alfaro, C. McDowell*

280J. Seminar on Computer Graphics (2 credits). *

Weekly seminar covering topics of current research in computer graphics. Enrollment restricted to graduate students and by permission of instructor. Enrollment limited to 30. May be repeated for credit. *J. Davis*

280S. Seminar on Computer Systems (2 credits). F,W,S

Weekly seminar series covering topics of current research in computer systems. Enrollment by permission of instructor. Enrollment limited to 30. May be repeated for credit. *E. Miller, S. Brandt, D. Long*

280X. Expressive AI (2 credits). F,W,S

Weekly seminar covering topics of current research in artificial intelligence applied to interactive art and entertainment, including computer games. Enrollment by permission of instructor. Enrollment restricted to graduate students. Enrollment limited to 30. May be repeated for credit. *M. Mateas*

290A. Topics in Algorithms and Complexity Theory: Probabilistic Algorithms and Average Case Analysis. W

Examines the use of probability theory both in the design and analysis of algorithms. Uses probability theory to

analyze the average performance of deterministic algorithms on randomly chosen or "typical" inputs, rather than on worst case inputs. Also a look at algorithms that use randomization, such as random walk and simulated annealing techniques. Examples of specific topics include martingales, random graphs, and rapidly mixing Markov Chains. Enrollment restricted to graduate students. Enrollment limited to 15. Offered in alternate academic years. May be repeated for credit. *D. Achlioptas*

290B. Advanced Topics in Computer Graphics. S

A graduate seminar in computer graphics on topics from recently published research journal articles and conference proceedings. Topics vary from year to year depending on interests of students. Primary areas of interest are likely to be scientific visualization, modeling, rendering, scattered data techniques, wavelets, and color and vision models. Students read technical papers and present class lectures. Guest lectures supplement the student presentations. A research project is required. Enrollment limited to 15. May be repeated for credit. *A. Pang, S. Lodha, J. Davis*

290C. Advanced Topics in Machine Learning. *

In-depth study of current research topics in machine learning. Topics vary from year to year but include multi-class learning with boosting and SUM algorithms, belief nets, independent component analysis, MCMC sampling, and advanced clustering methods. Students read and present research papers; theoretical homework in addition to a research project. Prerequisite(s): course 242. May be repeated for credit. *M. Warmuth, D. Helmbold*

290D. Neural Computation. S

An introduction to the design and analysis of neural network algorithms. Concentrates on large artificial neural networks and their applications in pattern recognition, signal processing, and forecasting and control. Topics include Hopfield and Boltzmann machines, perceptions, multilayer feed forward nets, and multilayer recurrent networks. Enrollment restricted to graduate students. Offered in alternate academic years. May be repeated for credit. *D. Haussler, M. Warmuth*

290E. Object-Oriented Programming Methodology. S

Object-oriented programming methodology is the application of abstract-data types and polymorphism to coding solution. Topics geared to beginning thesis research in this field. Prerequisite(s): courses 201 and 203. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *I. Pohl, C. McDowell*

290F. Applications of Combinatorics. *

Combinatorial mathematics, including summation methods, working with binomial coefficients, combinatorial sequences (Fibonacci, Stirling, Eulerian, Harmonic, Bernoulli numbers), generating functions and their uses, Bernoulli processes, and other topics in discrete probability. Oriented toward problem solving, applications mainly to computer science, but also physics. Prerequisite(s): Computer Engineering 16 and Applied Mathematics and Statistics 10. Enrollment restricted to graduate students and upper-division undergraduates. Offered in alternate academic years. May be repeated for credit. *J. Yellin*

290G. Topics in Software Engineering. F

Research seminar on current topics in software engineering. Topics vary from year to year depending on the current research of the instructor(s) and interests of students. Students read technical papers from relevant journals and conference proceedings. Synthesis and understanding of materials is demonstrated by a required research project. Prerequisite(s): Computer Engineering

276 recommended. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. Enrollment limited to 35. May be repeated for credit. *E. Whitehead, C. Flanagan, L. De Alfaro, C. McDowell, L. Werner*

290H. Topics in Database Systems. S

Focuses on current research topics in database systems. Different offerings cover different topics depending on current research of instructor(s) and the interests of students. Students read technical papers from journals and conference proceedings and present class lectures. A research project is required. Prerequisite(s): course 180 (or equivalent) or 277 or consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *W. Tan, N. Polyzotis, P. Kolaitis*

290I. Internet Technology and Policy. *

Graduate seminar that explores the transforming effects of the Internet on the physical access to information, the content of communications, the security of private information, and the availability of investments. Computer engineering and computer science undergraduate students may enroll in this course if they have completed Computer Engineering 152; other graduate and advanced undergraduate students may enroll with consent of the instructor. May be repeated for credit. *J. Yellin*

290S. Advanced Topics in Computer Systems. F

Focuses on current research topics in computer systems. Topics vary from year to year depending on the current research of the instructor(s) and the interests of the students. Students read technical papers from current journals and conference proceedings, and present class lectures. A research project is required. Prerequisite(s): course 221 recommended. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's consent. May be repeated for credit. *E. Miller, S. Brandt, D. Long*

290X. Cryptography and Computer Security. *

Research seminar on encryption and related technologies. Topics include theory of codes, random sequences and generators, public key cryptosystems, private key cyphers, key exchange protocols, quantum computing and cryptography. Major project required. Prerequisite: interview with instructor. Enrollment limited to 12. May be repeated for credit. *J. Yellin*

290Y. Quantum Computing. *

Quantum information theory and theory of quantum computation. Quantum circuits. Algorithms for database search, integer factorization, and order finding. Quantum coding and error correction. Quantum teleportation. Shannon and von Neumann entropies. Quantum communication and cryptography. See instructor to discuss course requirements before enrolling. Enrollment restricted to graduate students. Seniors may enroll with the consent of the instructor. May be repeated for credit. *J. Yellin*

296. Masters Project (2 credits). F,W,S

Independent completion of a masters project under faculty supervision. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study or Research. F,W,S

Independent study or research under faculty supervision. Although this course may be repeated for credit, not every degree program will accept a repeated course towards degree requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297F. Directed Readings in Machine Learning (2 credits). F,W,S

Directed readings in machine learning. Students read, present, and discuss current papers in machine learning. Specific topics include online learning the PAC (Probably Almost Correct) learning model, pattern recognition, and practical learning algorithms. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Thesis research conducted under faculty supervision. Although the course may be repeated for credit, not every degree program will accept a repeated course towards degree requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Dual-Degree Engineering

Program Description

Prior to establishing the Jack Baskin School of Engineering (SOE), UC Santa Cruz (UCSC) developed a dual-degree program with the College of Engineering at UC Berkeley (UCB) to meet the growing demand for engineers with both solid technical training and a broad liberal arts education. In addition to the challenging engineering majors offered at Baskin SOE, interested students may still pursue the dual-degree program option. As dual-degree majors, students spend three years at UCSC completing major requirements for a bachelor's degree in the social sciences, humanities, or the arts. Students also complete their engineering prerequisite courses in science, mathematics, and engineering for admission to UCB while at UCSC. Students who maintain a grade point average of 3.2 or higher in their engineering preparatory courses are eligible to apply to transfer to UCB and complete their fourth and fifth years in the dual-degree program. Once admitted to UCB, students complete requirements for a degree in a chosen engineering specialty, while also completing any remaining courses for their UCSC non-engineering major and general education. Students complete one major from each of the following lists:

UCB Engineering Majors

Bioengineering
Civil and environmental engineering
Engineering sciences
Industrial engineering and operations research
Manufacturing engineering
Materials science
Mechanical engineering
Nuclear engineering

Recommended UCSC Majors

American studies
Anthropology
Business management economics
Community studies
Economics
Environmental studies
Feminist studies
Film and digital media
History
History of art and visual culture
Legal studies
Linguistics

Literature
Philosophy
Politics
Psychology
Sociology

Upon completion of the program, the student receives two bachelor's degrees: a B.A. in a social science, humanities, or arts field from UCSC and a B.S. in engineering from UCB. Although the UCSC major cannot be in the Division of Physical and Biological Sciences or the School of Engineering, many combinations of fields are possible in the dual-degree program; examples include engineering along with economics, sociology, or philosophy. Specific curriculum and education plans for dual-degree students are developed in consultation with an engineering adviser and tailored to the needs of individual students. A committee composed of faculty from both UCSC and UCB jointly provide direction and oversight of the program. Students must enter the dual-degree program as first-quarter freshmen, beginning their course work at UCSC in the fall quarter.

Admission

In addition to completing the courses required for UC admission, high school students who plan to pursue the dual-degree engineering route at UCSC should develop a strong background in mathematics and physics.

The 3/2 Dual-Degree Program is only open to first-year students at the freshman level. Prospective students who wish to be considered for the dual-degree program should indicate it as their first choice of major on the UC Application for Undergraduate Admission. When the application is received by the Office of Admissions, additional information about the dual-degree program will be sent to the applicant in late January, along with a request for the applicant's specific choice of majors at UCSC and UCB. Admission to the campus does not guarantee admission to the dual-degree program.

The admissions committee for the dual-degree program reviews each application on an individual basis. Criteria for selection includes the applicant's strong performance in academic courses (particularly science and math), the applicant's essay, and excellent test scores. Dual-degree program applicants will also need to complete a formal application to UCB as a transfer student at the appropriate point in their UCSC studies.

Preparation for Dual-Degree Engineering Program

Dual-degree students typically enroll in a variety of classes while at UCSC due to the need to concurrently fulfill their UCSC major and their required preparation for their UCB major. Following are example classes that dual-degree students may take as preparation for the engineering major while at UCSC.

Applied Mathematics and Statistics 27L, *Mathematical Methods for Engineers/Laboratory*
Applied Mathematics and Statistics 131, *Introduction to Probability Theory*
Chemistry 1B/M and 1C/N, *General Chemistry/Laboratories*
Computer Science 12A/L, *Introduction to Programming/Laboratory (accelerated)*; or 5C, *Introduction to Programming in C/C++*, or 5J, *Introduction to Programming in Java*
Earth Sciences 10, *Geologic Principles*
Earth Sciences 142, *Engineering Geology for Environmental Scientists*

Electrical Engineering 70/L, *Introduction to Electronic Circuits/Laboratory*
Engineering 50/L, *Engineering Mechanics/Laboratory*
Mathematics 19A-B, *Calculus for Science, Engineering, and Mathematics*; or Mathematics 20A-B, *Honors Calculus*
Mathematics 21, *Linear Algebra*
Mathematics 24, *Ordinary Differential Equations*
Mathematics 23A-B, *Multivariable Calculus*
Physics 5A/L, 5B/M, and 5C/N, *Introduction to Physics series/Laboratories*; or Physics 6A/L, 6B/M, and 6C/N, *Introductory Physics series/Laboratories*
Physics 160, *Practical Electronics*

Electrical Engineering

Faculty and Professional Interests

BENJAMIN FRIEDLANDER

Digital communications, wireless communication system, array processing, adaptive signal processing

CLAIRE GU

Fiber sensors for bio-applications, optical fiber communications, volume holographic data storage, liquid crystal displays, nonlinear optics, optical information processing

MICHAEL ISAACSON

Nano- and microfabrication technology and applications to biomedical and diagnostic devices, nanocharacterization of materials with emphasis on the development of microscopy tools, novel modes of imaging, electron and light optics

GRETCHEN KALONJI

Materials science; innovations in science and engineering education; multinational project-based approaches to integrating research and education

WENTAI LIU

Retinal prosthesis, biomimetic systems, integrated neuro-electronics, molecular electronics, CMOS and SOI transceiver design, current mode band limited signaling, micro-electronic sensor, timing/clock recovery and optimization, noise characterization and modeling, and computer vision/ image processing

PEYMAN MILANFAR

Statistical signal image/video processing and reconstruction; modeling and inverse problems in imaging; detection and estimation theory; applied mathematics

ALI SHAKOURI

Quantum electronics; nano- and microscale heat and current transport in semiconductor devices; thermoelectric/thermionic energy conversion; renewable energy sources; thermal imaging; micro-refrigerators on a chip; and optoelectronic integrated circuits

JOHN F. VESECKY

HF radar design and construction and observation of ocean surface winds, waves and currents with applications to coastal and deep water ocean processes; project MEDSAT

DONALD WIBERG, Emeritus

Associate Professor

JOEL KUBBY

Micro-Electro-Mechanical-Systems (MEMS), adaptive optics, integrated optics, bio-MEMS, bio-imaging

KENNETH PEDROTTI

Optical communications, high-speed electronics for lightwave systems, devices for all optical networking and imaging

HAMID SADJADPOUR

Wireless communication systems, coding and information theory, ad hoc and sensor networks

HOLGER SCHMIDT

Integrated optics for biomedicine and quantum optics, nano-magneto-optics, single-particle spectroscopy, ultrafast optics

Acting Associate Professor

NOBUHIKO P. KOBAYASHI

Physics and chemistry of hybrid functional nanomaterials and nanometer-scale functional surfaces; study of III-IV compound semi-conductor nanometer-scale structures and related optoelectronic devices; study of mixed oxide nanometer-scale structures and related electronic devices

Adjunct Professor

FARID DOWLA

Signal and image processing

HEINZ ERZBERGER

Air traffic control

SUNG-MO (STEVE) KANG

Low-power, High-speed VLSI circuit design and synthesis, RF circuits, biological circuits, mixed technology, mixed signal CAD

EPHRAIM SUHIR

Physical design, reliability and packaging of micro- and optoelectronic systems, materials engineering, applied probability, predictive modeling, nanoengineering

Associate Adjunct Professor

BIN CHEN

Structure, optical and electronic properties in materials

NATALIO MINGO

Thermal and electronic transport, nanomaterials, nanotechnology, surface science, computational physics

CHRISTOPHER R. MOYLAN

Photonic materials and devices

TOSHISHIGE YAMADA

Modeling, micro/nanoscale electronic material and device experiments phenomenology, using energy band and equivalent circuit methods

Assistant Adjunct Professor

ZHIXI BIAN

Semiconductor materials and devices related to optics and thermoelectric energy conversion

KENNETH LAWS

HF radar sensing of ocean surface phenomena, autonomous ocean surface vehicles and passive microwave measurements of ocean surface vehicles

DOMINIK RABUS

Photonic Integrated Circuits (PICs), both in semiconductors and polymer materials



Professor

SUE CARTER (Physics)

Experimental condensed matter physics, polymer physics, molecular electronics, phase transitions, electronic and optical properties of materials

DAVID W. DREAMER, Emeritus (Chemistry and Biochemistry)

J. JOAQUÍN GARCÍA-LUNA-ACEVES (Computer Engineering)

(Baskin Professor of Computer Engineering) Wireless networks, Internet, multimedia information systems

DARRELL D. E. LONG (Computer Science)

Storage systems, distributed computing systems, operating systems, mobile computing, performance evaluation, fault tolerance, computer security, multimedia, and video-on-demand systems

PATRICK E. MANTEY (Computer Engineering)

(Baskin Professor of Computer Engineering) Image systems, image processing, visualization, image and multimedia systems, digital signal processing, real-time control

CLAIRE MAX (Astronomy)

Adaptive optics, planetary science

JERRY NELSON (Astronomy)

Design and construction of large telescopes; project scientist for the Keck telescope and Thirty Meter telescope

B. SHASTRY (Physics)

Condensed matter physics, strongly correlated matter, Mott-Hubbard physics, high T_c superconductivity, quantum magnetism, exactly integrable systems, exactly solvable models of many-body systems and in statistical mechanics, quantum chaos, geometric frustration

WILLIAM T. SULLIVAN (Biology)

*Genetics, cell biology, development of the *Drosophila* embryo*

JIN Z. ZHANG (Chemistry)

Design, synthesis, characterization, and application of nanomaterials, including semiconductor and metal nanoparticles; femtosecond laser spectroscopy; ultrafast dynamics on surfaces and at interfaces; cancer biomarker detection; surface-enhanced Raman spectroscopy

Associate Professor

ROBERTO MANDUCHI (Computer Engineering)

Sensor processing and image analysis with application to assistive technology and environmental modeling

HAI TAO (Computer Engineering)

Image and video processing, computer vision, vision-based graphics, and human-computer interaction

Assistant Professor

WILLIAM DUNBAR (Computer Engineering)

Theory and application of feedback control, air traffic control, nanopore sensors, dynamics and control of biomolecules

GABRIEL ELKAIM (Computer Engineering)

Embedded systems; robust software architectures for real-time reactive systems; sensor fusion; guidance, navigation, and control (GNC) system identification; robust and advanced control schemes; feedback control systems; robotics; unmanned autonomous vehicles (UAVs); and cooperative control

MATTHEW R. GUTHAUS (Computer Engineering)

VLSI, systems-on-a-chip, design automation, design for variability/robustness, mixed-signal system

JOSE RENU (Computer Engineering)

Computer architecture, chip multiprocessors, energy/performance trade-offs, thread level speculation, interaction between architecture and compilers, Linux kernel Research Professor

DAVID W. DEAMER (Biomolecular Engineering, Chemistry and Biochemistry)

Membrane biophysics, single molecule analysis

Program Description

Mission Statement

The mission of the Electrical Engineering Department is to build and sustain a teaching and research program to provide undergraduate and graduate students with inspiring and quality education in the theory and practice of hardware- and information-processing-oriented electrical engineering; serving industry, science, and government; and bringing faculty and staff a rewarding career in teaching, research, and service. The electrical engineering program is accredited by the Engineering Accreditation Committee of the Accreditation Board for Engineering and Technology (ABET).

Summary of Objectives

The educational objectives that the Electrical Engineering Department strives to provide for students are focused in five areas: fundamental prerequisites in theory, design, and basic science for a career based on electrical engineering; a scope of application that provides theory and practical knowledge as well as specialized training in hardware- and information-oriented electrical engineering; a professional approach to engineering in terms of high quality work skills in communication, teamwork, responsibility, high ethical standards, and participation in lifelong learning and the professional engineering community; encouragement and motivation based on a milieu of readily available opportunities, mentoring, and advising; and the basis for a successful transition to an engineering career, including an ability to apply research to engineering and opportunities for experience in an industry setting.

Engineering is a profession that emphasizes analysis and design, and electrical engineers apply their knowledge to an expanding array of technical, scientific, and mathematical questions. A good engineering education has three parts: a sound foundation in mathematics and science, substantial design experience to develop skills and engineering aesthetics, and a focus in the humanities and social sciences to learn how and where to apply the skills developed. Electrical engineering is a very broad discipline; the program at UCSC complements existing campus programs, emphasizing three general areas: electronics/optics (including digital and analog circuits and devices); communications (including signal and image processing and control); and VLSI design, micro-technology, nanotechnology, and biomedical devices.

The undergraduate curriculum provides a balance of engineering science and design. For the first two years, all electrical engineering students are expected to take a basic set of lower-division mathematics, physical science, and engineering courses. After the first two years, electrical engineering students focus on topics within the discipline and specialize in one of two options: electronics/optics, including digital and analog circuits and devices, VLSI design, optoelectronics, electromagnetics, and biomedical device engineering; or communications, signals, systems, and control, including optical, wireless communication, signal and image processing, networks signal processing, instrumentation, and control. Students interested in admission to the electrical engineering major should contact the Baskin School of Engineering Undergraduate Advising office, (831) 459-5840 or advising@soe.ucsc.edu.

Electrical Engineering Policies

Admissions Policy

Admission to the electrical engineering major is selective. First-year applicants may receive direct admission at the time they apply to UCSC based on their high school record and test scores. Students not directly admitted may still apply during their first year and their acceptance will be based upon their School of Engineering GPA, their high school grade point average, courses completed in mathematics and sciences, and scores on standardized tests. After the first year, students can apply to declare an electrical engineering major upon completion (with a grade of C or better) of all of the foundation courses: Mathematics 19A-B, Applied Mathematics and Statistics 10 and 20, Physics 5A, 5B, and 5C. Please refer to the School of Engineering section of the catalog for the full admissions policy.

Course Substitution

Please refer to the School of Engineering section of the catalog for the policy regarding course substitution.

Disqualification Policy

Please refer to the School of Engineering section of the catalog for the Major Disqualification Policy.

Letter Grade Policy

The Electrical Engineering Department requires letter grading for all courses applied toward the B.S. degree, with the exception of two lower-division courses, which students may elect to take Pass/No Pass. This exception does not include course 70/L, which must be taken for a letter grade.

Transfer Students

Please refer to the School of Engineering section of the catalog for the policy regarding transfer students and admission of transfer students to the electrical engineering major.

School of Engineering Policies

Please refer to the School of Engineering section of the catalog for additional policies that apply to all School of Engineering programs.

Major Requirements

In addition to completing UCSC's general education requirements, students must complete 15 lower-division science and engineering courses, plus associated laboratories; eight upper-division engineering courses, plus associated laboratories; four engineering electives; and a comprehensive senior design project course. To plan for completion of these requirements within the normative time, students should consult with an adviser at the Baskin School of Engineering Undergraduate Advising office as early as possible.

Lower-Division Requirements

Students gain a solid foundation in calculus, engineering mathematics, physics, computer science, and computer engineering during their first two years. Majors must complete the following 15 lower-division courses (including corresponding laboratories). These courses form part of the prerequisite sequence and should be completed during the first two years at UCSC. The requirements are rigorous; students must be prepared to begin these courses early in their studies.

Electrical Engineering

70/L, *Introduction to Electronic Circuits/Laboratory*
80T, *Modern Electronic Technology and How It Works*

Computer Engineering

12/L, *Computer Systems and Assembly Language/Laboratory*

13/L, *Computer Systems and C Programming/Laboratory*

16, *Applied Discrete Mathematics*; or 16H, *Honors Applied Discrete Mathematics*

80E, *Engineering Ethics*

Computer Science

12A/L, *Introduction to Programming/Laboratory*; or 13H, *Introduction to Programming and Data Structures (Honors)/Laboratory*

Mathematics

19A-B, *Calculus for Science, Engineering, and Mathematics*

23A-B, *Multivariable Calculus*

Applied Mathematics and Statistics

10, *Mathematical Methods for Engineers I*

20, *Mathematical Methods for Engineers II*

27L, *MATLAB Laboratory*

Physics

5A/L, 5B/M, 5C/N, *Introduction to Physics/Laboratories*

5D, *Heat, Thermodynamics, and Kinetics*

Ethics

Students must take one of the following courses (required even for transfer students who have had their general education requirements waived):

Computer Engineering 80E, *Engineering Ethics*

Philosophy 22, *Introduction to Ethical Theory*

Philosophy 24, *Introduction to Ethics: Contemporary Moral Issues*

Philosophy 28, *Environmental Ethics*

Biomolecular Engineering 80G/Philosophy 80G, *Bioethics in the 21st Century: Science, Business, and Society*

Upper-Division Requirements

Thirteen upper-division courses along with associated 1- or 2-credit laboratories are required for the major. The course requirements include both depth and breadth, technical writing, and a comprehensive capstone design project.

All students are required to take the following eight upper-division courses, with associated laboratories:

Electrical Engineering

103, *Signals and Systems*

135/L, *Electromagnetic Fields and Waves/Laboratory*

145/L, *Properties of Materials/Laboratory*

151, *Communications Systems*

171/L, *Analog Electronics/Laboratory*

Computer Engineering

100/L, *Logic Design/Laboratory*

107, *Mathematical Methods of Systems Analysis: Stochastic*

185, *Technical Writing for Computer Engineers*

Required Electives. In addition to completing the above required courses, electrical engineering majors must complete four elective courses chosen from the list below. At least three must be from one of the depth-sequence concentrations listed. Certain graduate-level courses as well as those courses taught in conjunction with graduate courses may also be used to fulfill an elective requirement as listed below. No course may be counted twice. See the electrical engineering web site for course descriptions: www.ee.ucsc.edu/academics.htm.

Electronics/Optics Concentration

Electrical Engineering

115, *Introduction to Micro-Electro-Mechanical-Systems Design*

130/L 1230, *Introduction to Optoelectronics and Photonics and Laboratory/Optical Fiber Communication*

136, *Engineering Electromagnetics* (strongly recommended)

154/241, *Feedback Control Systems*, and *Introduction to Feedback Control Systems*

172/221, *Advanced Analog Circuits/Advanced Analog Integrated Circuits*

178, *Device Electronics*

211, *Introduction to Nanotechnology*

231, *Optical Electronics*

Computer Engineering

118/L, *Introduction to Mechatronics/Laboratory*

121/L, *Microprocessor System Design/Laboratory* (strongly recommended)

173/L, *High Speed Digital Design/Laboratory*

Applied Mathematics and Statistics

147, *Computational Methods and Applications*

Communications, Signals, Systems, and Controls Concentration

Electrical Engineering

130/L/230, *Introduction to Optoelectronics, and Photonics and Laboratory/Optical Fiber Communication*

136, *Engineering Electromagnetics* (strongly recommended)

152/252, *Introduction to Wireless Communications and Wireless Communications*

153/250, *Digital Signal Processing*

154/241, *Feedback Control Systems* and *Introduction to Feedback Control Systems*

262, *Statistical Signal Processing I*

264, *Image Processing and Reconstruction*

261, *Error Control Coding*

253, *Information Theory*

Computer Engineering

118/L, *Introduction to Mechatronics/Laboratory*

150/L, *Introduction to Computer Networks/Laboratory*

251, *Principles of Digital Communications*

Applied Mathematics and Statistics

147, *Computational Methods and Applications*

162, *Design and Analysis of Computer Simulation Experiments*

The senior-year curriculum enables students to pursue independent study with a faculty member. Electrical engineering students are encouraged to take advantage of the opportunity to work within a faculty member's research group as part of their educational experience. Internship programs with local industry are available.

Comprehensive Requirement

The senior comprehensive requirement for electrical engineering majors is in two parts: a project course and assessment options.

Project Course

Students must complete one capstone design course that spans two quarters, Electrical Engineering 123A and 123B, or complete a senior thesis. These senior-level courses encompass an in-depth project, including analysis, design, testing, and documentation, requiring students to call upon knowledge acquired throughout their undergraduate studies. Current course choices include the following:

Electrical Engineering

123A and 123B, Engineering Design Project I (5 credits) and Engineering Design Project II (7 credits)
195, Senior Thesis Project (10 credits over two quarters)

Outcomes Assessment Options

The Electrical Engineering Department requires an outcomes assessment. All students are required to complete an exit survey and meet with a faculty member for an exit interview. The specifics of the outcomes assessment may change from year to year; for this catalog year, students must complete one of the following options:

1. maintenance of a 2.5 grade point average in all required and elective courses for the major; or
2. senior thesis submission; or
3. portfolio review.

Portfolios must include the following:

- project report(s);
- a one- or two-page overview of the student's contribution to the project(s);
- a two-page essay concerning the relationship of engineering to society (specific topics will be provided by the Electrical Engineering Department).

The portfolios must be submitted electronically at least seven days before the end of the instruction in the quarter of graduation. Portfolios will not be returned.

Electrical Engineering Major Planners

The following are two sample academic plans for students to complete during their first two years as preparation for the electrical engineering major.

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Math 19A Phys 5A/L College core	Math 19B Phys 5B/M EE 80T	AMS 10 Phys 5C/N gen ed (C2)
2nd (soph)	Phys 5D Math 23A Cmpe 12A/L	EE 70/L AMS 20 Math 23B	EE 171/L Cmpe 13/L gen ed

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	AMS 3 Cmpe 8 College core	Math 19A Cmpe 12/L EE 80T	Math 19B Cmpe 13/L gen ed (C2)
2nd (soph)	Phys 5A/L AMS 10 gen ed	Phys 5B/M AMS 20 Cmpe 100/L	Phys 5C/N Math 23A Cmpe 80E

Additional information about this program can be found on the department's web site at www.soe.ucsc.edu/programs/undergraduate/.

Electrical Engineering Minor

The electrical engineering minor provides a solid foundation in the core areas of electronic circuits and signals and systems, as well as the prerequisite material in mathematics and physics. Concentration of upper division electives in either of the major tracks constitutes substantial and focused work in the discipline of electrical engineering. This minor is particularly suitable for students with majors in Applied Physics or any School of Engineering major.

Electrical Engineering Minor Requirements

Requirements for the minor in electrical engineering are the following:

Mathematics

Mathematics 19A-B, *Calculus for Science, Engineering, and Mathematics*

Mathematics 23A, *Multivariable Calculus*

Applied Mathematics and Statistics 27/L, *Mathematical Methods for Engineers/Laboratory*; or Applied Mathematics and Statistics 10, *Mathematical Methods for Engineers I*, and 20, *Mathematical Methods for Engineers II*, and 27L, *MATLAB for Engineers Laboratory*; or Mathematics 21, *Linear Algebra and Mathematics 24, Ordinary Differential Equations*, and Applied Mathematics and Statistics 27L, *MATLAB for Engineers Laboratory*.

Science

Physics 5A/L or 6A/L, *Mechanics and 5C/N or 6C/N, Electricity and Magnetism*

Core Requirements

Electrical Engineering

Electrical Engineering 70/L, *Introduction to Electronics/Laboratory*; and

Electrical Engineering 103, *Signals and Systems*; and

Electrical Engineering 171/L, *Analog Electronics/Laboratory*

Upper-Division Electives

At least 15 units of upper-division or graduate electrical engineering courses, all chosen from one of the existing electrical engineering major tracks. All of the upper-division electives must come from the same track.

Graduate Programs

The Department of Electrical Engineering (EE) at the University of California, Santa Cruz (UCSC) offers M.S. and Ph.D. degree programs and conducts research in:

- Photonics and Electronics focusing on VLSI, electronic and optoelectronic materials, devices, circuits

and systems for information transmission, storage, processing, and display, especially for optical fiber communications and lower power, high performance systems, biomedical device instrumentation and MEMS;

- Signal Processing and Communications, including wireless and optical communications, coding, digital signal processing, image and video processing;
- Remote Sensing including wave propagation and scattering radar oceanography, nano-magneto-optics, remote sensing.
- Nanotechnology including applications to biomedicine, integrated optics for biomedical imaging, opto-thermo-electric energy conversion, near-field scanning optical microscopy, nano-magneto-optics, micro-mechanics and micro-fluidics.

Electrical Engineering enjoys a close relationship with the Departments of Applied Mathematics and Statistics, Computer Science, Computer Engineering, Biomolecular Engineering, Chemistry, Physics, Astronomy, and Molecular, Cell and Developmental Biology faculty. The Electrical Engineering faculty are affiliated with: 1) several federally funded and nationally recognized centers such as the Center for Biomimetic MicroElectronic Systems, the Center for Adaptive Optics, and the Center for Biomolecular Science and Engineering; 2) state-funded centers such as the Institute for Quantitative Biology (QB3), the Center for Information Technology Research in the Interest of Society (CITRIS), and the Institute for Regenerative Medicine (CIRM); and 3) many EE faculty participate in the University Affiliated Research Center (UARC) at NASA-Ames, which is managed by UCSC. The department also has ties to nearby industry, employing electrical engineering professionals as visiting and adjunct faculty and arranging for students to gain practical research experience through work in industrial labs. Indeed, the department strongly encourages students of all nationalities to seek practical training as part of their graduate education.

Students begin the program with the completion of courses in a core area of interest and then proceed to do research in their area of specialization. The M.S. degree can be completed in two years. M.S. students must complete a master's thesis. A Ph.D. degree is usually completed in four to six years. Ph.D. students are required to take a preliminary exam within their first two years of study. After completing the course requirements, students must pass an oral qualifying exam and write a dissertation. Part-time study is possible for students working in industry while attending school.

Requirements for the Master's Degree

Course Requirements

Each student is required to take 45 units which must consist of:

- at least 15 units in one of the four core areas of emphasis defined above.
- at least 25 of the total 45 units must be satisfied through EE graduate courses.
- at most 10 units of independent study (EE 297, EE 299) are counted toward the EE course requirements.

Total units required for the M.S. degree = 45.

Note that each graduate course satisfying the above requirements typically covers 5 units.

Thesis

Completion of a master's thesis is required for the Master's degree. To fulfill this requirement, the student

submits a written proposal to a faculty member, usually by the third academic quarter. By accepting the proposal, the faculty member becomes the thesis adviser. In consultation with the adviser, the student forms a Master's Thesis Reading Committee with at least two additional faculty members, each of whom is provided a copy of the proposal. Upon completion of the thesis work, the student presents an expository talk on the thesis research, and the final thesis must be accepted by the review committee before the award of the Master of Science degree.

M.S. students admitted to continue to the Ph.D. program must pass an oral preliminary exam covering fundamental undergraduate course work and a research topic (see below).

Requirements for the Ph.D. Degree

Course Requirements*

Each student is required to take 50 units which must consist of:

- at least 20 units in one of the four core areas of emphasis defined above.
- at least 30 of the total 50 units must be satisfied through EE graduate courses.
- at most 10 units of independent study (EE297, EE299) are counted toward EE course requirements.

Total units required for the Ph.D. degree = 50

* For students already holding an MSEE or equivalent degree, at most 20 units of transfer credit may be granted for equivalent course work performed at the students' M.S. granting institution. Credit transfer is subject to approval by the adviser and the electrical engineering graduate committee.

Preliminary Examination

At the end of the first year, i.e., no later than the fall quarter in the following year after their entry, students admitted to the Ph.D. program must take a written exam covering basic knowledge in electrical engineering. This examination will cover material from the following technical areas:

- circuits at the level of Electrical Engineering 70
- electromagnetics at the level of Electrical Engineering 135
- systems and signals at the level of Electrical Engineering 103
- materials at the level of Electrical Engineering 130 and Electrical Engineering 145
- applied mathematics and statistics at the level of Computer Engineering 107, and Applied Mathematics and Statistics 10 and 20.

The student will choose three areas from the above list in which to be examined. If the student does not pass the preliminary examination, the Electrical Engineering graduate committee may allow the student to repeat the preliminary examination once. If the student is to leave the Ph.D. program, and the student wishes to obtain a master's degree prior to departure, all requirements for the master's degree must still be satisfied.

After the student passes the preliminary examination, the student begins work on a thesis prospectus in preparation for the qualifying examination. During this period the student finds an adviser willing to supervise the student's thesis research, works with the adviser to prepare for the qualifying examination, and assembles a dissertation reading committee, consisting of the student's research supervisor (chair of the committee) and three or four appropriate faculty members in electrical

engineering and other relevant departments. The committee must consist of at least two electrical engineering faculty members in addition to the student's supervisor.

Qualifying Examination

This oral examination is a defense of the student's thesis prospectus and a test of the student's knowledge in advanced technical areas of relevance to the dissertation topic. This oral examination consists of a seminar-style talk before the examining committee, where the student describes the thesis prospectus, followed by questions from the committee on the substance of the talk or the areas of presumed expertise of the student. The exam, taken typically in the third year of Ph.D. study, is administered by a Ph.D. qualifying exam committee, consisting of at least four examiners. The composition of the committee is proposed by the department (in consultation with the student and his/her adviser) to the dean of graduate studies at least one month before the date of the exam. The composition of the committee must be approved by the dean of graduate studies, whereupon the student and the committee are notified.

If the student does not pass the qualifying exam, the student may be asked to complete additional course work, or other research-related work, before retaking the exam. The student may be allowed to retake the qualifying exam once, and the composition of the examining committee will remain the same for the second try. Students who fail the qualifying exam twice may be dismissed from the Ph.D. program.

Ph.D. students who have not advanced to candidacy by the end of the fourth year may be recommended for academic probation.

Dissertation and Advancement to Ph.D. Degree Candidacy

Advancement to candidacy requires that the student:

- pass the preliminary exam;
- complete all course requirements prior to taking the qualifying exam;
- clear all Incompletes from the student's record;
- pass the qualifying exam; and
- have an appointed Ph.D. dissertation reading committee.

After advancement to candidacy, work on the thesis research progresses until the dissertation is completed. The Ph.D. dissertation must show the results of in-depth research, be an original contribution of significant knowledge to the student's field of study, and include material worthy of publication. The student is strongly advised to submit research work for publication in advance of completing the thesis so that the latter requirement is clearly satisfied. The Ph.D. thesis results are presented in both oral and written forms, the oral form being a dissertation defense (see below) and the written form being the Ph.D. dissertation. The student must submit his or her written Ph.D. dissertation to the dissertation reading committee at least one month before the defense.

Dissertation Defense

Each Ph.D. candidate submits the completed dissertation to a Ph.D. thesis reading committee at least one month prior to the dissertation defense. The appointment of the dissertation reading committee is made immediately after the qualifying exam and is necessary for advancing to candidacy. The candidate presents his or her research results in a public seminar sponsored by the dissertation supervisor. The seminar is followed by a defense of the dissertation to the reading committee (only), who will then decide whether the dissertation is

acceptable or requires revision. Successful completion of the dissertation fulfills the final academic requirement for the Ph.D. degree.

Transfer Credit

For students already holding an MSEE or equivalent degree, at most 40 credits of transfer credit may be granted for equivalent course work performed at the student's M.S. granting institution. Credit transfer is subject to approval by the adviser and the electrical engineering graduate committee.

Students not already holding an MSEE degree, who are studying for the Ph.D. degree, may apply to be granted a M.S. degree when they have fulfilled all the M.S. degree requirements (including an M.S. thesis).

Review of Progress

Each year, the faculty reviews the progress of every student. Students not making adequate progress toward completion of degree requirements (see the Graduate Student Handbook for the policy on satisfactory academic progress) are subject to dismissal from the program. Students with academic deficiencies may be required to take additional courses. Full-time students with no academic deficiencies are normally expected to complete the degree course requirements at the rate of at least two courses each quarter. Full-time students must complete all course requirements within two years for the M.S. and three years for the Ph.D.

Students receiving two or more grades of U (unsatisfactory) or below B in the School of Engineering courses are not making adequate progress and will be placed on academic probation for the following three quarters of registered enrollment. Withdrawing or taking a leave of absence does not count as enrollment. Part-time enrollment is counted as a half-quarter of enrollment.

If an electrical engineering graduate student fails a School of Engineering course while on probation, the Electrical Engineering Department may request the graduate dean to dismiss that student from the graduate program. If after being removed from probation, the student again fails a School of Engineering course, he or she will return immediately to academic probation.

Graduate students experiencing circumstances or difficulties that impact their academic performance should contact their adviser and the graduate director immediately. Students may appeal their dismissal to the graduate committee.

Materials Fee

Please see the section on fees under School of Engineering.

Lower-Division Courses

70. Introduction to Electronic Circuits, F,W

Introduction to the physical basis and mathematical models of electrical components and circuits. Topics include circuit theorems, constant and sinusoidal inputs, natural and forced response of linear circuits. Introduction to circuit/network design, maximum power transfer, analog filters, magnetic circuits, and transformers. Prerequisite(s): Physics 5C/N or 6C/N, and Mathematics 24 or Applied Mathematics and Statistics 20 or 20A. Students must enroll concurrently in course 70L. *H. Schmidt, K. Pedrotti, J. Kubby, W. Liu, A. Shakouri*

70L. Introduction to Electronic Circuits Laboratory (1 credit), F,W

Laboratory sequence illustrating topics covered in course 70. One two-hour laboratory session per week. Students are billed a materials fee. Prerequisite(s): Physics 5C/N or

6C/N, and Mathematics 24 or Applied Mathematics and Statistics 20 or 20A. Students must enroll concurrently in course 70. *H. Schmidt, P. Mantey, J. Kubby, A. Shakouri, W. Liu, K. Pedrotti*

80J. Renewable Energy Sources. S

Introduction to energy storage conversion with special emphasis on renewable sources. Fundamental energy conversion limits based on physics and existing material properties. Various sources, such as solar, wind, hydro-power, geothermal, and fuel cells described. Cost-benefit analysis of different alternative sources performed, and key roadblocks for large-scale implementation examined. Latest research on solar cells and applications of nanotechnology on energy conversion and storage introduced. (General Education Code(s): T2-Natural Sciences.) *A. Shakouri*

80S. Sustainability Engineering and Practice. F

Topical introduction to principles and practices of sustainability engineering and ecological design with emphasis on implementation in society. Provides an understanding of basic scientific, engineering, and social principles in the design, deployment, and operation of resource-based human systems, and how they can be maintained for this and future generations. No specialized background in engineering, science, or social sciences is assumed. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *A. Shakouri*

80T. Modern Electronic Technology and How It Works. W

Basic knowledge of electricity and "how things work," how technology evolves, its impact on society and history, and basic technical literacy for the non-specialist. Broad overview of professional aspects of engineering and introduction and overview of basic systems and components. Topics include electrical power, radio, television, radar, computers, robots, telecommunications, and the Internet. (General Education Code(s): T7-Natural Sciences or Social Sciences, Q.) *K. Pedrotti*

94. Group Tutorial. F,W,S

A means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

A means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

103. Signals and Systems. F,S

The course covers the following topics: characterization and analysis of continuous-time signals and linear systems, time domain analysis using convolution, frequency domain analysis using the Fourier series and the Fourier transform, the Laplace transform, transfer functions and block diagrams, continuous-time filters, sampling of continuous time signals, examples of applications to com-

munications and control systems. Prerequisite(s): courses 70 and 70L and Applied Mathematics and Statistics 20. *B. Friedlander, H. Sadjadpour*

115. Introduction to Micro-Electro-Mechanical-Systems Design. S

Introduction to Micro-Electro-Mechanical-Systems (MEMS) design. Course begins with overview of MEMS devices and processes that are used to fabricate them. The basic governing equations for MEMS devices in different energy domains (mechanical, electrical, optical, thermal, and fluidic) reviewed, and both analytical and finite element coupled-domain modeling is used to design MEMS devices. Students work in teams to design, lay out, and fabricate MEMS devices and test structures using a standard multi-user process available through a foundry service. A presentation and term paper describing the design and layout will be required. Prerequisite(s): courses 70/L, 135/L, 145/L, Mathematics 19A and 19B, Mathematics 23A and 23B, Applied Mathematics and Statistics 20 or 20A, Physics 5A, 5B, 5C, and 5D. Enrollment limited to 15. *J. Kubby*

123A. Engineering Design Project I. F,W

First of a two-course sequence that is the culmination of the engineering program. Students apply knowledge and skills gained in elective track to complete a major design project. Students complete research, specification, planning, and procurement for a substantial project. Includes technical discussions, design reviews, and formal presentations; engineering design cycle, engineering teams, and professional practices. Formal technical specification of the approved project is presented to faculty. Prerequisite(s): Electrical Engineering 171 or Computer Engineering 121; previous or concurrent enrollment in Computer Engineering 185; permission of department and instructor. Students are billed a materials fee. (Also offered as Biomolecular Engineering 123A and Computer Engineering 123A. Students cannot receive credit for all courses.) *J. Vesecky, The Staff*

123B. Engineering Design Project II (7 credits). W,S

Second of two-course sequence in engineering system design. Students fully implement and test system designed and specified in course 123A. Formal written report, oral presentation, and demonstration of successful project to review panel of engineering faculty required. Students are billed a materials fee. (Also offered as Biomolecular Engineering 123B and Computer Engineering 123B. Students cannot receive credit for all courses.) Prerequisite(s): course 123A and Computer Engineering 185. Enrollment limited to 35. *J. Vesecky, The Staff*

130. Introduction to Optoelectronics and Photonics. F

Introduction to optics, photonics and optoelectronics, fiber optic devices and communication systems: Topics include: ray optics, electromagnetic optics, resonator optics, interaction between photons and atoms, dielectric waveguides and fibers, semiconductor light sources and detectors, modulators, amplifiers, switches, and optical fiber communication systems. Taught in conjunction with course 230. Students cannot receive credit for this course and course 230. Prerequisite(s): Physics 5B and 5C, or 6B and 6C; concurrent enrollment in course 130L. *C. Gu*

130L. Introduction to Optoelectronics Laboratory (1 credit). F

Includes a series of projects to provide hands-on experience needed for basic concepts and laboratory techniques

of optical fiber technology. Students are billed a materials fee. Prerequisite(s): Physics 5L-M-N, or 6L-M-N; concurrent enrollment in course 130. Enrollment limited to 30. *C. Gu*

135. Electromagnetic Fields and Waves. W

Vector analysis. Electrostatic fields. Magnetostatic fields. Time-varying fields and Maxwell's equations. Plane waves. Students must concurrently enroll in course 135L. Prerequisite(s): course 70/L; Mathematics 23B; and Applied Mathematics and Statistics 20. Students must concurrently enroll in course 135. *M. Isaacson, The Staff*

135L. Electromagnetic Fields and Waves Laboratory (1 credit). W

Laboratory sequence illustrating topics in course 135. One two-hour laboratory session per week. Students must concurrently enroll in course 135. Students are billed a materials fee. Prerequisite(s): course 70/L; Mathematics 23B; and Applied Mathematics and Statistics 20. Students must concurrently enroll in course 135. *M. Isaacson, The Staff*

136. Engineering Electromagnetics. S

Course will cover electromagnetic wave propagation, transmission lines, waveguides, and antennas. Prerequisite(s): course 135 and 135L. Enrollment restricted to School of Engineering and Division of Physical and Biological Sciences majors or permission of instructor. *M. Isaacson, The Staff*

145. Properties of Materials. F

The fundamental electrical, optical, and magnetic properties of materials, with emphasis on metals and semiconductors: chemical bonds, crystal structures, elementary quantum mechanics, energy bands. Electrical and thermal conduction. Optical and magnetic properties. Prerequisite(s): Physics 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N. Students must also concurrently enroll in course 145L. *H. Schmidt, N. Kobayashi, J. Kubby, A. Shakouri*

145L. Properties of Materials Laboratory (1 credit). F

Laboratory sequence illustrating topics covered in course 145. One two-hour laboratory per week. Students are billed a materials fee. Prerequisite(s): Physics 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N. Students must also concurrently enroll in course 145. *H. Schmidt, N. Kobayashi, J. Kubby, A. Shakouri*

151. Communications Systems. W

An introduction to communication systems. Analysis and design of communication systems based on radio, transmission lines, and fiber optics. Topics include fundamentals of analog and digital signal transmission in the context of baseband communications, including concepts such as modulation and demodulation techniques, multiplexing and multiple access, channel loss, distortion, bandwidth, signal-to-noise ratios and error control. Digital communication concepts include an introduction to sampling and quantization, transmission coding and error control. Prerequisite(s): courses 103, 70/L, and Computer Engineering 107 or probability theory and random variables background. Enrollment restricted to School of Engineering and Division of Physical and Biological Sciences majors or permission of instructor. *P. Mantey, B. Friedlander*

152. Introduction to Wireless Communications. *

Introduction to the principles of wireless communications systems. Wireless propagation channels and their impact

on digital communications. Modulation techniques for wireless systems and their performance. Multi-antenna systems and diversity. Multicarrier and spread spectrum. Multi-access methods: FDMA, TDMA, CDMA. The structure of cellular systems. Students cannot receive credit for this course and course 252. Prerequisite(s): Computer Engineering 107 and course 151, or by consent of instructor. Enrollment restricted to juniors and seniors. *B. Friedlander*

153. Digital Signal Processing. *

Introduction to the principles of signal processing, including discrete-time signals and systems, the z-transform, sampling of continuous-time signals, transform analysis of linear time-invariant systems, structures for discrete-time systems, the discrete Fourier transform, computation of the discrete Fourier transform, and filter design techniques. Taught in conjunction with Electrical Engineering 250. Students cannot receive credit for this course and Electrical Engineering 250. (Also offered as Computer Engineering 153. Students cannot receive credit for both courses.) Prerequisite(s): course 103. Enrollment restricted to School of Engineering and Division of Physical and Biological Sciences majors or permission of instructor. *P. Milanfar, H. Sadjadpour*

154. Feedback Control Systems. W

Analysis and design of continuous linear feedback control systems. Essential principles and advantages of feedback. Design by root locus, frequency response, and state space methods and comparisons of these techniques. Applications. Prerequisite(s): course 103. Enrollment restricted to School of Engineering and Division of Physical and Biological Sciences majors or permission of instructor. Enrollment limited to 30. *P. Milanfar, P. Mantey, W. Dunbar, G. Elkaim, J. Rosen*

171. Analog Electronics. S

Introduction to (semiconductor) electronic devices. Conduction of electric currents in semiconductors, the semiconductor p-n junction, the transistor. Analysis and synthesis of linear and nonlinear electronic circuits containing diodes and transistors. Biasing, small signal models, frequency response, and feedback. Operational amplifiers and integrated circuits. Prerequisite(s): course 70/L; previous or concurrent enrollment in course 171L required. *C. Gu, W. Liu, A. Shakouri, K. Pedrotti*

171L. Analog Electronics Laboratory (1 credit). S

Laboratory sequence illustrating topics covered in course 171. One two-hour laboratory session per week. Students are billed a materials fee. Prerequisite(s): 70/L; previous or concurrent enrollment in course 171 required. *C. Gu, W. Liu, A. Shakouri, K. Pedrotti*

172. Advanced Analog Circuits. F

Analog circuit design covering the basic amplifier configurations, current mirrors, differential amplifiers, frequency response, feedback amplifiers, noise, bandgap references, one- and two-stage operational amplifier design, feedback amplifier stability, switched capacitor circuits and optionally the fundamentals of digital-to-analog and analog-to-digital converters. Emphasis throughout will be on the development of approximate and intuitive methods for understanding and designing circuits. Cannot receive credit for this course and course 221. Prerequisite(s): course 171. *W. Liu, K. Pedrotti*

178. Device Electronics. S

This course reviews the fundamental principles, device's materials, and design and introduces the operation of several semiconductor devices. Topics include the motion of charge carriers in solids, equilibrium statistics, the

electronic structure of solids, doping, the pn junction, the junction transistor, the Schottky diode, the field-effect transistor, the light-emitting diode, and the photodiode. Prerequisite(s): courses 145/L and 171/L. Enrollment restricted to School of Engineering and Division of Physical and Biological Sciences majors or permission of instructor. *C. Gu, W. Liu, K. Pedrotti*

193. Field Study. F,W,S

Provides for individual programs of study with specific academic objectives carried out under the direction of a faculty member of the electrical engineering program and a willing sponsor at the field site and using resources not normally available on campus. Credit is based on the presentation of evidence of achieving the objectives by submitting a written and oral presentation. May not normally be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for individual programs of study with specific academic objectives carried out under the direction of a faculty member of the electrical engineering program and a willing sponsor at the field site and using resources not normally available on campus. Credit is based on the presentation of evidence of achieving the objectives by submitting a written and oral presentation. May not normally be repeated for credit. *The Staff*

195. Senior Thesis Research. F,W,S

Individual directed study for upper-division undergraduates. Students submit petition to sponsoring agency. *The Staff*

195F. Senior Thesis Research (2 credits). F,W,S

Prerequisite(s): petition on file with sponsoring agency. Students submit petition to sponsoring agency. *The Staff*

198. Individual Study or Research. F,W,S

Provides for department-sponsored individual study program off campus, for which faculty supervision is not in person, but by correspondence. Students submit petition to sponsoring agency. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for department-sponsored individual study program off campus for which faculty supervision is not in person, but by correspondence. Students submit petition to sponsoring agency. *The Staff*

199. Tutorial. F,W,S

Individual directed study for upper-division undergraduates. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual directed study for upper-division undergraduates. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Research and Teaching in Electrical Engineering (3 credits). *

Basic teaching techniques for TAs: responsibilities and rights, resource materials, computer security, leading discussion or lab sessions, presentations techniques, maintaining class records, electronic handling of homework, and grading. Examines research and professional training: use of library and online databases, technical typesetting, writing journal and conference papers, publishing, giving talks, and ethical issues. Enrollment restricted to graduate students. *C. Gu*

211. Introduction to Nanotechnology. *

Introduction to underlying principles of the emerging field of nanotechnology. Intended for multidisciplinary audience with a variety of backgrounds. Introduces scientific principles and laws relevant on the nanoscale. Discusses applications in engineering, physics, chemistry, and biology. Prerequisite(s): course 145 or consent of instructor. Enrollment limited to 35. *H. Schmidt*

212. Introduction to BioMEMS. *

Oriented to general engineering and science students. Topics included are: 1) microfabrication of silicon, glass, and polymer materials; 2) microfluidics and electrokinetics; 3) sensors, actuators, and drug-delivery systems; 4) micro total-analysis systems and lab-on-a-chip devices; 5) detection and measuring systems; 6) genomics, proteomics, DNA, and protein microarrays; 7) emerging applications in medicine, research, and homeland security; 8) packaging, power systems, data communication, and RF safety; and 9) biocompatibility and standards. Recommended for advanced undergraduates and graduate students in bioengineering, electrical engineering, chemistry, and health-related fields including biochemistry, molecular and cellular biology, physiology, and genetics. Enrollment restricted to graduate students, or by permission of the instructor. *J. Kubby*

215. Micro-Electro-Mechanical Systems (MEMS) Design. F

Introduction to MEMS technology: covers basic microfabrication technologies, the governing physics for MEMS devices in different energy domains (mechanical, electrical, optical, thermal, and fluidic). Fabrication and design of MEMS devices illustrated using examples of existing research prototypes and commercial products. Students design, lay out, and fabricate an optical MEMS deformable mirror device for applications in adaptive optics. Prerequisite(s): courses 135, 145, and 211; and Physics 5A, 5B, and 5C. Enrollment restricted to seniors and graduate students. May be repeated for credit. *J. Kubby*

221. Advanced Analog Integrated Circuits. F

Analog integrated circuit design with emphasis on fundamentals of designing linear circuits using CMOS. Covers MOS devices and device modeling, current mirrors, op-amp design, op-amp compensation, comparators, multipliers, voltage references, sample-and-holds, noise, and an introduction to more complicated systems using these building blocks, such as phase locked loops and analog-to-digital converters. If time permits, integrated circuit layout issues and device/circuit fabrication. Students cannot receive credit for this course and course 172. Prerequisite(s): course 171 or equivalent; course 178 or equivalent recommended. Enrollment limited to 20. *W. Liu, K. Pedrotti*

222. High-Speed Low-Power Integrated Circuit Design. *

Digital integrated circuit design covered with an emphasis on high-speed and low-power applications. Covers signaling techniques and circuits including transmitters and receivers, with emphasis on on-chip interconnect, timing fundamentals and timing circuits. Theoretical fundamentals of phase locked loops and design issues of implementation addressed. Course has a project design component. Interview to assess technical skills of student. Enrollment restricted to electrical engineering and computer engineering graduate students. Enrollment limited to 20. May be repeated for credit. *W. Liu*

223. Advanced Solid-State Devices. W

Offers graduate students the opportunity to learn advanced solid-state devices (e.g., electronic, optoelectronic, photonic devices, and smart sensors) from various scientific, technological, and engineering aspects of functional materials (e.g., semiconductors, metals, insulators) used in these devices. Enrollment restricted to undergraduate students who have completed course 178 or to graduate students. *N. Kobayashi*

224. Physical Design of Micro- and Opto-Electronic Packages. *

Micro- and opto-electronic packaging and materials; mechanical properties and behavior, thermal stress in dissimilar materials, and predictive modeling. Design for reliability, dynamic response to shocks and vibrations; reliability evaluations and testing; plastic packages of IC devices; photonics packages, fiber optics structures, and new frontiers. Enrollment restricted to graduate students. *The Staff*

225. Basics of Electronics Reliability. *

Basic concepts of reliability engineering taught in application to microelectronic and photonic materials, assemblies, and packages and systems. Emphasis on the physics and mechanics of failure physical design for reliability predictive modeling and accelerated testing, with numerous practical examples and illustrations. Prerequisite(s): basic calculus; electronic and photonic devices and systems. Enrollment restricted to graduate students. *The Staff*

230. Optical Fiber Communication. F

Components and system design of optical fiber communication. Topics include step-index fibers, graded-index fibers, fiber modes, single-mode fibers, multimode fibers, dispersion, loss mechanics, fiber fabrication, light-emission processes in semiconductors, light-emitting diodes, laser diodes, modulation response, source-fiber coupling, photodetectors, receivers, receiver noise and sensitivity, system design, power budget and rise-time budget, fiber-optic networks (FDDI, SONET, etc), wavelength division multiplexing (WDM). Students cannot receive credit for this course and course 130. Enrollment restricted to graduate students. May be repeated for credit. *C. Gu*

231. Optical Electronics. W

Introduction to phenomena, devices, and applications of optoelectronics. Main emphasis is on optical properties of semiconductors and semiconductor lasers. Prerequisite(s): course 145/L. May be repeated for credit. *H. Schmidt, A. Shakouri, C. Gu*

232. Quantum Electronics. F

Covers basic theory of interaction of electromagnetic radiation with resonant atomic transitions; density matrix treatment; Rabi oscillation, laser mode-locking, Q-switching; parametric oscillation, stimulated Brillouin and Raman scattering, coherent radiation; and noise in photodetectors and lasers. Prerequisite(s): course 231 or equivalent. *A. Shakouri*

233. Fiber Optics and Integrated Optics. S

Concepts and analysis of optical wave propagation in optical fibers and waveguides. Topics include geometrical optics description and electromagnetic theory of slab waveguides; modes, dispersion, and birefringence in optical fibers; mode coupling and gratings in fibers; wavelength-division multiplexing; nonlinear optics in fibers and solitons; semiconductor optical amplifiers and Er doped fiber amplifiers. Prerequisite(s): courses 135 and 145. *C. Gu*

234. Liquid Crystal Displays. *

Introduction to principle of operation, components and systems of liquid crystal displays (LCDs). Topics include basic LCD components, properties of liquid crystals, polarization of optical waves, optical wave propagation in anisotropic media, Jones matrix method, various display systems, active matrix addressing, and color LCDs. Prerequisite(s): course 135 and 136. Enrollment restricted to seniors and graduate students. *C. Gu*

235. Optical Information Storage and Processing. *

Introduction to applications of optical technologies in data storage and information processing. Topics include basic principles of Fourier optics; electro-optic, acousto-optic, and magneto-optic effects and devices; planar and volume holography; optical data storage systems; and optical information processing, interconnecting, and switching systems. Enrollment restricted to graduate students, or undergraduates having completed Physics 5B and 5C and course 103. *C. Gu*

236. Integrated Biophotonics. S

Covers use of integrated optics for study of biological material; fluorescence spectroscopy, single molecule detection, optical tweezers, layered dielectric media, hollow-core waveguides, photonic crystals, optofluidics, biophotonic systems, and applications. Prerequisite(s): course 233 or equivalent. Enrollment restricted to graduate students. Enrollment limited to 20. *H. Schmidt*

241. Introduction to Feedback Control Systems. W

Graduate-level introduction to control of continuous linear systems using classical feedback techniques. Design of feedback controllers for command-following error, disturbance rejection, stability, and dynamic response specifications. Root locus and frequency response design techniques. Extensive use of MATLAB for computer-aided controller design. Course has concurrent lectures with Electrical Engineering 154. (Also offered as Computer Engineering 241. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *W. Dunbar, G. Elkaim, P. Milanfar, P. Manthey, J. Rosen*

250. Digital Signal Processing. F

In-depth study of signal processing techniques, including discrete-time signals and systems, the z-transform, sampling of continuous-time signals, transform analysis of linear time-invariant systems, structures for discrete-time systems, the discrete Fourier transform, computation of the discrete Fourier transform, filter design techniques. Students cannot receive credit for this course and course 153. *H. Sadjadpour, P. Milanfar, B. Friedlander*

251. Principles of Digital Communications. *

A core course on digital communications theory. Provides an introduction to digital communication, including source coding, characterization of communication signals and systems, modulation and demodulation for the additive Gaussian channel, digital signaling, and over bandwidth constrained linear filter channels and over fading multipath channels. Prerequisite(s): course 151 and 153 (or Computer Engineering 153) and Computer Engineering 107. *B. Friedlander*

252. Wireless Communications. W

In-depth study of the physical layer of wireless communications. Wireless propagation channels and their impact on digital communications. Modulation techniques for wireless systems and their performance. Multi-antenna systems and diversity. Multicarrier and spread spectrum. Multi-access methods: FDMA, TDMA, CDMA. The

structure of cellular systems. Students cannot receive credit for this course and course 152. Prerequisite(s): course 251. *B. Friedlander*

253. Introduction to Information Theory. W

An introduction to information theory including topics such as entropy, relative entropy, mutual information, asymptotic equipartition property, channel capacity, differential entropy, rate distortion theory, and universal source coding. (Also offered as Computer Science 250. Students cannot receive credit for both courses.) Prerequisite(s): Computer Engineering 107, or Applied Mathematics and Statistics 131 or equivalent course, or permission of instructor. Enrollment restricted to graduate students. *H. Sadjadpour*

254. Multi-User Information Theory. S

Topics include basic information theory, multiple-access channel, broadcast channel, interference channel, relay channel, capacity with feedback, capacity of networks, and channels with state and current research. Prerequisite(s): course 253. Enrollment restricted to graduate students. *The Staff*

255. Multiple-Antenna Wireless Communications. *

Basic theory of multiple-antenna wireless systems. Introduction to space-time propagation models, capacity of multiple-input multiple-output (MIMO) channels, space-time coding, transmitter CSI, and multiuser space-time systems. Includes discussion of multiple antennas in emerging systems and standards. Prerequisite(s): course 252 and Computer Engineering 107, or Applied Mathematics and Statistics 131, or equivalent. *The Staff*

261. Error Control Coding. S

Covers the following topics: introduction to algebra; linear block code; cyclic codes; BCH code; RS codes; spectral domain study of codes; CRC; and product codes. Enrollment restricted to graduate students. *H. Sadjadpour*

262. Statistical Signal Processing I. F

Covers fundamental approaches to designing optimal estimators and detectors of deterministic and random parameters and processes in noise, and includes analysis of their performance. Binary hypothesis testing: the Neyman-Pearson Theorem. Receiver operating characteristics. Deterministic versus random signals. Detection with unknown parameters. Optimal estimation of the unknown parameters: least square, maximum likelihood, Bayesian estimation. Will review the fundamental mathematical and statistical techniques employed. Many applications of the techniques are presented throughout the course. Note: While a review of probability and statistics is provided, this is not a basic course on this material. Prerequisite(s): course 103 and Computer Engineering 107, or permission of instructor. *P. Milanfar*

263. Advanced Topics in Coding Theory. *

Covers convolutional codes and its principles, maximum likelihood decoding and Viterbi decoding, performance evaluation of convolutional codes, trellis coded modulation (TCM), rotationally invariant convolutional codes, turbo codes, turbo decoding principles, performance evaluation of turbo codes, interleaver design for turbo codes, topics on turbo codes, space-time codes, and LDPC. Prerequisite(s): course 261. Enrollment restricted to electrical engineering, computer engineering, and computer science graduate students. Enrollment limited to 10. *H. Sadjadpour*

264. Image Processing and Reconstruction. W

Fundamental concepts in digital image processing and reconstruction. Continuous and discrete images; image acquisition, sampling. Linear transformations of images, convolution and superposition. Image enhancement and restoration, spatial and spectral filtering. Temporal image processing: change detection, image registration, motion estimation. Image reconstruction from incomplete data. Applications. Students that have completed Computer Engineering 261 may not take this course for credit. Prerequisite(s): course 153 or permission of instructor. *P. Milanfar*

265. Introduction to Inverse Problems (3 credits). *

Fundamental approaches and techniques in solving inverse problems in engineering and applied sciences, particularly in imaging. Initial emphasis on fundamental mathematical, numerical, and statistical formulations and known solution methods. Sampling of applications presented from diverse set of areas (astronomical, medical and optical imaging, and geophysical exploration). Enrollment restricted to graduate students. *P. Milanfar*

270. Neural Implant Engineering. W

Advanced studies of the basic neuroscience-engineering design requirements and technological issues associated with implantable neural prostheses, with particular emphasis on retinal and cortical function. Course is team-taught via remote web cast. A basic understanding of physics, circuit theory, and electronics is required. Enrollment restricted to graduate students; juniors and seniors may enroll by permission of instructor. *W. Liu*

280B. Seminar on Integrated Bioelectronics (2 credits). F,W,S

Weekly seminar covering current research in integrated bioelectronics. May be repeated for credit. *W. Liu*

280I. Seminar on Microscopy and Nanotechnology (1 credit). *

Weekly seminar series covering research topics and experimental research in microscopy and nanotechnology. Current research and literature are discussed. Students lead discussion and participate in all meetings. Enrollment restricted to graduate students. Enrollment by permission of instructor. Enrollment limited to 10. May be repeated for credit. *M. Isaacson*

280M. Seminar on Micro-Electro-Mechanical Systems (MEMS) (2 credits). F,W,S

Weekly seminar series covering topics of current research interest in Micro-Electro-Mechanical Systems (MEMS) design, fabrication and applications. Current research work and literature in these areas are discussed. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. May be repeated for credit. *J. Kubby*

280O. Seminar on Applied Optics (2 credits). F,W,S

Weekly seminar series covering topics of current research in applied optics, including integrated, quantum, nonlinear, and nano-optics. Current research work and literature in these areas are discussed. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. May be repeated for credit. *H. Schmidt*

280Q. Seminar on Quantum Electronics and Nanoelectronics (2 credits). F,W,S

Weekly series covers current research in quantum electronics including electron and photon transport in

nanostuctures; nanoscale heat transport; optoelectronic integrated circuits; nanoscale devices for energy conversion; micro-refrigeration; thermal and acoustic imaging of nanostructures. Current research work and recent literature are discussed. Enrollment restricted to graduate students; undergraduates may enroll by permission of instructor. May be repeated for credit. *A. Shakouri*

281. Guest Seminar Series (1 credit). *

Distinguished speakers from industry, universities, and government discuss current developments in electrical engineering and related fields. Emphasis on research questions that may lead to collaborative work with faculty and graduate students. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

283. Special Topics in Electrical Engineering (3 credits). *

Graduate seminar on a research topic in electrical engineering that varies with the particular instructor. Topics may include, but are not limited to, electromagnetics, antennas, electronics biotechnology, nanotechnology, signal processing, communications, VLSI, MEMS, and radio frequency. Enrollment restricted to graduate students and consent of instructor. Enrollment limited to 25. May be repeated for credit. *The Staff*

290. EE Graduate Seminar (1 credit). *

Research seminar at the graduate level regarding technical areas of electrical engineering activity that are of interest to the research and/or commercial communities. Enrollment restricted to computer engineering, electrical engineering, or physics graduate students, or by permission of instructor. Enrollment limited to 30. May be repeated for credit. *The Staff*

291. Tomorrow's Professor: Preparing for an Academic Career in Science and Engineering (3 credits). *

The aim of this course is two-fold: (1) inform, motivate, and prepare graduate students for a possible career in academia; (2) expose both undergraduate and graduate students to the academic enterprise, possible career options for those who pursue advanced degrees in engineering and science. Restricted to graduate students. Appropriate for graduate students in all fields of engineering, science, and mathematics; advanced undergraduates in good standing may enroll with permission of instructor. *P. Milanfar*

293. Advanced Topics in Electrical Engineering. *

Graduate seminar course on a research topic in electrical engineering that varies with the particular instructor. Typical topics include, but are not limited to, electromagnetics, antennas, electronics biotechnology, nanotechnology, signal processing, communications, VLSI, and MEMS. Prerequisite(s): Consent of instructor. Enrollment restricted to graduate students. Enrollment limited to 25. May be repeated for credit. *The Staff*

297. Independent Study or Research. F,W,S

Independent study or research under faculty supervision. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Thesis research conducted under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

Information Systems Management

Faculty and Professional Interests**Professor**

RAMAKRISHNA AKELLA

Information technology and systems, management of technology, new product introduction and development, enterprise and knowledge management, supply chain management and e-business, financial engineering

PATRICK MANTEY

Image systems, image processing, visualization, image and multimedia systems, digital signal processing, real-time control, management and leadership

Assistant Professor

JOHN MUSACCHIO

Control, analysis, and pricing of communications networks; applications of game theory in networking; wireless ad-hoc networks; and management of technology

KEVIN ROSS

Service engineering and management; resource allocation; operations research; pricing; scheduling; queueing theory; networks

YI ZHANG

Information retrieval, knowledge management, natural language processing, machine learning

Lecturer

SUBHAS DESA

Product development, supply chain management, management of technology, system dynamics and control

LINDA WERNER

Software engineering, testing, usability engineering, educational and social issues

**Professor**

MARTIN M. CHEMERS (Psychology)

Leadership, team and organizational effectiveness, cultural and personality characteristics of leaders, college student adjustment and performance

YIN-WONG CHEUNG (Economics)

Econometrics, applied econometrics, exchange rate dynamics, financial price behavior, aggregate output dynamics

DANIEL FRIEDMAN (Economics)

Microeconomic theory, experimental economics, evolution and learning, behavioral economics, financial markets

MICHAEL ISAACSON (Electrical Engineering)

Nano- and microfabrication technology and applications to biomedical and diagnostic devices, nanocharacterization of materials with emphasis on the development of microscopy tools, novel modes of imaging, electron and light optics

ROBERT A. LEVINSON (Computer Science)

Artificial intelligence, machine learning, heuristic search, associative pattern retrieval, hierarchical reinforcement learning, semantic networks

DARRELL LONG (Computer Science)

Storage systems, distributed computing systems, operating systems, mobile computing, performance evaluation, fault tolerance, computer security, multimedia, and video-on-demand systems

MARC MANGEL (Applied Mathematics and Statistics)

Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

CHARLES E. MCDOWELL (Computer Science)

Programming languages, parallel computing, and computer science education

ALEX PANG (Computer Science)

Uncertainty visualization, tensor visualization, scientific visualization, collaboration software, virtual reality interfaces

IRA POHL (Computer Science)

Artificial intelligence, programming languages, heuristic methods, educational and social issues, combinatorial algorithms

NIRVIKAR SINGH (Economics)

Industrial organization, political economy, economic development, technology and innovation, South Asian immigrants in the U.S.

Associate Professor

LUCA DE ALFARO (Computer Engineering)

Formal methods, game theory, embedded systems, software engineering

JAMES WHITEHEAD, JR. (Computer Science)

Software engineering, software evolution, software bug prediction, automated software construction, video game level design

Assistant Professor

WILLIAM B. DUNBAR (Computer Engineering)

Theory and application of feedback control, air traffic control, nanopore sensors, dynamics and control of biomolecules

Program Description

Information Systems Management (ISM) is a multi-disciplinary program that focuses on the integration of information systems, technology, and business management for two purposes: the technology of management, i.e., the use of information systems to solve business problems, and the management of technology, which includes new product development and enterprise management. Today, it is widely accepted that managing information resources to optimize enterprise performance is as important as managing resources such as labor, capital, and raw materials. ISM supports the management of the processes of collection, manipulation, storage, distribution, and utilization of an organization's information resources as well as the use of these processes in the management of technology. The program offers a B.S. in information systems management as well as a minor in information systems and technology management (ISTM).

To develop information systems that address the needs of the organization—in areas such as engineering, manufacturing, finance, accounting, and marketing—ISM professionals must possess a solid mix of business and technical knowledge. They must be well versed in organizational structures, operations (including processes and the flows of data between processes), and the financial implications related to these factors. In addition, they must also be well versed in topics such as systems development tools and techniques, information architecture, networks, databases, telecommunications, and systems integration.

The essence of the information systems management major at UCSC is the integration of the fundamental

intellectual content of the computer science, engineering, and business management economics majors. It is a rigorous, challenging major for those students wanting to pursue careers in information systems management and the management of technology. To accomplish these objectives, students must learn the mathematics, science, and technical fundamentals of computer science and engineering as well as understand the environment in which information technology (IT) solutions will be applied through economics, business, and management of technology courses.

To graduate with a B.S. in information systems management, students normally complete 19 required courses (with two laboratories, totaling 99 quarter credits) plus four elective courses (20 quarter credits) for the information systems management major program. To plan for completion of these course requirements within the normative time, students should consult with an adviser as early as possible. Honors students are likely to find the rigorous management and leadership elements of the new program of significant interest. Industrial interactions and projects are key features of this major.

Information Systems Management Policies

Admissions Policy

Admission to majors in the School of Engineering is selective. First-year applicants may receive direct admission at the time they apply to UCSC based on their high school record and test scores. Admission to the major after a student has entered UCSC is based on performance in all School of Engineering and Physical and Biological Sciences courses attempted at UCSC. Please refer to the School of Engineering section of the catalog for the full admissions policy.

UCSC students who have completed 3 or more quarters at UCSC must complete the foundation courses before they can declare an information systems management major. Please refer to the School of Engineering section of the catalog for the full admissions policy.

Foundation Courses: Computer Science 12A, or 5J and 11, or 13H; Computer Engineering 16 (or 16H); and Mathematics 19A-B, or Mathematics 20A-B, or Economics 11A and 11B; Information Systems Management 50 (or Economics 1 and 2).

Disqualification and Satisfactory Progress in the Major

Please refer to the Engineering section of this catalog for the School of Engineering's major disqualification policy.

Letter Grade Policy

Information systems management requires letter grading for all courses applied toward the B.S. in information systems management, with the exception of two lower-division courses which students may elect to take Pass/No Pass (not to include course 50 or 58). This policy includes courses required for the information systems management major but sponsored by other departments.

Transfer Students

Articulation agreements with other California institutions are in place for some courses required for the information systems management major; it is important for students to inquire whether specific courses meet the requirements of this major. Articulation information is available on ASSIST at www.assist.org. Courses taken at other institutions which emphasize applications

of programming languages often do not count toward the information systems management major at UCSC. Please refer to the School of Engineering section of the catalog for the policy regarding transfer students.

School of Engineering Policies

Please refer to the School of Engineering section of the catalog for additional policies that apply to all School of Engineering programs. These policies include admission to the major, limits on the number of times courses can be attempted, and the need for UCSC students to obtain pre-approval before taking courses elsewhere.

Preparation for the Major

The information systems management major is intended for students with an interest in both technology and business. It is recommended that students intending to declare this major have completed four years of mathematics (through advanced algebra and trigonometry) and three years of science in high school. Completion of business-oriented computer literacy and basic programming courses is of benefit to students entering this major. Completion of any economics and/or business-related courses in high school is also beneficial, but the faculty realizes that these courses may not be available at many high schools. Completion of comparable college courses at other institutions serves to strengthen the preparation of a student for the information systems management major.

Information Systems Management Major Requirements

In addition to completing UCSC general education requirements, students must complete 19 required courses (with two laboratories, totaling 99 quarter credits) plus four elective courses (20 quarter credits) for the information systems management major program. To plan for completion of these course requirements within the normative time, students should consult with a School of Engineering adviser as early as possible. These 23 courses include the following:

Required Courses (19 courses plus one laboratory)

Mathematics (three 5-credit courses)

19A-B, *Calculus for Science, Engineering, and Mathematics*; or

Applied Mathematics and Statistics 11A and 11B, or Economics 11A and 11B, *Mathematical Methods for Economists*; and

Applied Mathematics and Statistics 10, *Mathematical Methods for Engineers I*

Economics (five required 5-credit courses)

1, *Introductory Microeconomics: Resource Allocation and Market Structure*

2, *Introductory Macroeconomics: Aggregate Economic Activity*

10A, *Economics of Accounting*

100A, *Intermediate Microeconomics*; or

100M, *Intermediate Microeconomics Math Intensive*

113, *Introduction to Econometrics*; or

Applied Mathematics and Statistics 113, *Managerial Statistics*

Computer Engineering (three 5-credit courses and a 2-credit lab)

12/L, *Computer Systems and Assembly Language/Laboratory*

16, *Applied Discrete Mathematics*; or 16H, *Honors Applied Discrete Mathematics*

150/L, *Introduction to Computer Networks/Laboratory*

Computer Science (three 5-credit courses)

12A, *Introduction to Programming*; or 5J, *Introduction to Programming Java* and 11, *Intermediate Programming*

12B, *Introduction to Data Structures*

182, *Introduction to Database Management Systems*

Information Systems Management (five 5-credit courses and one 2-credit seminar)

50, *Business Information Systems*

58, *Systems Analysis and Design*

105, *Management of Technology I*

125, *Management of Technology II*

158, *Business Strategy and Information Systems*

101, *Management of Technology Seminar*

Elective Courses (four courses)

- Two 5-credit School of Engineering courses
Students select two upper-division School of Engineering electives on the basis of their particular interests. These electives may be any 5-credit upper-division School of Engineering courses, with the following limitations:
 1. either Computer Engineering 153 or Electrical Engineering 153, but not both;
 2. either Applied Mathematics and Statistics 131 or Computer Engineering 107, but not both;
 3. independent and field-study courses (193, 195, 198, 199) require prior approval and support from the department to be used as an elective.
- One 5-credit upper-division economics course
- One 5-credit, upper-division School of Engineering or economics course; the limitations on School of Engineering electives given above apply)

Information Systems Management Major Planners

The following are three sample academic plans for students to complete during their first two years as preparation for the information systems management major. Plan One A and B are suggested guidelines for students who are committed to the major early in their academic career. Plan Two is for students who are considering the major.

Plan One A			
Year	Fall	Winter	Spring
1st (frsh)	Econ 1 CMPS 10	Econ 2 Math 19A	ISM 50 Math 19B
2nd (soph)	CMPS 12A, or 5J and 11 Econ 10A CMPE 16 or 16H	CMPS 12B ISM 58	CMPE 12/L AMS 10

Plan One B			
Year	Fall	Winter	Spring
1st (frsh)	Econ 10A CMPS 10	Econ 1 Econ 11A	Econ 2 Econ 11B
2nd (soph)	CMPS 12A, or 5J and 11 ISM 50	ISM 58 CMPE 16 or 16H	CMPS 12B Econ 100A AMS 10

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Math 3	Econ 1	ISM 50 Econ 2
2nd (soph)	CMPS 10 Math 19A or Econ 11A Econ 10A	ISM 58 Math 19B or Econ 11B	CMPS 12B AMS 10

Comprehensive Requirement

Students complete two project-intensive courses, Information Systems Management 158 and Information Systems Management 105, which constitute the comprehensive requirement for the information systems management major, based on the dual aspects (technology of management and management of technology) of the program. Course 158 deals with the technology of management, and course 105 deals with the management of technology. Both courses involve a substantial amount of critical thinking and writing within the context of comprehensive projects.

Information Systems Management 158, *Business Strategy and Information Systems*, requires that students understand and use a structured methodology to evaluate the competitive use of information systems within an enterprise. This is accomplished by a team project as well as by an individual project that involves researching and writing a comprehensive analytical term paper using a methodology taught as part of this course

Information Systems Management 105, *Management of Technology I*, requires that students understand and apply structured methodologies for the development, management, and commercialization of technologies and products. Students will work in teams on a comprehensive term project in the development, commercialization, and management of technologies such as computers, networks, semiconductors, mechatronics, and biotechnology.

Minor in Information Systems and Technology Management (ISTM)

Purpose

There is a growing need in today's increasingly complex socio-technological world for the fusion of information systems, technology, and business management for two important purposes: the use of information systems to solve business problems, and the management of technology, which includes new product development and enterprise management. The Information Systems Management (ISM) Program therefore proposes a minor in Information Systems and Technology Management (ISTM) to provide undergraduates in the School of Engineering as well in other programs and divisions in the university, such as economics and business management economics, the physical and biological sciences, and arts, the opportunity to expand the breadth of their knowledge and training to include the management of information systems and the management of technology.

Rationale for the Courses

Courses for the information systems management minor will include a combination of courses from the ISM Program, computer engineering, computer science, and economics courses as well as the chains of prerequisites behind these courses. The ISM program courses for the information systems management minor will include a mix of information systems and management of technology courses, providing students with a strong

foundation in both the management of information systems and the management of technology.

Course Requirements

Requirements for the minor in information systems management are the following:

Lower-Division Requirements:

Mathematics (2 courses)

- Mathematics 19A, *Calculus* (or Applied Mathematics and Statistics 11A/Economics 11A, *Mathematical Methods for Economists*, or Mathematics 11A, *Calculus*, or Mathematics 20A, *Honors Calculus*)
- Mathematics 19B, *Calculus* (or Applied Mathematics and Statistics 11B/Economics 11B, *Mathematical Methods for Economists*, or Mathematics 11B, *Calculus*, or Mathematics 20B, *Honors Calculus*)

Computer Science (1 course)

- 12A, *Introduction to Programming*; or Computer Science 5J, *Introduction to Programming in Java* and 11, *Intermediate Programming*
- Information Systems Management (2 courses)
- Information Systems Management 50, *Business Information Systems*
One of the following courses:
 - Information Systems Management 58, *Systems Analysis and Design*
 - Information Systems Management 80C, *Starting a New Technology Company*

Upper-Division Requirements

Mathematics (1 course)

- One of the following courses:
- Applied Mathematics and Statistics 113, *Managerial Statistics*; or
 - Economics 113, *Introduction to Econometrics*; or
 - Computer Engineering 107, *Mathematical Methods of Systems Analysis: Stochastic*; or
 - Applied Mathematics and Statistics 131, *Introduction to Probability Theory*

Upper-Division Electives (4 courses)

- Four (4) upper-division courses selected from the following:
- Information Systems Management 105, *Management of Technology I*
 - Information Systems Management 125, *Management of Technology II*
 - Information Systems Management 158, *Business Strategy and Information Systems*
 - Computer Engineering 150/L, *Introduction to Computer Networks/Laboratory*
 - Computer Science 180, *Database Systems I* (or CS 182, *Introduction to Database Management Systems*)
 - Economics 100A, *Intermediate Microeconomics* (or 100M, *Intermediate Microeconomics*, Mathematics Intensive—requires additional prerequisites)
 - Economics 100B, *Intermediate Macroeconomics* (or 100N, *Intermediate Macroeconomics*, Mathematics Intensive—requires additional prerequisites)

With pre-approval from the information systems management undergraduate director, up to two graduate information systems management courses may be used to satisfy upper-division elective requirements.

Lower-Division Courses

50. Business Information Systems. F,S

Addresses the use of information systems (IS) within a business enterprise. Subjects include computer hardware and software concepts, system design and implementation, telecommunications, data management, transaction-based systems, management information systems, and the use of IS to compete. Intended for information system management and business management economics majors. *J. Musacchio, K. Ross*

58. Systems Analysis and Design. W

Students learn how information technology is used to deal with business requirements and/or solve business problems. Provides an understanding of structured computer systems analysis and design methodologies and techniques and their application to business information systems. Intended for information systems management and business management economics majors. Prerequisite(s): course 50. Enrollment limited to 40. *Y. Zhang*

80C. Starting a New Technology Company. S

Focuses on the creation and management of technology start-ups and small companies, using case studies and team projects as the basis for learning and applying the course materials. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *S. Desa, R. Akella*

94. Group Tutorial. F,W,S

A means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

A means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

101. Management of Technology Seminar (2 credits). F,W,S

Uses weekly talks by leading industry practitioners and university researchers to provide in-depth exposure to the management of technology. Topics covered include product development, operations, strategy, finance, and marketing for technologies such as software and information systems. May be repeated for credit. *S. Desa*

105. Management of Technology I. F

An in-depth examination of technological, strategic, marketing, and financial methods and analytical tools for the management of technology to enable cost-effective and rapid development of profitable and high quality technologies. Includes case studies and a comprehensive project. Students who receive credit for this course can-

not also receive credit for course 80A; students who receive credit for course 205 cannot also receive credit for this course. Prerequisite(s): Mathematics 19B or 11B or Applied Mathematics and Statistics 11B or Economics 11B. *S. Desa*

125. Management of Technology II. W

High-technology enterprises must understand and operate effectively within their technology-business value chains in order to maximize profitability. This course develops and applies methods and tools for the design, optimization, selection, and management of these value chain networks. Students who receive credit for this course cannot also receive credit for course 80B; students who receive credit for course 225 cannot also receive credit for this course. Prerequisite(s): course 105. *S. Desa, R. Akella*

158. Business Strategy and Information Systems. S

Analysis of effective use of information systems within a business enterprise, with emphasis on gaining a competitive advantage. Integration of information systems with business strategy, financial justification, personnel, and organizational considerations are highlighted. Intended for information system management majors or senior engineering majors who have a business interest. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 50 or permission of instructor. (General Education Code(s): W.) *K. Ross*

193. Field Study. F,W,S

Provides individual programs of study with specific academic objectives carried out under direction of faculty member of Information Systems Management and a willing sponsor at field site. Uses resources not normally available on campus. Credit based on presentation of evidence of achieving objectives by submitting written and oral presentation. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides individual programs of study with specific academic objectives carried out under direction of faculty member of Information Systems Management and a willing sponsor at field site. Uses resources not normally available on campus. Credit based on presentation of evidence of achieving objectives by submitting written and oral presentation. Cannot normally be repeated for credit. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195. Senior Thesis Research. F,W,S

Intended for majors. Students submit petition to sponsoring agency. *The Staff*

195F. Senior Thesis Research (2 credits). F,W,S

Intended for majors. Students submit petition to sponsoring agency. *The Staff*

198. Individual Study or Research. F,W,S

Intended for majors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Individual Study or Research

(2 credits). F,W,S

Intended for majors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Individual Study or Research. F,W,S

Individual directed study for upper-division undergraduates. Students submit petition to sponsoring agency. Enrollment restricted to senior information systems management majors. May be repeated for credit. *The Staff*

Graduate Courses

205. Management of Technology I. F

Addresses technological, strategic, marketing, financial methods, and analytical tools for management of technology in an integrated manner that enables the cost-effective and rapid development of profitable and high quality technologies. Includes case studies and a comprehensive project. Students cannot receive credit for this course and either course 80A or 105. Enrollment restricted to juniors, seniors, and graduate students. *S. Desa, R. Akella*

206. Optimization Theory and Applications. W

A first graduate course in optimization with an emphasis on problems arising in management and engineering applications. Objectives are to become experts in problem formulation, comfortable with software for solving these problems, and familiar with analytical methods behind these solver technologies. Prerequisite(s): calculus and linear algebra. Enrollment restricted to graduate students. *K. Ross*

207. Random Process Models in Engineering. F

A first graduate course in stochastic process modeling and analysis with an emphasis on applications in technology management, information systems design, and engineering. Enrollment restricted to graduate students. Prerequisite: Computer Engineering 107 or other undergraduate probability course recommended. *J. Musacchio*

209. Knowledge Services and Data Analytics. F

Provides students with the systematic methodology and analytical tools to address the field of knowledge services in an integrated manner. Focuses on data, text, and business analytics. Includes training in the basic elements of stochastic optimization and other algorithmic approaches, such as stochastic dynamic programming, statistics, and machine learning. These methods enable corporate enterprises to achieve rapid, effective, and profitable optimization of knowledge-services management. Students are expected to have undergraduate preparation in probability and statistics. Undergraduates may enroll with instructor approval. Enrollment restricted to graduate students. Students are expected to have undergraduate preparation in probability and statistics. Undergraduates may enroll with instructor approval. *R. Akella*

211. E-Business Technology and Strategy. S

Surveys structure of modern information technology, the relation of that structure to structure of the industry that creates it, and the economic forces that drive the players in the industry. Building on these technological and economic concepts, studies how firms can craft a technology and business strategy to create and capture value in the information technology product and/or services sectors. Enrollment restricted to graduate students. *J. Musacchio*

225. Management of Technology II. W

High technology enterprises must understand and operate effectively within their technology-business value chains in order to maximize profitability. Course develops and applies methods and tools for the design, optimization, selection, and management of these value chain networks. Students cannot receive credit for this course and either course 80B or 125. Prerequisite(s): course 205 or consent of instructor. Enrollment restricted to juniors, seniors, and graduate students. *S. Desa, R. Akella*

240. Information Technology for Decision Support: An Introduction. S

Introduction to the information technologies useful to IT management. Reviews/surveys four major topics: 1) information systems: from computer technology—systems architecture (hardware and software), multiprocessors and cluster—to client-server, networking and distributed computing, data storage and data servers, file management, database systems, input/output technology, graphics and multimedia; 2) IT as a "service": commercial and open-course tools for information-system development and knowledge management; 3) managing, searching, and mining of structured and unstructured data; 4) decision-support systems that integrate knowledge with data mining and text mining tools to support decision-making in product development, supply-chain management, marketing, sales and logistics. Enrollment restricted to graduate students. *The Staff, Y. Zhang, P. Mantey*

245. Data Mining. S

Covers the principles, algorithms, and applications of data mining, including mining sequential data, structured data, stream data, text data, spatiotemporal data, biomedical data, and other forms of complex data. Enrollment restricted to graduate students. *R. Akella, Y. Zhang*

250. Stochastic Optimization in Information Systems and Technology. W

First in a sequence of courses in information systems and technology management (ISTM). Provides systematic methodology and corresponding set of methods and analytical tools to address the field of ISTM in an integrated manner; provides required training in stochastic optimization and other algorithmic approaches, such as dynamic programming, to achieve business intelligence in corporate enterprises. Students should have solid background in the following: probability equivalent to statistics, stochastic methods, calculus, linear algebra, mathematical maturity, stochastic processes, and optimization. Enrollment restricted to graduate students; undergraduates may enroll if they have completed Computer Engineering 107 or Applied Mathematics and Statistics 131 or have permission of instructor. Applied Math 205A and Computer Engineering 230 recommended. *R. Akella*

251. Information Systems and Technology Management 2. *

Provides a systematic methodology and corresponding set of methods and analytical tools in stochastic and neurodynamic programming used for business intelligence in corporate enterprises and AI and Machine learning research and applications in computer science, computer engineering, and electrical engineering and related to applied mathematics and statistics, business, management, and economics. Students should have solid background in probability equivalent to statistics, stochastic methods, calculus, mathematical maturity, stochastic processes and optimization, business intelligence and algorithms. Prerequisite(s): Computer Engineering 107 or Applied Mathematics and Statistics 131 or permission of instructor.

Enrollment restricted to graduate students. Applied Mathematics and Statistics 205B, 230, and course 250 recommended. *R. Akella*

260. Information Retrieval. S

Course covers major topics of information retrieval, including statistical characteristics of text, several important retrieval models, text clustering, text classification, text filtering, web analysis, information extraction, peer-to-peer research, distributed search, personalized search, and other related topics. Enrollment restricted to graduate students. Undergraduates may enroll with permission of instructor. *Y. Zhang*

270. Service Engineering and Management. W

Introduction to service engineering and management, from the role of services in the global economy to analytical models in service operations management. This field is developing rapidly; the material covers the fundamental principles of services as well as recent research. Topics include designing efficient service networks, forecasting, resource allocation, and globalization. Enrollment restricted to graduate students. *K. Ross, The Staff*

280A. Graduate Research Seminar (2 credits). *

Weekly seminar series in topics of current research in information systems and technology management. Enrollment by permission of instructor. Enrollment limited to 30. May be repeated for credit. *The Staff*

280I. Seminar on Information Retrieval and Knowledge Management (2 credits). F

Seminar series discussing advanced topics in information retrieval and knowledge management. Current research and literature are presented during each meeting. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *Y. Zhang*

280M. Sales and Marketing for Technologists and Engineers (2 credits). S

Perspective on the theory, plus examples, and tools useful to technologists and engineers for successfully guiding and supporting sales and marketing endeavors and, thereby, ensuring funding, staffing, product appeal, positive customer relationships, and marketplace success. *P. Mantey, The Staff*

280S. Seminar Topics (2 credits). *

Weekly seminar series of current research on a special topic in information systems and technology management. The theme of research presented throughout the course selected by the instructor. Topics may include, but are not limited to, knowledge planning, new product development and management of technology. Enrollment with permission of instructor. Enrollment limited to 30. May be repeated for credit. *P. Mantey*

293. Advanced Topics in Technology and Information Management (TIM). *

Advanced research topics in TIM (as determined by instructor). Topics include, but are not limited to, approaches and solutions to complex business problems, and development of information-based technology and services. Enrollment restricted to graduate students. Enrollment limited to 25. May be repeated for credit. *P. Mantey, The Staff*

297. Independent Study. F,W,S

Independent study under faculty supervision. Although course may be repeated for credit, not every degree program will accept a repeated course towards degree

requirements. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

English

See Literature, page 337, and Linguistics, page 333.

English-Language Literatures

Students wishing to pursue a course of study in English literature should consult the concentration in national/transnational literatures under Literature, page 337.

Entry Level Writing Requirement

See page 25.

Environmental Sciences and Policy*Program Description*

UCSC offers a range of options for students to pursue environmental topics. The Environmental Studies Department offers an interdisciplinary B.A. program that emphasizes social sciences, conservation biology, and agroecology (see Environmental Studies, page 260). The Environmental Studies Department offers combined majors with the Departments of Biological Sciences, Earth and Planetary Sciences, and Economics. Effectively, the environmental studies/biology and environmental studies/Earth sciences combined majors extend the scientific training in disciplinary areas but are not intended to develop a student's core competence to a level equivalent to that attained with a major in the related science. The Chemistry Department and the Earth and Planetary Sciences Department offer concentrations in environmental topics within their B.S. degree programs. The environmental sciences concentrations are designed for students in the natural sciences who wish to pursue interdisciplinary study of the environment. These develop a level of competency suitable for pursuing graduate work in these disciplinary areas or in graduate environmental programs (see descriptions in the appropriate sections: Chemistry, see page 154; and Earth and Planetary Sciences, see page 176).

Environmental Studies

405 Interdisciplinary Sciences Building
(831) 459-2634
<http://envs.ucsc.edu>

Faculty and Professional Interests

Professor

WEIXIN CHENG

Soil ecology, agroecology, biogeochemistry, global change ecology

ROBERT R. CURRY, Emeritus

BRYAN H. FARRELL, Emeritus

MARGARET FITZSIMMONS

Social and spatial aspects of environmental change, the development and regulation of primary-sector activities and the regional integration of environmental planning and resources management institutions in urban and rural settings

GREGORY S. GILBERT

Tropic ecology and conservation, disease ecology

STEPHEN R. GLIESSMAN

Agroecology, sustainable agriculture, tropical land use and development, alternative trade networks, sustainable livelihoods and conservation, community and agroecology

DAVID GOODMAN, Emeritus

BRENT HADDAD

Market-based regulation, property rights, economic institutions and the environment, California water institutions, renewable-resource electricity, greenhouse gas reduction

KAREN D. HOLL

Restoration ecology, conservation biology, landscape ecology

SHELDON KAMIENIECKI

Environmental politics and policy; agenda building; strategic regulatory planning; business and interest group influence; political campaigns and elections; research methodology

DEBORAH K. LETOURNEAU

Agroecology, tropical biology, insect-plant interactions, biological control as an alternative to chemical pesticides

PAUL L. NIEBANCK, Emeritus

JAMES E. PEPPER, Emeritus

DANIEL M. PRESS

U.S. environmental politics and policy, social capital and democratic theory, industrial ecology, land and species conservation, regionalism

ALAN R. RICHARDS

Political economy, agricultural and economic development, economic history

CAROL SHENNAN

Agroecology, ecosystem studies, agriculture-wetland interactions, participatory research, gender, and environmental issues

MICHAEL E. SOULÉ, Emeritus

Associate Professor

MICHAEL E. LOIK

Plant physiological ecology, climate change ecology, biometeorology, ecophysiology

S. RAVI RAJAN

Environmental history and political ecology, risk and disaster studies, science and technology studies, North-South environmental conflicts, environmental social theory, environmental ethics

Assistant Professor

JEFFREY T. BURY

Political ecology; sustainable development; Latin American studies; international relations; institutional dimensions of natural resource conservation in the global south

ZDRAVKA TZANKOVA

Preventing marine bio-invasions in the United States and Australia: science, politics, and institution in environmental decision-making

CHRISTOPHER C. WILMERS

Population and community ecology, conservation biology, ecological modeling

ERIKA ZAVALETA

Ecology and evolutionary biology, biodiversity and global change, biological invasions, terrestrial plant and ecosystem ecology, ecological economics, human ecology, conservation

Lecturer

ANDREW SCHIFFRIN

Environmental assessment, transportation, watershed management



GIACOMO BERNARDI (Ecology and Evolutionary Biology)

Fish biology, phylogenetics, evolution

MICHAEL K. BROWN (Politics)

Inequality, race and African American politics, political economy, political development of welfare states, theories and methods of historical social science

KENNETH W. BRULAND (Ocean Sciences)

Chemical oceanography, biogeochemistry of trace metals and radionuclides, aquatic chemistry, geochemistry

EDMUND BURKE III (History)

Islamic history, modern Middle East and North African history, French history, European imperialism, world history

MELISSA L. CALDWELL (Anthropology)

Poverty and welfare, religious development work, food, transnationalism, socialism and postsocialism, Russia, the former Soviet Union, and Eastern Europe

MARK CIOC (History)

German history, modern European history, environmental history

DANIEL P. COSTA (Ecology and Evolutionary Biology)

Physiological ecology of marine mammals and birds

BEN CROW (Sociology)

International development, sociology of water and markets, global inequality, South Asia and East Africa, political economy, and green enterprise

E. MELANIE DUPUIS (Sociology)

Economic sociology, sociology of consumption, sociology of development, political sociology, sociology of the environment, technological change, historical sociology, social theory, food and social change

JAMES ESTES (Ecology and Evolutionary Biology and Ocean Sciences)

Marine sciences, community ecology

ANDREW FISHER (Earth Sciences)

Hydrogeology, crustal studies, heat flow, modeling

JONATHAN A. FOX (Latin American and Latino Studies)

Latin American and Latino politics, including issues of democratization, social movements, social and environmental policy, immigration, and public interest groups

LAUREL R. FOX (Ecology and Evolutionary Biology)

Terrestrial population and community ecology, plant-animal interactions

DIANE GIFFORD-GONZALEZ (Anthropology)

Paleolithic and Neolithic Africa and Eurasia, colonial New Mexico, origins of food production, pastoralists, zooarchaeology, history of archaeology, interpretive theory, visual anthropology

JAMES B. GILL (Earth Sciences)

Igneous petrology, geochemistry of island arcs

GARY B. GRIGGS (Earth Sciences)

Coastal processes, hazards and engineering

DANIEL GUEVARA (Philosophy)

Kant, moral philosophy, moral psychology, environmental ethics, history of modern philosophy

JULIE H. GUTHMAN (Community Studies)

Sustainable agriculture and alternative food movements, international political economy of food and agriculture, politics of obesity, political ecology, race and food, critical human geography

DONNA J. HARAWAY (History of Consciousness and Feminist Studies)

Feminist theory, cultural and historical studies of science and technology, relation of life and human sciences, human-animal relations, and animal studies

RONNIE D. LIPSCHUTZ (Politics)

International relations; international political economy; foreign policy; resource/environmental politics; global political networks; global civil society; film, fiction, and politics; technology and society; states of terror

PAUL M. LUBECK (Sociology)

Political sociology; political economy of development, globalization, labor and work; logics of methodology; religion and social movements; Islamic society and identities; information and networks

CHARLES L. (LEO) ORTIZ (Ecology and Evolutionary Biology)

Physiology of marine mammals, physiological integration, physiology of secretion

INGRID M. PARKER (Ecology and Evolutionary Biology)

Plant ecology, pollination, plant-pathogen interactions, biological invasions

MANUEL PASTOR JR., (Latin American and Latino Studies)

Urban poverty and regional development, Latinos in the urban U.S., environmental justice, macroeconomic stabilization in Latin America; distribution and growth in the developing world; Cuban economic reform; Mexican economic reform

GRANT H. POGSON (Ecology and Evolutionary Biology)

Molecular population genetics, ecological genetics, marine invertebrates and fishes

DONALD C. POTTS (Ecology and Evolutionary Biology)

Coral reef ecology, genetics, evolution, and geological history; marine biodiversity; tropical biology, global change, and remote sensing

PETER T. RAIMONDI (Ecology and Evolutionary Biology)

Marine ecology, evolutionary ecology, experimental design, applied ecology

LISA C. SLOAN (Earth Sciences)

Paleoclimatology, climate change, Earth system science, surficial processes

DONALD R. SMITH (Microbiology and Environmental Toxicology)

Neurotoxicity, cellular and organismal responses to environmental toxins

ANDREW SZASZ (Sociology)

Environmental sociology (environmental movements, policy, environmental justice); theory

DANA Y. TAKAGI (Sociology)

Social inequality and identity, research methods, race relations, nationalism and social movements

ANNA TSING (Anthropology)

Culture and politics, feminist theory and gender in the U.S., social landscapes and tropical forest ethnographies, ethnicity, local power and relations to the state in Indonesia, Southeast Asia, and the U.S.

TERRIE M. Williams (Ecology and Evolutionary Biology)

Vertebrate locomotor and thermoregulatory physiology; marine biodiversity; comparative vertebrate energetics, exercise physiology

PATRICIA ZAVELLA (Latin American and Latino Studies)

Chicana/o-Latina/o studies, women's work and domestic labor, poverty, family, sexuality and social networks, feminist studies, ethnographic research methods, and transnational migration of Mexican/o workers and U.S. capital

Program Description

The environmental studies major prepares students for meaningful lifetime engagement with the environmental challenges that are, and will be, facing society. UCSC environmental studies graduates hold leadership positions as legislative and policy analysts, environmental management officials, educators, restoration ecologists, conservation and field biologists, museum curators, business consultants, and political advocates. In addition, many graduates go on to obtain professional, master's, or doctoral degrees at the nation's finest institutions.

Students pursue an interdisciplinary curriculum that combines course work in the natural and social sciences. Introductory courses cover the ecological, political, and economic aspects of historic, current and future environmental issues. The core course, Environmental Studies 100/L, *Ecology and Society* (most often completed during the fall quarter of a student's junior year) builds on the skills acquired in the lower-division classes, and encourages students to apply ecological, economical and political skills toward environmental and ecosystem management. The remaining upper-division elective courses further emphasize the integration of ecological knowledge with an understanding of social institutions and policies. The program emphasizes active, interdisciplinary learning with the overall objective of instilling the necessary skills to conserve biodiversity and integrate the principles of sustainability with respect to management of complex environmental systems. Faculty work on these issues at local, regional, and global levels providing a unique, proactive, and progressive academic environment for students wishing to pursue a degree program within the Environmental Studies Department.

In addition to the single environmental studies major, students may choose to pursue one of three combined majors with biology, Earth sciences, or economics. The combined major curricula offer the unique integration of the underlying concepts of environmental studies with a focus on the application of these concepts in a closely related field (or vice versa).

As a complement to classroom instruction and research, many courses have field components. The Environmental Studies Field and Internship Program helps qualified students find placements with government and educational agencies, community organizations, and private firms. Furthermore, faculty-directed, independent, or field-oriented research courses allow environmental studies students the opportunity to learn more about their specific academic career or personal interests, often while earning academic credit.

Requirements for the Major

Prerequisites for the Single Major

Continuing UCSC students are required to complete all six prerequisite courses before taking Environmental Studies 100/L. Five of the prerequisite courses are present and are listed below. See the course descriptions for more specific information.

Environmental Studies 23 *The Physical and Chemical Environment*. Offered in spring quarter.

Environmental Studies 24 *General Ecology*. Offered in fall and summer quarters.

Environmental Studies 25 *Environmental Policy and Economics*. Offered in winter and summer quarters.

Mathematics 3 *Precalculus*; or Applied Mathematics and Statistics 3 *Precalculus for Science and Engineering*; or a score of 3 or higher on the College Board AP calculus exam, or equivalent. Check the catalog for the quarters offered.

Applied Mathematics and Statistics 7/L *Statistical Methods for the Biological and Environmental Studies*. Offered fall, winter, and summer quarters. Precalculus is a required prerequisite for this course.

In addition, students choose one introductory course in sociology, cultural anthropology, or ethics. The acceptable courses are as follows:

Anthropology 2 *Introduction to Cultural Anthropology*

Sociology 1 *Introduction to Sociology*

Sociology 15 *World Society*

Philosophy 21 *Wilderness Studies*

Philosophy 22 *Introduction to Ethical Theory*

Philosophy 24 *Introduction to Ethics: Contemporary Moral Issues*

Philosophy 28 *Environmental Ethics*

Philosophy 80G *Bioethics in the 21st Century: Science, Business, and Society*

Declaration Process for Environmental Studies Students

Students wishing to declare within the Environmental Studies Department are to visit the Environmental Studies main office in room 405 ISB to sign up for a pre-declaration advising appointment early in their sophomore year. In order to be officially declared and enroll in the core course, Environmental Studies 100/L, students must have a study sheet and the official declaration of major form filed with the Environmental Studies Department. Study sheets may be downloaded from the environmental studies web site (<http://envs.edu/>)

undergraduate/ listed under "print materials") and paper copies are available in the main office (room 405 ISB).

Transfer Students

Students transferring to UCSC should complete as much of the lower-division curriculum as possible, with a grade of C or better, at another recognized institution before transferring to UCSC. Below is an outline of acceptable substitute courses for the lower-division environmental studies single major prerequisites. Please note that as of Fall 2006, all students wishing to pursue a degree within the Environmental Studies Department must at Applied Mathematics and Statistics 7/L at UCSC to fulfill the introductory statistics requirement.

Completion of an introductory college chemistry course will substitute for Environmental Studies 23.

Two courses, one in politics, one in economics, will substitute for Environmental Studies 25.

A college-level precalculus course will substitute for Mathematics 3 or Applied Mathematics and Statistics 3 at UCSC.

Environmental Studies 24 and 25 are offered during Summer Session at UCSC, and transfer students are encouraged to take them. If you are transferring, compare catalog descriptions, consult your current institution's adviser, and refer to the ASSIST web site, www.assist.org, to determine equivalency.

Upper-Division Requirements

In addition to lower-division course work, students are required to complete nine upper-division courses:

Environmental Studies 100/L *Ecology and Society* (environmental studies core course, offered once yearly during the fall quarter)

Seven upper-division electives (environmental studies courses numbered 101-179)

Senior comprehensive requirement (see below)

Comprehensive Requirement

The senior comprehensive may be satisfied by completing one of the options listed below. Before enrolling in the senior thesis or senior internship option, students must formally apply to work with a particular faculty mentor very early in their thesis or project preparation. These courses require careful planning, additional independent research, and at least a two-quarter commitment.

Environmental Studies 183B *Senior Internship*

Environmental Studies 190 *Capstone Course: Environmental Problem Solving*

Environmental Studies 195A or 195B *Senior Thesis*

Environmental Studies 196 (one course from the series) *Senior Seminar*

Students with advanced skills in one of the graduate focal areas may also take a graduate seminar (courses 210, 220, 230, or 240) by invitation from the instructor.

Major Disqualification Policy

The Environmental Studies Department considers courses 23, 24, 25, and 100/L to be the core of the program. Students who have failed two of these courses will be disqualified from the major and barred from enrollment in all upper-division environmental studies courses. Students who have failed the same course (of the four core courses) twice will likewise be barred from enrollment in all upper-division courses. Students who have failed course 100/L may be admitted to upper-division courses by exception only; they must present their case in writing to the department chair in order

to be allowed to remain enrolled in any upper-division environmental studies courses in which they have advance enrolled. The department also reserves the right to disqualify from the major students who fail three or more upper-division environmental studies elective courses.

Students who feel that there were extenuating circumstances surrounding their failure of a course for the second time may appeal their disqualification within the appeal period by submitting a letter to the chair of the Environmental Studies Department. This appeal must be filed no later than 15 days from the date the disqualification notification was mailed, or the 10th day of classes in the quarter of their disqualification, whichever is later. The department will subsequently notify the student, the college, and the Office of the Registrar of the decision no later than 15 days after the filing of the appeal.

Requirements for the Combined Majors

Environmental Studies/Biology

This course of study provides students with the basic tools of biological science and sufficient understanding of resource conservation, conservation biology, and concerns about environmental sustainability to apply these tools to environmental problems.

Prerequisites

All courses must be taken for a letter grade.

Biology and mathematics courses may require placement exams. See course descriptions for prerequisite information.

Biology 20A, 20B, and 20C

Environmental Studies 25

Anthropology 2, or Philosophy 21, 22, 24, 28, or 80G,

or Sociology 1 or 15

Precalculus (Applied Mathematics and Statistics 3, Mathematics 3, or a score on the math placement exam or the College Board AP calculus exam sufficient to be placed into calculus)

Applied Mathematics and Statistics 7 and 7L

Chemistry 1A, 1B/M, and 1C/N

Two courses in physics or computer science, either Physics 7A/L and 7B/M or two courses from Computer Science 12A, 12B, 60G or 60N, 80B, and 80G.

Upper-Division Requirements

Students are required to complete nine upper-division courses and the comprehensive requirement listed below.

Environmental Studies 100/L

Biology 105 *Genetics*

Biology 175 *Evolution*

Six upper-division courses, three in biology and three in environmental studies. One of the six must be a laboratory course, and one of the three environmental studies courses must be based in the social sciences. Students wishing to pursue an advanced degree in the pure or applied sciences are strongly encouraged to complete the Organic Chemistry series as well. Chemistry 108A/L and 108B/M may be substituted to fulfill one of the upper-division biology elective requirements.

These upper-division elective courses should be selected in pursuit of a coherent plan of study, chosen in consultation with faculty sponsors from both the Biological Sciences and Environmental Studies Departments.

Comprehensive Requirement

Students satisfy the senior comprehensive requirement by completing the following:

- for environmental studies, one of the options for environmental studies majors (see Comprehensive Requirement above); or
- for biological sciences, one of the senior comprehensive options for biology (see Comprehensive Requirement under Biological Sciences)

Disqualification Policy for the Environmental Studies/Biology Combined Major

All environmental studies/biology combined majors are covered by the biology and environmental studies major disqualification policies, which limit the number of times a student may receive a No Pass, D, and/or F in the introductory biology sequence and the environmental studies core courses and still remain a combined major, and which also limits the number of times a student may receive a No Pass, D, and/or F in upper-division biology and environmental studies courses. Students should refer to the Biological Sciences section and the Major Disqualification Policy section above for more information.

Environmental Studies/Earth Sciences

This course of study provides students with the basic tools of Earth sciences and environmental studies needed to address environmental problems.

Prerequisites

Applied Mathematics and Statistics 7 and 7L

Mathematics 11A-B (or 19A-B)

Chemistry 1A, 1B/M, and 1C/N

Physics 6A/L and 6B/M (or 5A/L and 5B/M)

Earth Sciences 20/L (or 5/L or 10/L)

Environmental Studies 24 and 25

Anthropology 2 or Philosophy 21, 22, 24, 28, or 80G or

Sociology 1 or 15.

Upper-Division Requirements

Earth Sciences 110A/L, 110B/M, or 110C/N

Environmental Studies 100/L

Three additional upper-division environmental studies courses, including at least one course based in the social sciences

Three additional upper-division Earth sciences courses

The upper-division courses should be selected in pursuit of a coherent plan of study, such as water policy-hydrology, restoration ecology-geochemistry, agroecology-soil physical processes, or environmental policy-climate change, among others, in consultation with faculty from both the Environmental Studies and Earth Sciences Departments.

Comprehensive Requirement

Students satisfy their senior comprehensive requirement in environmental studies or Earth sciences by completing one of the following:

One of the senior comprehensive options for single environmental studies majors (see Comprehensive Requirement above) or one of the senior comprehensive options for Earth sciences majors (see Comprehensive Requirement under Earth Sciences).

Environmental Studies/Economics

This major provides students with the basic tools of economic analysis and an understanding of the mechanics of resource production, conservation, and use, in both ecological and economic terms.

Prerequisites

Economics 1, 2, 11A, 11B

Environmental Studies 23, 24, 25

Anthropology 2 or Philosophy 21, 22, 24, 28, or 80G or

Sociology 1 or 15.

Upper-Division Requirements

Economics 100A, *Intermediate Microeconomics*

Economics 113, *Econometrics*

Environmental Studies 100/L

Six elective courses from the following, with at least three courses from each discipline:

Economics 100B, 120, 134, 140, 150, 152, 153, 160, 169, 170, 175, and 189 *

Environmental Studies courses numbered 101-179.

One of the three environmental studies electives must be based in the natural sciences.

* Subject to change. Please see the Economics Department adviser or the environmental studies adviser for the most up-to-date approved course listings.

Comprehensive Requirement

Students satisfy the senior comprehensive requirement by completing the following:

- for environmental studies, one of the options for environmental studies majors (see Comprehensive Requirement above);
- for economics, pass those portions of the economics comprehensive examination administered in Economics 100A and 113.

Graduate Program

Human societies rest on an ecological foundation and are sustained by ecosystem processes, biological diversity, and genetic resources. Current threats to this foundation imperil societies' well-being, challenging us to maintain the integrity, diversity, and resilience of existing ecological and agricultural systems and of the human societies that depend on them. Environmental problems are among the most serious of current issues. As these problems become more acute, the challenge of harmonizing societies' environmental practices and choices with ecological sustainability, economic necessity, social justice, democratic participation, and human well-being will require increasing numbers of people prepared to respond to both ecological and social problems. This poses a historic challenge to graduate training and requires increasing numbers of skilled professionals able to address complex social and ecological problems from an interdisciplinary viewpoint.

The program at UCSC draws from two areas of knowledge: ecology and social science. Our interests in ecology range from conservation biology (the maintenance of biodiversity in wild ecosystems, where we seek strong limits on human impacts on other species) to agroecology (where ecological knowledge is used to inform human management of nature for the production of natural products for human use in ways that are environmentally benign). Our interests in the social sciences bridge the dimension between environmental policy analysis (which looks for the best management strategies within the frame of existing social institutions and practices) and political economy of the environment (which examines the deeper social processes through which the institutions that structure our social and ecological agendas have been constructed). These all are historically independent fields and UCSC's program is one of the first to link them.

Graduates of the program are expected to be informed in all of these fields, to have deep intellectual

strength in their area of specialty, and to have made substantial contributions toward the understanding of an environmental problem. We expect our doctoral students to be as skilled and intellectually rigorous within their research emphases as are students emerging from more traditional programs-but also to possess the knowledge needed to understand, analyze, and communicate in different but highly relevant fields of study. This expectation of intellectual breadth as well as disciplinary depth is a central goal of our doctoral program.

Given the strong interdisciplinary focus of the environmental studies Ph.D. program, study in other fields is encouraged. The environmental studies faculty have a wide range of research interests, and some are affiliated with other departments on campus. Students have the option of pursuing a "Parenthetical Notation," the equivalent of a graduate minor. These provide a framework for in-depth study in specialized fields in your area, and an opportunity for recognition of particular scholarly expertise. We currently have agreements with the Ecology and Evolutionary Biology, Latin American and Latino Studies, and Sociology Departments, and are pursuing agreements with others.

Requirements for the Ph.D. Degree

For admission to the program, students must have completed a bachelor's degree or equivalent in a related disciplinary field. Students with degrees in interdisciplinary fields such as environmental studies should have disciplinary course work equivalent to a double major or a master's degree in an appropriate field. Superior scholarship, capacity to carry out independent research, and commitment to disciplinary integration must be demonstrated in the statement of purpose, course work, GRE General Test score, and letters of recommendation. The GRE Subject Test (in a discipline of the student's choice) is strongly recommended. Other considerations for admission include grades, evaluations, publications, professional or extramural experience, and completion of more than one degree (second bachelor's or master's). In addition to the application materials, students should submit a substantial written project (undergraduate or master's), where possible. Prospective students must also contact faculty directly to inquire about specific course requirements and sponsorship.

Doctoral training and the graduate curriculum in environmental studies are based on an integrative, problem-oriented pedagogy whose aim is to provide students with the analytical tools, research methods, and project design capabilities required to undertake interdisciplinary research. These skills are essential to all environmental studies graduate students, whether they pursue careers in the academy or other professional arenas.

The interdisciplinary nature of this core curriculum requires rigorous preparation at the undergraduate level. Students are expected to have completed at least one course in statistical analysis, an advanced upper-division course in ecology (genetics, evolutionary, biology), economics (either macro- or micro-), and a course in politics/political economy. Calculus is useful in many areas of the program and essential to independent work in some.

The graduate curriculum trains students in the methodological principles and practice of interdisciplinary research. In their first year, students are required to complete core courses 201A-B, and 201N, as well as the department's interdisciplinary research seminar 290 each quarter, 290L in fall and one other quarter, and attend lab group meetings (292). An upper-division or graduate-level course in quantitative methods is required by the time the student takes the prequalifying exam. The course should provide training in research

design and the selection of appropriate quantitative tools for research and analysis. Examples of appropriate courses for fulfilling this requirement are available from the graduate program coordinator. In the fall and winter quarters of the second year, students are required to take a minimum of two area specialization courses, at least one of which must be in the natural sciences (220 or 230), one course in the social sciences (210 or 240), and attend lab group meetings (292) as well as the department's interdisciplinary research seminar 290, and two quarters of 290L. Depending on the student's preparation, interests, and intentions, his or her adviser may suggest or require additional course work. In the third year of study, the research seminar, 290, is required each quarter, and one quarter of enrollment in 290L is strongly recommended.

By the end of winter quarter of their third year, students take exams designed to measure depth in their disciplinary and interdisciplinary areas of expertise; these areas are defined by the student and the examining committee. Also during the course of their third year, students prepare and present a dissertation research proposal and take an oral candidacy exam in which they defend the proposal and are examined on subjects related to their research area. In addition, before advancing to candidacy, students are required to serve as teaching assistants in undergraduate courses for two quarters unless they can demonstrate equivalent experience. If the venue of a student's research is in a non-English-speaking country, he or she must also pass a language exam testing reading and speaking competence in the language of that area before advancement to candidacy. A dissertation in environmental studies is expected to present an original contribution to the understanding of a significant environmental problem or issue. It should demonstrate a clear understanding of the relevant literature, careful and rigorous research design, and effective communication of the results within the context of their area of emphasis.

The typical duration of the doctoral program is five to six years.

We do not offer a terminal master's degree, except in the case of students who have passed the qualifying exam but do not complete the Ph.D. dissertation.

Lower-Division Courses

15. Natural History of the UCSC Campus (2 credits). S

Introduces students to the range of natural species and communities occurring on the UCSC campus. All class time is spent outside, and each week a different area of campus is visited. Course 24 is recommended. Enrollment limited to 21. *The Staff*

23. The Physical and Chemical Environment. S

Introduces students to basic physical and chemical processes that govern the structure and function of ecosystems. Topics to be covered include climate and weather, soil types and their formation, and biogeochemical cycles. (General Education Code(s): IN.) *W. Cheng*

24. General Ecology. F

Covers principles of ecology including limits to species abundances, evolutionary ecology, population dynamics, community interactions and patterns, and ecosystem patterns and dynamics. (General Education Code(s): IN.) *J. Washburn*

25. Environmental Policy and Economics. W

Environmental policy issues are situated within historical developments in political and economic systems. Introduces some of the key concepts of politics and economics

by way of examining the processes which have given rise to environmental issues, their social and political perception, and institutional responses. (General Education Code(s): IS.) *B. Haddad*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

80A. The Future of Rain Forests. S

A broad overview of both ecological and social aspects related to tropical rain forests drawing on case studies worldwide. Topics include the biology and distribution of rain forests, causes and effects of their destruction, and management options to facilitate their conservation. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *The Staff*

80B. The Ecological Forecast for Global Warming. F

A broad overview of the impacts of human activities on the global climate system. Topics include how climate affects the distribution of ecosystems, the influence of global climate change on biodiversity, ecosystem function, and consequences for the human enterprise. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *M. Loik*

83. Environmental Studies Internship. F,W,S

A supervised off-campus learning experience related to environmental problem solving. Focuses on initial experiences in applied work and specific skill development. Students may be placed individually or with a team in government agencies, private organizations, citizen action groups. May be repeated for credit. *The Staff*

84. Environmental Studies Internship (2 credits). F,W,S

Supervised learning experience designed to introduce environmental issues and problem solving. Places students with governmental and nongovernmental agencies, private organizations, schools, or in specialized apprenticeships. Two-unit internship intended to focus interest and to develop skills for more advanced work. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

91F. Community and Agroecology (2 credits). F,W,S

Interdisciplinary two-credit seminar designed to introduce students to concepts of community and agroecology in the context of sustainability. Course can serve as a gateway to or as a continuing basis for participation in PICA (Program in Community and Agroecology). Specific topics and readings change each quarter. Enrollment limited to 25. May be repeated for credit. *S. Gliessman*

93. Field Study. F,W,S

Supervised research or organized projects for lower-division students conducted off campus within regular commuting distance of the campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

93F. Field Study (2 credits). F,W,S

Provides for department-sponsored individual field study for lower-division students in the vicinity of the campus under the direct supervision of a faculty sponsor. May not be counted toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Directed reading, supervised research, and organized projects relating to environmental problems. May be

repeated for credit with consent of the chairperson of Environmental Studies Department. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Provides for department-sponsored directed reading, supervised research, or organized project for lower-division students under the direct supervision of a faculty sponsor. May not be counted toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

100. Ecology and Society. F

Introduction to environmental issues in an interdisciplinary matrix. Focuses on three issues at the intersection of ecological questions and social institutions: agroecology and sustainable agriculture; population growth, economic growth, and environmental degradation; and biodiversity conservation and land management. Reviews the important roles of disciplinary abstraction and of the application of that knowledge to context-dependent explanation of environmental problems. Enrollment restricted to environmental studies, environmental studies/biology, environmental studies/economics, and environmental studies/Earth sciences majors. Prerequisite(s): course 23 or Chemistry 1A or 1B; course 24 or Biology 20C; course 25; and Applied Mathematics and Statistics 7 and 7L. Concurrent enrollment in 100L is required. *E. Zavaleta, J. Bury*

100L. Ecology and Society Writing Laboratory (2 credits). F

Required writing lab accompanying course 100. Students are introduced to writing in different styles and for different audiences typical of the ecosystem-society interface. Course 100 writing assignments are developed, written, and revised in conjunction with the lab. W credit is granted only upon successful completion of course 100. Prerequisite(s): Satisfaction of the Entry Level Writing and Composition requirements. Concurrent enrollment in 100 is required. Enrollment limited to 20. (General Education Code(s): W.) *E. Zavaleta, J. Bury*

104A. Introduction to Environmental Field Methods. S

A course in basic field skills including habitat description, behavior observation, specimen collection techniques, mapping and map interpretation, vegetation analysis, population sampling, microclimate measurement, soil and water sampling. Emphasis on use of the scientific method; experimental design, data handling, statistical analysis and presentation; and basic field methodologies. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 24 or 100 or Biology 20C, and Applied Math and Statistics 7 and 7L. Enrollment limited to 44. (General Education Code(s): W.) *E. Zavaleta*

107A. Natural History Field Quarter. *

A 15-unit field course that uses California wild lands to develop skills of natural history observation and interpretation. Students gain the ability to identify plants, animals, vegetation types, and landscapes, as well as address the complex issues of preservation and management of these resources. Enrollment by interview. Concurrent enrollment in courses 107B and 107C required. Students are billed a materials fee. Enrollment limited to 24. Offered in alternate academic years. *S. Gliessman*

107B. Natural History Field Quarter. *

A 15-unit field course that uses California wild lands to develop skills of natural history observation and interpretation. Students gain the ability to identify plants, animals, vegetation types, and landscapes, as well as address the complex issues of preservation and management of these resources. Enrollment by interview. Concurrent enrollment in courses 107A and 107C required. Enrollment limited to 24. *The Staff*

107C. Natural History Field Quarter. *

A 15-unit field course that uses California wild lands to develop skills of natural history observation and interpretation. Students gain the ability to identify plants, animals, vegetation types, and landscapes, as well as address the complex issues of preservation and management of these resources. Enrollment by interview. Concurrent enrollment in courses 107A and 107B required. Enrollment limited to 24. *S. Gliessman*

108. General Entomology. F

Introduction to entomology including anatomy, physiology, systematics, evolution, behavior, and reproduction of the world's most diverse group of organisms. These topics are illustrated in several contexts, from the importance of insects as disease vectors to the historical and contemporary uses of insects by humans. Enrollment limited to 20. Offered in alternate academic years. *D. Letourneau*

108L. General Entomology Laboratory (3 credits). F

Laboratory sections are devoted to the identification of insects. Individual collections representing 15 orders, sight identification of 60 families, and use of taxonomic keys for positive designations required. Concurrent enrollment in course 108 is required. Enrollment limited to 10. Offered in alternate academic years. *D. Letourneau*

109A. Ecology and Conservation in Practice Supercourse: Ecological Field Methods. *

An intensive, on-site learning experience in terrestrial field ecology and conservation, using the University of California Natural Reserves. Students study advance concepts in ecology, conservation, and field methods for four weeks, then experience total immersion in field research at the UC Natural Reserves. Lectures, field experiments, and computer exercises familiarize students with research methods, study design, statistical approaches, and analytical tools for ecological research. Enrollment by application. Prerequisite(s): Biology 20A, 20B, 20C or Environmental Studies 23, 24, 100; and Applied Mathematics and Statistics 7 and 7L. Concurrent enrollment in Biology 151B-C-D or Environmental Studies 109B-C-D is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and Biology 107, 107L, Environmental Studies 104A or 196A. (Formerly Biology 165A.) (Also offered as Biology:Ecology & Evolutionary 151A. Students cannot receive credit for both courses.) Enrollment limited to 25. *E. Zavaleta, D. Croll*

109B. Ecology and Conservation in Practice Supercourse: Ecological Field Methods Laboratory. *

Field-oriented course in ecological research. Combines overview of methodologies and approaches to field research with practical field studies. Students complete field projects in ecology and also learn the natural history of the flora and fauna of California. Students are billed a materials fee. Enrollment by application. Prerequisite(s): Entry Level Writing and Composition requirements;

Biology 20A, 20B, 20C or Environmental Studies 23, 24, 100; and Applied Mathematics and Statistics 7 and 7L. Concurrent enrollment in Biology 151A-C-D or Environmental Studies 109A-C-D is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and Biology 150, 150L, Environmental Studies 104A or 196A. (Formerly Biology 165B.) (Also offered as Biology:Ecology & Evolutionary 151B. Students cannot receive credit for both courses.) Enrollment limited to 25. (General Education Code(s): W.) *E. Zavaleta, D. Croll*

109C. Ecology and Conservation in Practice Supercourse: Functions and Processes of Terrestrial Ecosystems. *

From lectures and discussion of terrestrial community and ecosystem ecology, students work individually or in small groups to present an idea for a project, review relevant literature, develop a research question/hypothesis, design and perform an experiment, collect and analyze data, and write a report. The instructor evaluates the feasibility of each student's project before it begins. Enrollment by application. Prerequisite(s): Biology 20A, 20B, 20C or Environmental Studies 23, 24, 100; and Applied Mathematics and Statistics 7 and 7L. Concurrent enrollment in Biology 151A-B-D or Environmental Studies 109A-B-D is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and Biology 150, 150L, Environmental Studies 104A or 196A. (Formerly Biology 165C.) (Also offered as Biology:Ecology & Evolutionary 151C. Students cannot receive credit for both courses.) Enrollment limited to 25. *E. Zavaleta, D. Croll*

109D. Ecology and Conservation in Practice Supercourse: Conservation in Practice. *

Focuses on current issues in environmental and conservation biology and the emerging field methods used to address them. From field-oriented lectures about current issues in environmental and conservation biology, students pursue research project as individuals and small groups to develop hands-on experience with field skills in conservation research and resource management. Enrollment by application. Prerequisite(s): Biology 20A, 20B, 20C or Environmental Studies 23, 24, 100; and Applied Mathematics and Statistics 7 and 7L. Concurrent enrollment in Biology 151A-B-C or Environmental Studies 109A-B-C is required. Satisfies the senior exit requirement for biological sciences majors and satisfies the senior exit requirement for environmental studies majors by prior approval. Students cannot receive credit for this course and Biology 150, 150L, Environmental Studies 104A or 196A. (Formerly Biology 165D.) (Also offered as Biology:Ecology & Evolutionary 151D. Students cannot receive credit for both courses.) Enrollment limited to 25. *E. Zavaleta, D. Croll*

110. Institutions, the Environment, and Economic Systems. S

Debate about environmental policy is often couched in economic terms. Environmental issues have become questions of political economy, as they influence international and domestic policy and reflect on the functioning of the market system. Examines the assumptions and implications of alternative approaches to political economy, as these pertain to questions of environmental policy and political institutions. Prerequisite(s): course 100. *M. Fitzsimmons*

115A. Geographic Information Systems and Environmental Applications. F

Introduction to geographic information systems (GIS) as the technology of processing spatial data, including input, storage and retrieval; manipulation and analysis; reporting and interpretation. Emphasizes GIS as a decision support system for environmental and social problem solving, using basic model building, experimental design, and database management. Students cannot receive credit for this course and course 215A. Prerequisite(s): Applied Math and Statistics 5 or 7. Enrollment restricted to environmental studies majors and the combined majors. Course 115L is required. A course in computer science, Earth sciences, mathematics, or geography is recommended. Enrollment limited to 40. *The Staff*

115L. Exercises in Geographic Information Systems (2 credits). F

Exercises in Geographic Information Systems and Remote Sensing that demonstrate the development of digital geographic data. Students gain hands-on experience with developing datasets, using imagery to create GIS layers, performing spatial analysis, and utilizing GPS technology. Emphasis placed on environmental applications. Students cannot receive credit for this course and course 215L. Enrollment restricted to environmental studies majors and students majoring in the combined majors with biology, Earth sciences, and economics. Concurrent enrollment in course 115A required. *The Staff*

120. Conservation Biology. W

Biological principles and their application to conservation with emphasis on the loss of biodiversity. Prerequisite(s): course 24 or Biology 20C or Biology 150. A course in statistics is strongly recommended and calculus is recommended as additional preparation. Enrollment limited to 70. *C. Wilmers*

122. Tropical Ecology and Conservation. *

An introduction to the ecological processes, principles, and players of tropical ecosystems, and to conservation issues facing tropical American forests. We will look at how tropical ecosystems work, roles of humans in shaping them, and current conservation opportunities and dilemmas. Prerequisite(s): course 24 or Biology 20C or 150. A course in statistics and precalculus is recommended. *G. Gilbert*

123. Animal Ecology and Conservation. S

Introduction to study of animals, including how field study can be made scientifically rigorous. Reviews evolutionary relationship among vertebrates and their special adaptations. Students are exposed to principles in population and community ecology, biogeography, and behavioral and physiological ecology as they relate to vertebrates. Prerequisite(s): courses 24 and 100. Enrollment limited to 30. *C. Wilmers*

129. Integrated Pest Management. S

Provides an extensive coverage of applied ecology, pest control technology, and the social, political, and economic factors regulating the ideologies and practice of pest management. Topics include agroecosystem design and population regulation of insects, weeds, vertebrates, and pathogens; field monitoring, chemical and biological control; economic thresholds, decision-making processes, and the role of agribusiness. Prerequisite(s): course 24 or Biology 20C or 150. A course in general entomology is recommended. *S. Swezey*

129L. Integrated Pest Management Laboratory (2 credits). S

Field trips and field exercises that demonstrate the practice of integrated pest management techniques.

Individual and group projects provide hands-on experience with field sampling techniques, pest identification, recognition of biological control agents, experimental design, interview techniques, data interpretation and field report writing. Prerequisite(s): course 24 or Biology 20C or 150; concurrent enrollment in course 129. *S. Swezey*

130A. Agroecology and Sustainable Agriculture. F

Ecological concepts and principles are applied to the design and management of sustainable agroecosystems. Alternatives for agriculture are discussed in terms of ecosystem structure and function. A weekly three-hour lab is required. Prerequisite(s): course 24 or Biology 20C or consent of instructor; concurrent enrollment in course 130L. Enrollment restricted to environmental studies and biology majors and students in the combined majors with Earth sciences, biology, and economics. *S. Gliessman*

130B. Principles of Sustainable Agriculture. W

Agricultural sustainability is examined as a complex set of interactions between ecological, social, and economic components of an agroecosystem. Case studies are drawn from issues facing current U.S. agriculture and a basis for formulating policy for change that ensures sustainability is developed. Prerequisite(s): Restricted to junior and senior majors in environmental studies and the combined majors with Earth sciences, biology, and economics; and to graduate students. *M. Fitzsimmons*

130L. Agroecology and Sustainable Agriculture Laboratory (2 credits). F

Laboratory and field exercises to train in the analysis of ecological processes in agricultural systems, with a focus on the quantification of ecological sustainability. Experimental design, analysis, and data interpretation are emphasized. Prerequisite(s): course 24 or Biology 20C; interview and concurrent enrollment in course 130A is required; bring class and work schedule to first class meeting. Enrollment restricted to environmental studies and biology majors and students in the combined majors with Earth sciences, biology, and economics. *S. Gliessman*

131. Insect Ecology. *

Advanced course in ecology featuring insect-plant interactions such as herbivory, pollination, and the effects of plants on insect population dynamics. Lectures emphasize current controversies in ecological theory and relate theory to application. Prerequisite(s): course 24 or Biology 20C, and Applied Mathematics and Statistics 7 and 7L. Enrollment limited to 20. Offered in alternate academic years. *D. Letourneau*

131L. Insect Ecology Laboratory (3 credits). *

Field and laboratory exercises are designed to test hypotheses or demonstrate principles in areas such as behavior, mutualism theory, community ecology, and agricultural ecology. Experimental design, analysis and interpretation of data are emphasized along with observational skills. Prerequisite(s): course 24 or Biology 20C; Applied Mathematics and Statistics 7 and 7L; concurrent enrollment in course 131. Enrollment limited to 10. Offered in alternate academic years. *D. Letourneau*

133. Agroecology Practicum. *

Lectures and demonstrations are combined with field applications to give students direct experience and knowledge of sustainable agriculture and horticulture practices and principles. UCSC Farm and Garden are the living laboratories for testing agroecological principles. Emphasis is placed on small-farm systems. Prerequisite(s): courses 130A and 130L. Enrollment restricted to majors in environmental studies and the combined majors with Earth sciences, biology and economics. Admission by

interview only. Enrollment limited to 25. Offered in alternate academic years. May be repeated for credit. *C. Shennan*

138. Field Ethnobotany. S

Lectures, laboratory, and fieldwork examine field botany from a human ecology perspective. Students have the opportunity to learn the skills of field botany and plant identification through the study of plants that are of major significance for human cultures. The emphasis of field skills is on applications to sustainable management of natural resources. Concurrent enrollment in course 138L required. Enrollment limited to 40. Offered in alternate academic years. *S. Gliessman*

138L. Ethnobotany Laboratory (2 credits). S

Laboratory and field studies allow students to learn the taxonomy of important useful plant families, carry out field studies on local plant use and management practices, and investigate in detail home garden agroecosystems and model systems. Prerequisite(s): concurrent enrollment in course 138 required. Enrollment limited to 40. *S. Gliessman*

140. National Environmental Policy. S

An overview of all major federal environmental policy domains. Analyzes political, social, economic, and other forces influencing federal (and some state) public policy responses to land use, natural resources, pollution, and conservation dilemmas. Course 25 and/or Politics 20 strongly recommended as preparation. Enrollment restricted to junior and senior environmental studies majors and biology, Earth sciences, and economics combined majors. Enrollment limited to 75. *D. Press*

141. Ecological Economics. W

Application of economic analysis to natural resource policy and management. Topics include welfare economics, property rights and externalities, natural resource valuation, exhaustible and renewable resources, and sustainable development. (Formerly *Natural Resource Economics*) Economics 1 is strongly recommended as preparation. Enrollment restricted to environmental studies majors and biology, Earth sciences, and economics combined majors. *The Staff*

143. Sustainable Development: Economy, Policy, and Environment. W

Considers whether and how global poverty can be alleviated without irreparably damaging the environment. Examines interactions among population, economic growth, poverty, global consumption ethos, property rights systems, global economy, state capacity, and environmental damage. Scrutinizes impact of various developmental strategies adopted during the past 50 years on poverty, governance, and the environment. Prerequisite(s): course 100. Enrollment limited to 47. *The Staff*

144. Blood and Oil: Natural Resources, Poverty, and Violence. F

Chronological and analytical examination of economics and politics of global oil use. The interactions of state policies, violent conflicts, and natural-resource use are stressed. Focus is on the Middle East, which contains two-thirds of all known petroleum reserves. Other examples of the nexus of conflict and natural-resource use are also considered. Enrollment limited to 50. *A. Richards*

148. Environmental Policy Implementation. *

Assessment of local, state, and federal environmental agency performance, with particular attention to regulatory development and compliance enforcement. Emphasis on successes and failures of both traditional environmental regulations and new policy approaches.

Students examine various industry responses to environmental regulations, each case set in the context of overall business performance and sustainability. (Formerly *Environmental Management Systems*.) Prerequisite(s): course 100, and course 140, 141, 149, 151, or 165. Enrollment restricted to environmental studies and environmental studies combined majors. Enrollment limited to 40. *The Staff*

149. Environmental Law and Policy. *

Surveys a wide range of topics in environmental law, including population control, state and federal jurisdiction, land and resources control, public land management, pollution control, and private rights and remedies. Students read a large number of judicial cases and other legal documents. (Also offered as Legal Studies 149. Students cannot receive credit for both courses.) Prerequisite(s): course 25. Enrollment restricted to junior and senior environmental studies majors and biology, Earth sciences, and economics combined majors. Enrollment limited to 60. *The Staff*

150. Coastal and Marine Policy. S

Introduces and analyzes the history, design, implementation, and effectiveness of key legal and institutional frameworks that govern the use and stewardship of coastal and marine areas and resources. Primary focus is on the U.S., although attention is also devoted to international laws and institutions targeting major transboundary issues like marine pollution and management of migratory fish stocks. Enrollment restricted to junior and senior environmental studies majors. Enrollment limited to 30. *Z. Tzankova*

151. Environmental Assessment. S

Introduction to California land use planning law and practice, and the theory, practice, and public policy aspects of environmental assessment, using the California Environmental Quality Act (CEQA) as a model. The National Environmental Policy Act (NEPA) and other environmental and planning legislation also considered. Covers elements of State law and regulations, environmental impact assessment requirements, and practical procedures for preparing and evaluating CEQA documents, with case studies that exemplify legal, regulatory and public policy and practice aspects of the assessment process. Prerequisite(s): course 100. Enrollment restricted to junior and senior environmental studies majors and biology, Earth sciences, and economics combined majors. *A. Schiffrin*

152. Science and Land Use Decisions. *

Technical and policy dimensions of major land use decisions will be assessed through a detailed case study. Technical review will stress geological constraints; policy review will stress the CEQA process. The initial case study will be the reuse of Ford Ord. One field trip is required. Prerequisite(s): one of courses 140, 149, 151 (recommended), 165 or Earth Sciences 20. *J. Gill*

153. Trade and the Environment. *

Focuses on international and regional institutional arrangements of free trade and their implications for environment and social well-being. Provides better understanding of environmental issues as elements of social processes. Enrollment restricted to all environmental studies majors. *The Staff*

156. Environmental Action through Writing. S

Guided practice in writing skills useful to environmental activists. Assignments emphasize thinking quickly, revising adeptly, researching resourcefully, and tempering powerful passions with careful arguments. Toward the development of effective individual voices, students

read each other's drafts as well as the published work of established writers. Enrollment priority will be given to students who have not taken course 157. Prerequisite(s): course 100/L or concurrent enrollment, satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to majors in environmental studies and the combined majors with Earth sciences, biology and economics. Enrollment limited to 28. (General Education Code(s): W.) *S. Rabkin*

157. Writing in the Natural Sciences. *

Guided practice in writing effectively about science and natural history for a variety of audiences. Assignments emphasize reporting first-hand observations, explaining processes and phenomena, understanding scientific papers, and writing about scientific and technical subjects for a general audience. Enrollment priority will be given to students who have not taken course 156. Prerequisite(s): course 100/L or concurrent enrollment, satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to majors in environmental studies and the combined majors with Earth sciences, biology, and economics. Enrollment limited to 28. (General Education Code(s): W.) *The Staff*

158. Political Ecology and Social Change. *

The object is to provide a rigorous grounding in the method of political ecology and to demonstrate how this approach has been used in environmental analysis and problem solving by environmental social movements. Enrollment restricted to junior and senior majors in environmental studies and the combined majors in Earth sciences, biology, and economics. Enrollment limited to 20. *The Staff*

159. Nature Literature. W

Introduction to 19th- and 20th-century American writers who have influenced our understanding of humans' place in the natural world. Readings include original works as well as biographical and critical texts. Discussions, field trips, and writing assignments emphasize active learning. Prerequisite(s): course 100 and satisfaction of the Subject A and Composition requirements. Enrollment restricted to environmental studies, environmental studies/biology, environmental studies/earth sciences, and environmental studies/economics majors. Enrollment limited to 40. *S. Rabkin*

160. Restoration Ecology. F

A multidisciplinary overview of restoring degraded ecosystems. Among the topics addressed are linkages between ecological principles and restoration, planning and implementing restoration projects, evaluating restoration success, and case studies of restoration of specific ecosystem types. Participation in one work day is required. Prerequisite(s): course 23 or Chemistry 1A or 1B and course 24 or Biology 20C. Enrollment limited to 40. *The Staff*

161A. Soils and Plant Nutrition. *

Provides fundamentals of soils and plant nutrition. The physical, biological, and chemical components of soils are investigated in relation to their ecological functions, fertility to plants, and sustainable management. Prerequisite(s): course 23 or Chemistry 1A or 1B. Enrollment limited to 35. *W. Cheng*

161L. Soils and Plant Nutrition Laboratory (2 credits). *

Practice analytical techniques for evaluation of physical, chemical, and biological properties of soils. Grow plants to observe some typical symptoms of plant nutrient

deficiencies. Prerequisite(s): course 23 or Chemistry 1A or 1B. Concurrent enrollment in course 161A is required. Enrollment limited to 18. *W. Cheng*

162. Plant Physiological Ecology. W

Introduces the theory of plant interactions with the physical environment. Emphasizes influence of abiotic stresses on the recruitment, survival, growth, productivity, and reproduction of plants. Prior course work in ecology and/or plant physiology is recommended. Prerequisite(s): course 24 or Biology 20C, and Applied Mathematics and Statistics 7 and 7L. Enrollment limited to 24. *M. Loik*

162L. Plant Physiological Ecology Laboratory (2 credits). W

Introduces techniques for the study of plant interactions with the physical environment. Examines the role of stress on energy budgets, water relations, photosynthesis, and reproductive allocation. Emphasizes experimental design, field techniques, and instrumentation during field trips to local chaparral and grassland ecosystems. Prior course work in ecology and/or plant physiology is recommended. Prerequisite(s): course 24 or Biology 20C; and Applied Mathematics 7 and 7L. Enrollment limited to 24. *M. Loik*

163. Plant Disease Ecology. S

Introduction to ecological roles of plant diseases, including their importance in regulating plant population dynamics, community diversity, and system function in natural ecosystems; considerations of plant diseases in conservation ecology; and ecological approaches to managing diseases in agroecosystems. Students cannot receive credit for this course and course 263. Prerequisite(s): course 24 or Biology 20C or 150. A statistics course is strongly recommended. *G. Gilbert*

163L. Plant Disease Ecology Lab (2 credits). S

Introduction to techniques for studying plant diseases, including detection, isolation, cultivation, and identification of important groups of plant pathogens, completing Koch's postulates; diseases assessment techniques; experimental manipulation of plant-pathogen systems; and basic epidemiological tools. One field trip required. Prerequisite(s): course 24 or Biology 20C or 150; concurrent enrollment in course 163 required. A statistics course strongly recommended. Enrollment limited to 24. *G. Gilbert*

165. Freshwater Issues and Policy. F

Concepts, vocabulary, and skills necessary to the analysis of freshwater issues are introduced from hydrology, ecology, law, economics, engineering, and other disciplines. The skills are then applied to case studies involving local, state, and international freshwater conflicts and crises. Prerequisite(s): courses 23 and 25. Enrollment restricted to environmental studies majors and biology, Earth sciences, and economics combined majors. *B. Haddad*

166. Agroecosystem Analysis and Watershed Management. S

Explores a range of approaches to examine agroecosystem function, watershed management, and concepts of sustainability. Uses a combination of lecture, demonstration, field work, and field trips to illustrate approaches to analysis of managed ecosystems behavior and the integration of biophysical and socio-political knowledge to aid in watershed management. Prerequisite(s): course 130A/L or 130B or 129 or 133 or 160 or 167. Enrollment restricted to junior and senior environmental studies/combined majors. A 2-unit concurrent internship is strongly recommended. Enrollment limited to 30. *C. Shennan*

167. Freshwater and Wetland Ecology. W

Field and lecture course teaches the physical and biological patterns and processes in freshwater and wetland systems, primarily focusing on Central Coast systems from headwaters to coastal marshes. Prerequisite(s): course 24 or Biology 20C and Chemistry 1A. Enrollment limited to 30. *C. Shennan*

167L. Freshwater and Wetland Ecology Lab (2 credits). *

Provides basic skills to assess chemical, biological, and physical characteristics of freshwater creeks, rivers, and wetlands. These skills are needed in environmental consulting, municipal agencies engaging in water management or impacts on water, and regulatory agencies. Relies on methods in geomorphology, biogeochemistry, hydrology, and field biology. Enrollment restricted to environmental studies, environmental studies/Earth sciences, environmental studies/biology, and environmental studies/economics majors. Concurrent enrollment in course 167 is required. Enrollment limited to 20. *The Staff*

168. Biogeochemistry and the Global Environment. W

Studies biogeochemical cycles and related environmental issues such as global environmental change, eutrophication, ecosystem degradation, and agricultural sustainability. Discusses transformation and movement of major nutrient elements in context of watershed ecology and societal implications. Students cannot receive credit for this course and course 268. Prerequisite(s): course 23 or Chemistry 1A or 1B or 1C. *W. Cheng*

172. Science, Policy, and the Environment. *

Introduces students to the dilemmas of science-based environmental policy and discusses their underlying philosophical underpinnings. Explores emergent alternatives, such as the precautionary principle and alternatives assessment, and examines the relationship between experts and the lay public in public controversies. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *S. Rajan*

173. An Introduction to World Environmental History. S

Introduces students to some of the central issues in world environmental history such as: human attitudes toward the natural environment; the role of human societies, their institutions and technologies in changing the face of the earth; and the historical impact of environmental and developmental policies on race, class, and gender differences in a variety of human communities across the world. Prerequisite(s): course 100. Enrollment limited to 30. *S. Rajan*

175. Biotechnology: Social and Environmental Dimensions. *

Surveys the rapid development of genetic engineering science and biotechnology-based industries and examines the economic, health, environmental, legal, and social justice dimensions of new biotechnology applications: genetic screening, cloning, transgenic animals and crops, genetically engineered food, and biodiversity prospecting. Readings, lectures, World Wide Web site reviews, student presentations, and papers will address controversial choices faced now by scientists, farmers, doctors, consumers, public officials, and global governance agencies. Prerequisite(s): course 25 strongly recommended. Enrollment limited to 30. *The Staff*

179. Environmental Interpretation. F

A field course in theory and practice of environmental interpretation in parks, museums, and school programs with special attention to local natural history and chil-

dren. Students will work to define their own interpretive philosophy, skills, and style. Background in natural history and/or experience working with children recommended. Preference given to juniors. Prerequisite(s): course 100. Concurrent enrollment in course 184 required. Preference given to juniors. Enrollment limited to 18. *The Staff*

183. Environmental Studies Internship. F,W,S

A supervised off-campus learning experience related to environmental problem solving. Students may work with government agencies, private organizations, citizen action groups, or in specialized apprenticeships on an individual or team basis. Internship intended for environmental studies majors. Prerequisite(s): permission of instructor. Students submit petition to course sponsoring agency. May be repeated for credit. *The Staff*

183B. Senior Internship. F,W,S

Open to declared majors only, this course combines fieldwork at an off-campus agency and a comprehensive analytical paper produced for the agency. Equivalent to a thesis in terms of the depth and quality of the work expected, it is combined with a 5-credit internship. Concurrent enrollment in course 183 required. Students submit petition to sponsoring agency. Enrollment restricted to environmental studies majors and the combined majors with Earth sciences, biology and economics. *The Staff*

184. Environmental Studies Internship (2 credits). F,W,S

A supervised learning experience related to environmental problem solving. Students may work with government agencies, private organizations, citizen action groups, or in specialized apprenticeships on an individual or team basis. This 2-credit internship focuses on specific skill development and must be connected to another internship, thesis, or course—except in rare circumstances for which students must petition. May be repeated for credit. *The Staff*

189. Environmental Studies Research Seminar (1 credit). F,W,S

Research seminars presented weekly throughout the year by environmental studies faculty, visiting scholars, and graduate students. Students discuss content and methodology of research presented following each seminar. Students write critiques of some seminars. May be repeated for credit. *E. Zavaleta*

190. Capstone Course: Environmental Problem Solving. W

A synthetic course that draws on the knowledge and skills students bring from other courses in the major. Focuses on written and oral individual and group projects in which students must take the initiative. Emphasizes developing skills critical for students in their future careers. (Formerly *Capstone Course: Environment and Culture*.) Prerequisite(s): course 100. Enrollment restricted to senior environmental studies majors and the combined majors with Earth sciences, biology, and economics. *K. Holl*

191F. Community and Agroecology Seminar (2 credits). F,W,S

Interdisciplinary two-credit seminar designed for upper-division students who want to become involved in PICA (Program in Community and Agroecology) and to explore concepts of community and agroecology as they relate to sustainability. Also emphasizes development of leadership skills. Specific topics and readings change each quarter. Prerequisite(s): course 91F, 130A, 130B, 133, or equivalent experience. Enrollment limited to 25. May be repeated for credit. *S. Gliessman*

192. Directed Student Teaching. F,W,S

Teaching a lower-division seminar. (See course 42.) Prerequisite(s): upper-division standing; permission of environmental studies faculty member and chairperson of department. *The Staff*

193. Field Study. F,W,S

Supervised research or organized projects relating to environmental problems, supplemented by guided individual study. May be repeated for credit with consent of the chairperson of environmental studies. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for department-sponsored individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor. May not be counted toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Teaching Environmental Studies. F,W,S

This provides an opportunity to participate in the preparation and teaching of introductory environmental studies courses. Students will have significant responsibility in leading discussion sections. Students submit petition to sponsoring agency. *The Staff*

195A. Senior Research. F,W,S

An individually supervised course, with emphasis on independent research that either results in a thesis or project or is done in conjunction with a senior internship. In order to receive credit, students must turn in two bound copies of the final write-up. Satisfies the senior comprehensive requirement. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Thesis Group. *

Students involved in group or individual research that results in a senior thesis or project or done in conjunction with an internship meet regularly with their faculty sponsor to discuss the progress of their work, to receive academic and technical guidance, and to critique one another's written work. To receive credit the student must submit two bound copies of the completed research and write-up. Satisfies the senior comprehensive requirement. Students must discuss details with faculty sponsor. Students submit petition to sponsoring agency. *S. Gliessman*

196A. Senior Seminar: Management of Protected Lands. S

Through selected readings, explores natural reserve and biodiversity management. Completion of an individual/team project related to University of California, Santa Cruz, natural reserves (campus, Younger Lagoon, Fort Ord). Project focus may be on reserve planning and policy, ecological diversity, design and management, or program development. Prerequisite(s): course 100 or permission of instructor. Enrollment restricted to senior environmental studies majors. Enrollment limited to 15. *M. Loik*

196B. Senior Seminar: Methods in Environmental Policy Analysis. *

Introduction to some of the tools in environmental policy analysis, ranging from quantitative techniques (drawing on economics and statistics) to cross-cutting, qualitative designs. Students perform policy analysis exercises throughout the quarter and evaluate normative dimensions of competing analytic techniques. Prerequisite(s): instructor determination based on student's academic background. Enrollment limited to 18. *The Staff*

196D. Senior Seminar: Risks, Values, and Choices. *

Advanced readings and research on environmental risk and public choice and policy. Builds on course 172 and explores the values and choices implicit in conventional risk assessment methodologies as well as those in emergent alternatives, such as the precautionary principle. Prerequisite(s): course 172 and interview to determine level of preparation and appropriateness of background. Enrollment restricted to senior and graduate environmental studies majors and Earth sciences, biology, and economics combined majors. Enrollment limited to 20. *S. Rajan*

196E. Senior Seminar: Advanced Agroecosystem Analysis. *

Explores a range of approaches to examine agroecosystem function and concepts of sustainability. The Center for Agroecology and Sustainable Food Systems farm and its surrounding habitat will be the major focus of independent or group field research, but off-site locations may also be studied. Students will learn field and analytical techniques, formulate a research project, design a data collection scheme, conduct research, and provide a written analysis and discussion of their results. Prerequisite(s): course 130A or 130B. Enrollment limited to 15. *C. Shennan*

196K. Senior Seminar: Sustainable Development in Developing Countries. *

Analyzes selected topics in policy issues surrounding sustainable development in developing countries. Theoretical issues/definitions of "sustainability" will be examined, and concrete cases of environmental and natural resource policy choices will be analyzed. Prerequisite(s): permission of instructor only with assessment of level and suitability of prior coursework. Enrollment limited to 20. *A. Richards*

196P. Senior Seminar: Regional Foodshed Research Practicum. *

This course involves supervised individual and group interdisciplinary research on ecological and social justice dimensions of food production and community food security in the Monterey Bay region. Students are expected to actively engage with regional actors, local agencies, and community programs. Prerequisite(s): interview to determine background and interest in doing advanced field research on local agro-food issues with assessment of quality of work in relevant courses. Enrollment limited to 15. May be repeated for credit. *D. Press*

196R. Senior Seminar: Advanced Research Topics in Applied Ecology. *

Faculty-facilitated research projects conducted within a central theme to satisfy the senior exit writing requirement. Themes have theoretical and applied components and encompass multiple disciplinary approaches. Examples include "Forest Ecology and Exploitation" and "Transgenic technologies: Science and Policy." Prerequisite(s): student must present theme-based research ideas in interview with instructor. Enrollment limited to 20. *D. Letourneau*

196S. Senior Seminar: Functions and Processes of Terrestrial Ecosystems. S

Students present an idea for a project, review relevant literature, develop a research question/hypothesis, design and execute an experiment, collect and analyze data, and write a report. The instructor evaluates the feasibility of each student's project initially. Prerequisite(s): permission

of instructor only with assessment of level and suitability of prior coursework. Enrollment restricted to seniors. Enrollment limited to 15. *W. Cheng*

196V. Senior Seminar: Organic Agriculture Theory and Practice. F

Interdisciplinary research seminar examining scientific theory and practice of organic agriculture in both biological and social contexts. Research emphasis placed on ecology of organically-managed agroecosystems and the growing market and consumption of organic commodities. Prerequisite(s): course 129, or 130A or 133 or 161; interview to determine level of preparation and appropriateness of background. Enrollment restricted to senior environmental studies majors and the combined majors with biology, Earth and planetary sciences, and economics. Enrollment limited to 15. *C. Shennan*

198. Independent Field Study. F,W,S

Student's supervision is conducted by a regularly appointed officer of instruction by means other than usual supervision in person (e.g., by correspondence) or student is doing all or most of the course work off campus. Prerequisite(s): suitable preparation for fieldwork and facility and competence in subject matter area; students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for department-sponsored individual field study off campus for which faculty supervision is not in person but by correspondence. May not be counted toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Advanced directed reading, supervised research, and organized projects relating to environmental problems. May be repeated for credit with consent of the chair of environmental studies. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Provides for department-sponsored directed reading, supervised research, or organized project under the direct supervision of a faculty sponsor. May not be counted toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses**201A. Keywords and Concepts. F**

Two-quarter course introduces keywords and concepts that underlie interdisciplinary work in environmental studies through lectures, directed readings, and discussion. Modules include resonant concepts in ecology and society; ecology and evolution; environment and development; the global environment and society; agroecology and conservation biology; and public policy, economics, and law. Final grade for both courses assigned at the end of the second quarter. Enrollment restricted to graduate students. *M. Fitzsimmons, D. Letourneau*

201B. Keywords and Concepts. W

Two-quarter course introduces keywords and concepts that underlie interdisciplinary work in environmental studies through lectures, directed readings, and discussion. Modules include resonant concepts in ecology and society; ecology and evolution; environment and development; the global environment and society; agroecology and conservation biology; and public policy, economics, and law. Final grade for both courses assigned at the end of the second quarter. Enrollment restricted to graduate students. *The Staff, W. Cheng*

201M. Developing Research Proposals (2 credits). S

Offers graduate students the opportunity to become familiar with the research expertise of the faculty in the Environmental Studies department. Enrollment restricted to graduate students. *K. Holl*

201N. Interdisciplinary Research Design in Environmental Studies. S

Provides students with opportunities to learn research protocols, practices, and methods used in environmental studies. Combination of lectures, reading, practical exercises, and short projects used to explore how these methods can best be incorporated into interdisciplinary research designs. Enrollment restricted to graduate students. *G. Gilbert*

210. Political Ecological Thought and Environment. S

Provides an introduction to social scientific analyses of the relationships between capitalistic development and the environment in the late 20th century. It has a dual purpose: First, to develop a contemporary historical understanding and sensibility of how economic change, new institutional configurations, and world scale processes are shaping interactions with the environment. Second, to examine some recent political social theoretical perspectives on nature-society relations and radical environmental and social movements. Enrollment restricted to graduate students in environmental studies. *A. Richards*

215A. Geographic Information Systems and Environmental Applications. F

Introduction to geographic information systems (GIS) as the technology of processing spatial data, including input, storage and retrieval; manipulation and analysis; reporting and interpretation. Emphasizes GIS as a decision support system for environmental and social problem solving, using basic model building, experimental design, and database management. Students cannot receive credit for this course and course 115A. Concurrent enrollment in course 215L is required. Enrollment restricted to environmental studies graduates students. Enrollment limited to 10. *B. Fulfrost*

215L. Exercises in Geographic Information Systems (2 credits). F

Exercises in Geographic Information Systems and Remote Sensing that demonstrate the development of digital geographic data. Students gain hands-on experience with developing datasets, using imagery to create GIS layers, performing spatial analysis, and utilizing GPS technology. Emphasis placed on environmental applications. Students cannot receive credit for this course and course 115L. Concurrent enrollment in course 215A is required. Enrollment restricted to environmental studies graduate students. Enrollment limited to 15. *B. Fulfrost*

220. Conservation Biology. *

The principles of conservation biology, including a review of the core disciplines of demography, population genetics, island biogeography, and community ecology and discussion of area and edge effects, population viability, and ecosystem issues related to the maintenance of biological diversity, especially in fragmented landscapes. Enrollment restricted to environmental studies graduate students. Enrollment limited to 20. *C. Wilmers*

230. Agroecology and Sustainable Agriculture. *

The application of ecological concepts and principles to the design and management of agricultural systems. The long-term goal of sustainable agroecosystems is examined

in economic, social, and ecological contexts. Enrollment restricted to environmental studies graduate students. *S. Gliessman*

235. Social Theories of Nature. *

Intensive reading and discussion seminar on the treatment of nature in social theory. Focuses on major recent works which examine nature in social theory, in themselves, and in the context of the intellectual history of development of disciplinary discourses about nature. Students write critical reviews of assigned books and a research paper situating a particular book within its intellectual tradition. Prerequisite(s): interview with instructor to determine preparedness. Enrollment limited to 15. May be repeated for credit. *M. Fitzsimmons*

240. Public Policy and Conservation. F

Introduction to political and economic approaches to policy analysis, with particular reference to natural resource scarcity, property rights, and environmental conservation. Case studies apply economic and policy process concepts to the management of public lands, biodiversity, and renewable resources. Enrollment restricted to environmental studies graduate students. *D. Press*

247. Regional Approaches to Environmental Policy. *

A research seminar combining theoretical issues in democratic theory, political economy, and planning with emerging concepts of bioregionalism. The focus is on institutional, scientific, and political innovations in managing the environment. Students evaluate current and historical proposals to regionalize environmental policy in the U.S. Enrollment restricted to environmental studies graduate students. Enrollment limited to 15. *The Staff*

263. Plant Disease Ecology. *

Introduction to ecological roles of plant diseases, including their importance in regulating plant populations dynamics, community diversity and system function in natural ecosystems, considerations of plant diseases in conservation ecology, and ecological approaches to managing diseases in agroecosystems. Students cannot receive credit for this course and course 163. Prerequisite(s): one ecology course. Enrollment restricted to graduate students. *G. Gilbert*

268. Biogeochemistry and the Global Environment. W

Studies biogeochemical cycles and related environmental issues such as global environmental change, eutrophication, ecosystem degradation, and agricultural sustainability. Discusses transformation and movement of major nutrient elements in context of watershed ecology and societal implications. Students cannot receive credit for this course and course 168. Enrollment restricted to environmental studies graduate students. Enrollment limited to 15. *W. Cheng*

271. Valuing the Environment. *

Intensive seminar examining the normative underpinnings of environmental values. Draws on tools from analytical, ethical, and political philosophy to develop normative arguments concerning environmental inequality and justice, environmental preservation, and risk evaluation. Involves team projects in which students develop cases on controversial contemporary issues such as biotechnology. Prerequisite(s): interview only. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *S. Rajan*

280. Advanced Topics in Environmental Studies. W,S

Intensive research seminar, including reading and critique of primary research literature and research in progress. Topics vary and are announced in advance; students should consult with faculty prior to enrolling. Enrollment by permission of instructor. Enrollment restricted to graduate students. May be repeated for credit. *B. Fulfroost, M. Loik*

281C. Advanced Readings in Risk and Public Policy. *

Advanced readings and research on environmental risk and public policy. Explores environmental decision making given the question of the burden of proof and scientific uncertainty and grapples, in an advanced manner, with emergent policy alternatives, such as the precautionary principle. Also offered as course 291C for 3 credits. Prerequisite(s): course 172 or equivalent work demonstrated by an interview. Enrollment restricted to graduate students. Enrollment limited to 10. *S. Rajan*

283. Environmental Studies Internship. F,W,S

Graduate level internship focuses on integrating interdisciplinary academic theory with practical, specialized experience in a professional setting. Course intended for environmental studies graduate students; students must complete paperwork and meet with coordinator prior to first day of instruction. *The Staff*

290. Interdisciplinary Research Seminar (2 credits). F,W,S

Research seminars presented weekly throughout the year by environmental studies and affiliated faculty, by visiting scholars, and by graduate students. Students discuss the content and methodology of research presented following each seminar. Enrollment restricted to graduate students. May be repeated for credit. *E. Zavaleta*

290L. Graduate Research Seminar (2 credits). F,W,S

Graduate student presentations of doctoral research proposals, dissertation work-in-progress, grant applications, and conference papers. This weekly laboratory meeting seeks to develop professional skills, teach constructive criticism, and foster effective discussion among peers. Enrollment restricted to graduate students. *K. Holl*

291. Advanced Readings in Environmental Studies (3 credits). F,W,S

Focusing on a recently published volume or on a topic of current interest, this seminar requires a rigorous analysis of the principles and methods employed in the four core areas of the program: sustainable agriculture and agro-ecology; conservation biology; environmental policy analysis; and political economy. Enrollment restricted to graduate students. May be repeated for credit. *M. Fitzsimmons, D. Goodman*

291C. Advanced Readings in Risk and Public Policy (3 credits). *

Advanced readings and research on environmental risk and public policy. Explores environmental decision making given the question of the burden of proof and scientific uncertainty and grapples, in an advanced manner, with emergent policy alternatives, such as the precautionary principle. Also offered as course 281C for 5 credits. Prerequisite(s): course 172 or equivalent work demonstrated by an interview. Enrollment restricted to graduate students. Enrollment limited to 10. May be repeated for credit. *S. Rajan*

291D. Advanced Readings in Tropical Ecology, Agriculture, and Development (3 credits). S

Analyzes recent publications in ecology, conservation, agroecology, and development in tropical and subtropical regions, particularly Latin America. Discussions place special emphasis on integration across natural and social science disciplines to address issues of sustainability in tropical regions. Enrollment restricted to graduate students. *The Staff*

291M. Advanced Readings in Biogeochemistry (3 credits). *

Course consists of three parts: fundamental biogeochemistry of the Earth, global cycles of nutrient elements, and societal and scientific issues of global change. Class activities include (1) presentation of summary statements based on reading assignments; (2) discussion of theories, concepts, methodologies, and applications; (3) computer simulation and modeling of elemental cycles using STELLA; and (4) integration of scientific information on global change with social issues by writing. Enrollment restricted to graduate students. *W. Cheng*

291P. Advanced Readings in Environmental History and Anthropology (3 credits). *

Course of readings systematically surveying the theoretical contributions of the disciplines of environmental history, historical ecology, environmental anthropology, and geography. After an overview of the evolution of 20th-century thought on the relationship between environment and culture as seen through the lenses of these disciplines, explores emerging research hybrids and new research frontiers. Enrollment restricted to graduate students. *S. Rajan*

292. Topics in Research in Environmental Studies (2 credits). F,W,S

Seminar in which students give critically evaluated presentations regarding current research in environmental studies and issues in research design. Students should consult with faculty prior to enrolling. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Independent study and research under faculty supervision. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297F. Independent Study (2 credits). F,W,S

Independent study and research under faculty supervision. Intended to be taken in conjunction with a 5-credit course. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Environmental Toxicology

See Microbiology and Environmental Toxicology, page 358.

Ethnic Studies

209 Humanities 1
(831) 459-4658
<http://amst.ucsc.edu>

Program Description

Ethnic studies is not a separate undergraduate program of study at UCSC, but students with an interest in ethnic studies can find an extensive array of courses on the subject in the following departments: American studies, anthropology, community studies, education, feminist studies, film and digital media, economics, history, history of art and visual culture, history of consciousness, Latin American and Latino studies, literature, music, politics, psychology, sociology, and theater arts. Feminist studies offers two ethnic studies concentrations within their major: race, class, and ethnicity (within the U.S.) and nations and cultures (comparative, non-U.S.). The Community Studies Department and the Latin American and Latino Studies Department offer opportunities for fieldwork that extend ethnic studies outside the traditional classroom setting. See also the campus general education (E code) requirement. A list of U.S.-centered ethnic studies courses offered each quarter is published in the *Schedule of Classes*. In addition, a list of faculty for whom ethnic studies are a professional specialty is published on the UCSC catalog web site, <http://reg.ucsc.edu/catalog/>.

Feminist Studies

315 Humanities 1
(831) 459-4324
fmst@ucsc.edu
<http://feministstudies.ucsc.edu/>

Faculty and Professional Interests

BETTINA APTHEKER, Professor of Feminist Studies and History

Women's history, feminist oral history and memoir; feminist pedagogy; African-American women's history; queer studies; feminist Jewish studies; feminist critical race studies

ANJALI ARONDEKAR, Associate Professor of Feminist Studies

South Asian studies, colonial historiography; feminist theories; queer theory; critical race studies; 19th-century interdisciplinary studies

NEDA ATANASOSKI, Assistant Professor of Feminist Studies

U.S. and Eastern European film and media; cultural studies and critical theory; war and nationalism; gender, ethnicity, and religion

KAREN BARAD, Professor of Feminist Studies
Physics, feminist philosophy, philosophy of science, cultural studies of science, and feminist theory

GINA DENT, Associate Professor of Feminist Studies, History of Consciousness, and Legal Studies

Africana literary and cultural studies, legal theory, popular culture

MARGARET M. DOWNES-BASKIN, Research Associate in Feminist Studies

Presidential leadership styles, elections and the media, women's political and corporate leadership style, intergenerational relations

MARGE FRANTZ, Emerita, Lecturer in American Studies and Feminist Studies

AKASHA HULL, Emerita, Professor of Feminist Studies and Literature

FELICITY SCHAEFFER-GRABIEL, Assistant Professor of Feminist Studies
Transnational feminisms; sexuality and migration, technology, and subjectivity; Latin American/Latino studies; border studies; Chicano/a studies; affect and globalization



ANGELA Y. DAVIS, Emerita, Professor of History of Consciousness and Feminist Studies

CARLA FRECCERO, Professor of Literature, Feminist Studies, and History of Consciousness
Renaissance studies, French and Italian language and literature, early modern studies, postcolonial theories and literature, contemporary feminist theories and politics, queer theory, U.S. popular culture

ROSA LINDA FREGOSO, Professor of Latin American and Latino Studies, and Film and Digital Media

Cultural studies, transnational feminist theories, Chicano/a and Latino/a cinema, issues of human rights and gender violence

JODY GREENE, Associate Professor of Literature and Feminist Studies

Seventeenth- and 18th-century British and French literature and culture, pre- and early modern studies, early modern colonialisms, gay and lesbian cultural studies, gender studies, history of authorship, history of the book

DONNA J. HARAWAY, Professor of History of Consciousness and Feminist Studies

Feminist theory, cultural and historical studies of science and technology, relation of life and human sciences, human-animal relations, and animal studies

HELENE MOGLEN, Emerita, Professor of Literature

Affiliated Faculty

GABRIELA ARREDONDO, Assistant Professor of Latin American and Latino Studies

U.S. social and cultural history; Chicano/a history; critical race and ethnicity theories; im/migration history; Latino/as in the U.S.; Chicana feminisms; "borderlands" studies, modern Mexico history

KAREN BASSI, Professor of Classics (Literature)
Greek and Latin literatures, Greek drama, Hellenistic poetics, feminist interpretation, literary and cultural theory, pre- and early modern studies, historiography

JULIE BETTIE, Associate Professor of Sociology
Cultural studies, feminist studies, race/ethnic studies, identity, popular culture, critical ethnography, visual ethnography

HEATHER BULLOCK, Associate Professor of Psychology

Poverty and economic inequality, welfare policy, feminist psychology, discrimination

JULIANNE BURTON-CARVAJAL, Professor of Literature

American visual media, particularly film; melodrama as a transnational form; gender and authorship; history, cultures, and representations of California, particularly the Central Coast

NANCY N. CHEN, Associate Professor of Anthropology

Medical anthropology, visual anthropology, urban anthropology, Asian American identity, mental health, food, China

ANNETTE M. CLEAR, Assistant Professor of Politics
Comparative democratization, transnationalism, global politics, global organization, Southeast Asia

VILASHINI COOPAN, Associate Professor of Literature

Postcolonial studies, comparative and world literature, literatures of slavery and diaspora, globalization studies, cultural theory of race and ethnicity

E. G. CRICHTON, Associate Professor of Art
Intermedia, electronic arts, photography, installation

FAYE J. CROSBY, Professor of Psychology
Gender; social identity; and social justice, especially affirmative action

TERESA DE LAURETIS, Emerita, Professor of History of Consciousness

DANA FRANK, Professor of History

U.S. social and economic history; women, labor, and working-class history; contemporary political economy
Pascale Gaiet, Professor of Literature and Language Studies
Nineteenth- and 20th-century French literature, sociolinguistics, political history, Celine, Genet

MARY-KAY GAMEL, Professor of Classics and Comparative Literature

Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

DIANE GIFFORD-GONZALEZ, Professor of Anthropology

Paleolithic and Neolithic Africa and Eurasia, colonial New Mexico, origins of food production, pastoralists, zooarchaeology, history of archaeology, interpretive theory, visual anthropology

SUSAN GILLMAN, Professor of American Literature

Nineteenth-century American literature and culture; theories of culture, race, and gender; world literature and cultural studies

JENNIFER A. GONZÁLEZ, Associate Professor of History of Art and Visual Culture

Contemporary theories of visual culture, semiotics, critical museum studies, photography, public and activist art in the U.S.

JUNE GORDON, Associate Professor of Education

Urban education of working-class and ethnic minority students in East Asia, Britain, and the U.S. and related issues in teacher education

HERMAN GRAY, Professor of Sociology

Cultural studies, media and television studies, black cultural politics, social theory

IRENE GUSTAFSON, Assistant Professor of Film and Digital Media

Producing across the boundaries between "theory" and "practice," non-fiction, gender and queer studies, production design

LISBETH HAAS, Associate Professor of History
U.S.-Mexico borderlands, Chicano and Native American history; visual culture in the colonial Americas; the U.S. West and California; historical memory, theory, and historical methodology

AMELIE HASTIE, Assistant Professor of Film and Digital Media
Film theory and history, feminist film and television studies, Chinese cinemas, issues of authorship, interdisciplinary approaches

MARGO HENDRICKS, Associate Professor of Literature
Early modern English literature and culture; theories and discourses of race, gender, drama, and theory; women playwrights; pre- and early modern studies

GAIL B. HERSHATTER, Professor of History
Modern Chinese social and cultural history; labor history; gender history; history of sexuality; feminist theory; history, memory, and nostalgia

EMILY HONIG, Professor of History
Gender, sexuality, and ethnicity in modern Chinese history; comparative labor history; Chicana history, nationalism, and sexuality in the Third World; oral history

JOCELYN HOY, Lecturer in Philosophy
Feminist philosophy, 19th- and 20th-century continental philosophy

DONNA HUNTER, Associate Professor of History of Art and Visual Culture
European painting (especially French) from 1600 to the 1960s; German art and visual culture between the two world wars; art as social practice, portraiture

AIDA HURTADO, Professor of Psychology
Social identity, feminist theory, social psychology of education, survey methodology

VIRGINIA JANSEN, Emerita, Professor of History of Art and Visual Culture

STACY KAMEHIRO, Assistant Professor of History of Art and Visual Culture
Visual cultures of the Pacific, 19th-century Hawai'i, (inter) nationalism, culture contact; (post)colonialism

L. S. KIM, Assistant Professor of Film and Digital Media
Television history and theory, racial discourse, feminist criticism, Asian-American media production, industrial practices and social change in both mainstream Hollywood and alternative media

NORMA KLAHN, Professor of Literature
Latin American literary and cultural studies (specialization: Mexico), Chicano/Latino literature and culture from a cross-border perspective, modernity/postmodernity, poetics and politics, genre theory (novel, poetry, autobiography), contemporary critical theories (i.e., border, ethnic, feminist, transnational/global)

LORI G. KLETZER, Professor of Economics
Employment and wage determination, impact of globalization on the domestic labor market, industrial relations, government labor market policies, higher education and the labor market

CAMPBELL LEAPER, Professor of Psychology
Social construction and socialization of gender in childhood, adolescence, and adulthood; self-concept and social identity; language and social interaction; social relationships, gender bias in the schools and academic achievement; images of gender in the media; perceptions and consequences of sexism

CAROLYN MARTIN SHAW, Professor of Anthropology
African societies, colonial discourse, social theory, anthropology of women, sexuality

LOURDES MARTÍNEZ-ECHAZÁBAL, Associate Professor of Latin American Literature
Latin American and Caribbean literatures; Afro-Latin American literatures, cultures, and societies; found[n]ational narratives; Brazilian literature; literatures of Cuba and the Cuban diaspora; critical race theory

JENNIE LIND MCDADE, Professor of Art
Drawing, painting

LETA E. MILLER, Professor of Music
Renaissance and baroque music history and performance practices, 20th-century American music, modern and baroque flute, 16th-century chanson and madrigal, music and science, 18th- and 20th-century flute literature and performance styles, music of C.P.E. Bach and Lou Harrison

MARGARET MORSE, Professor of Film and Digital Media
Digital and electronic media theory and criticism, media art, media history, technology and culture, film history and theory, German cinema, documentary and science fiction

MARCIA OCHOA, Acting Assistant Professor of Community Studies
Gender and sexuality, race and ethnicity, Latino studies, media and cultural studies, ethnography of media, feminism, queer theory, multimedia production, Latin American studies—Colombia and Venezuela, political philosophy, geography

CATHERINE RAMIREZ, Assistant Professor of American Studies
Chicana and U.S. Latino literature, culture, and history; gender studies and feminist theory; visual culture and style politics; cultural studies; popular and urban youth cultures; speculative fiction, Afrofuturism, and Chicanafuturism; science, technology, race, and gender; theories and methods of American studies

JENNIFER E. REARDON, Assistant Professor of Sociology
Issues of social identity as influenced by the new sciences of genetics and genomics; intersection of the sociology of science and knowledge and the sociology of race, gender, and class

B. RUBY RICH, Professor of Community Studies
Documentary film and video, post-9/11 culture, new queer cinema, feminist film history, Latin American and Latino/a cinema, U.S. independent film and video, the essay film, the politics of film festival proliferation and the marketing of foreign films in the U.S.

PAMELA ANN ROBY, Emerita, Professor of Sociology

LISA ROFEL, Associate Professor of Anthropology
Critical theory, anthropology of modernity, popular/public culture, gender and sexuality, cultures of capitalism, postcolonial feminist anthropology, China

GABRIELA SANDOVAL, Assistant Professor of Sociology
Race and ethnic studies, Latino/a and Chicano/a studies, stratification, urban and political sociology, and voting behavior

VANITA SETH, Assistant Professor of Politics
Early modern and modern political theory, feminist theory, cultural history, race politics, postcolonial theory

DEANNA SHEMEK, Professor of Literature
Italian literature and cultural history, Renaissance studies, early modern popular culture, narrative (early modern to contemporary), women's studies, literary theory

MARY W. SILVER, Professor of Ocean Sciences
Biological oceanography, marine plankton, midwater ecology

SHELLEY STAMP, Associate Professor of Film and Digital Media
Film history, theory, and criticism; silent cinema; women's filmmaking; film censorship; histories of moviegoing; feminist approaches to cinema

ELIZABETH STEPHENS, Associate Professor of Art
Intermedia, electronic art, sculpture, and performance art

NANCY STOLLER, Emerita Professor of Community Studies

RENEE TAJIMA-PEÑA, Associate Professor of Community Studies
Documentary film and video focusing on Asian American and immigrant communities, media, and social change

AVRIL THORNE, Professor of Psychology
Identity development through personal memory telling, development of meaning in adolescents' self-defining memory narratives, family storytelling and the development of a sense of self, narrative co-construction of identity and intimacy

NINA K. TREADWELL, Assistant Professor of Music
Renaissance through early baroque music history and performance practices, early plucked-string instruments (theorbo, renaissance, and baroque guitar; renaissance lute), 16th- and 17th-century Italian theatrical music, gender studies, women and music, literary and critical theory

ANNA TSING, Professor of Anthropology
Culture and politics, feminist theory and gender in the U.S., social landscapes and tropical forest ethnoecologies, ethnicity, local power and relations to the state in Indonesia, Southeast Asia, and the U.S.

CANDACE WEST, Professor of Sociology
Language and social interaction, sociology of gender, conversation analysis, microanalysis and medicine

MARILYN J. WESTERKAMP, Professor of History
British America, American revolution/early national U.S., U.S. religious history, early modern cultural and religious history, women/gender

ROB WILSON, Professor of Literature
Transnational and postcolonial literatures, especially as located in Asia/Pacific emergences as posited against American empire of globalization; cultural poetics of America; the sublime, Longinus to Hiroshima; mongrel poetics of experimental writing, especially poetry

ALICE YANG Murray, Associate Professor of History
Historical memory, Asian American history, gender history, race and ethnicity, 20th-century U.S., oral history

PATRICIA ZAVELLA, Professor of Latin American and Latino Studies
Chicano/Latino studies, women's work and domestic labor, poverty, family, sexuality and social networks, feminist studies, ethnographic research methods, and transnational migration of Mexican/ workers and U.S. capital

EILEEN ZURBRIGGEN, Assistant Professor of Psychology
Connections between power and sex, sexual aggression and abuse, sexual decision making, Motivation, especially power and affiliation-intimacy motives. Information processing models of social and personality psychology

Program Description

Feminist studies is an interdisciplinary field of analysis that investigates how relations of gender are embedded in social, political, and cultural formations. The undergraduate program in feminist studies provides students with a unique interdisciplinary and transnational perspective. The department emphasizes theories

and practices derived from multiracial and multicultural contexts.

Feminist studies prepares undergraduates for a variety of careers. The B.A. degree in feminist studies provides excellent grounding for undergraduates who have career aspirations in, for example, law, health, public administration, community organizations, and social services. Students wishing to pursue doctoral work will also find that interdisciplinary training in feminist studies equips them with theoretical and methodological strengths in most disciplines and applied research fields. Specialists in feminist studies are employed as consultants in industry, higher education, and human resources. State and federal government agencies employ people who have special training in understanding gender relations. Educational institutions need specialists to develop and administer feminist studies programs, women's centers, and other institutional structures designed specifically to study and assist women.

Requirements for the Major

Feminist studies majors must complete 10 courses and a senior comprehensive exit requirement in the feminist studies program. Students must choose one of the following concentrations within the major: Culture, Power, and Representation; Law, Politics, and Social Change; Science, Technology, and Medicine; or Sexuality Studies. Courses appropriate for each concentration are listed in the Feminist Studies office at Humanities 1 and at <http://feministstudies.ucsc.edu>.

A proposal for an independent concentration will be approved only when a student presents a clear, coherent, and rigorous plan of study that does not fit the existing concentrations. Both the student's adviser and the Feminist Studies Department chair must approve a proposal for an independent concentration.

Required courses include course 1, *Introduction to Feminisms*; course 80 or another 80 course taught by feminist studies affiliated faculty; course 100, *Feminist Theories* (must be taken at UCSC); five courses in the concentration; two electives, both of which must be upper-division courses; and an exit (comprehensive) requirement course. One independent study (course 199) may count toward the concentration or toward the elective requirements. Either course 193 or 198 may be used to count toward the elective requirements.

Because feminist studies is an interdisciplinary major and lists courses taught by affiliate faculty in other departments, feminist studies majors must take a minimum of five courses at UCSC taught directly in the Feminist Studies Department, i.e., courses designated FMST, not including course 193, 198, or 199. Two EAP courses may count towards the major; three transfer courses may count towards the major; and the total combined number of EAP and transfer courses that may count towards the major is a maximum of three.

Exit requirement options include a senior thesis or a senior project (course 195) or a senior seminar (course 194) taught by core or affiliated faculty. Courses 1, 80, 100, and the composition (general education code C) requirement are prerequisites to course 195 and the senior seminars. A fourth option for fulfilling the exit requirement is to develop and teach a student-directed seminar. Only two student-directed seminars may be offered each year, and they must be approved by the feminist studies undergraduate program committee before being recommended for final course approval. Guidelines for completion of the exit requirement are available in the Feminist Studies office or online at <http://feministstudies.ucsc.edu>.

Transfer Students

Transfer students are encouraged to declare the major as soon as possible to be assured entrance into the required core courses. Feminist studies advisers or the chair determine which courses from other institutions are transferable. Courses 1, 80, and 100 must be completed in the junior year so that the exit requirement may be completed in the senior year.

Graduate Studies

Graduate students may work toward a Ph.D. degree that notes a concentration in feminist studies on the graduation documents. The request must originate in the degree-granting department. The Anthropology, History, History of Consciousness, Literature, Politics, Psychology, and Sociology Departments participate in this parenthetical notation program with the Feminist Studies Department. Students in other departments wishing to pursue this option should consult with the chairs of their respective Ph.D. programs and the chair of feminist studies. A list, updated annually, of regularly offered, approved graduate courses is available in the Feminist Studies Department office.

The following are required for the notation:

- Committee composition. The student must have a designated graduate adviser from the feminist studies core or affiliated faculty who serves on the qualifying examination committee or in some other appropriate capacity.
- Writing. The student must prepare a significant piece of writing in the area of feminist studies. This writing must be a master's essay or a chapter of the doctoral dissertation.
- Course requirements. The student must take four graduate courses in feminist studies. The courses can be selected from among the graduate offerings of any UCSC department, as long as they are taught by core or affiliated feminist studies faculty.
- Teaching. The student must be a teaching assistant in at least one feminist studies course or teach a feminist studies course independently (designated FMST) in the regular curriculum or in Summer Session.

Graduate Courses

Note: Upper-division undergraduates are admitted only with permission of the instructor.

Anthropology 234

Feminist Anthropology,

A. Tsing

History 204

Engendering China,

E. Honig

History 204A

History of Gender Research Seminar,

A. Yang Murray or M. Westerkamp

History of Consciousness 210A-B

Cultural and Historical Studies of Race and Ethnicity,

A. Y. Davis

History of Consciousness 215A-B-C

Critical Theory in the Marxist Tradition,

A. Y. Davis

History of Consciousness 217A-B-C

Seminar: Topics in Feminist Theory,

D. Haraway

History of Consciousness 250A-B

Foundation in Science Studies,

D. Haraway

History of Consciousness 251

Readings in Science Studies,

D. Haraway

Latin American and Latino Studies 242

Globalization, Transnationalism, and Gender in the

Americas,

P. Zavella

Sociology 242

Feminist Research Seminar,

P. Roby

Lower-Division Courses

1. Introduction to Feminisms. F

Core course for feminist studies. Introduces a gendered analysis of philosophical, scientific, historical, economic, political, and cultural issues from feminist perspectives, emphasizing complexities of globalization, class, race, ethnicity, and sexuality. (General Education Code(s): IH.) *B. Aptheker*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

80F. Feminisms of/and the Global South. W

Explores feminist theories from domestic U.S. and global contexts in order to ask how interventions of women of color in the U.S. and of radical feminist movements in non-U.S. locations radically re-imagine feminist politics. Rather than focusing on feminist movements that represent different regions of the world, course examines feminist theory through multiple histories of colonialism, post-colonialism, and globalization. (General Education Code(s): T5-Humanities and Arts or Social Sciences, E.) *A. Arondekar*

80K. Feminism and Science. S

Considers the nature of scientific practice, the culture of science, and criteria for the responsible practice of science. Particular attention is given to feminist commitments to strengthening objectivity, increasing scientific literacy, and including ethical considerations in the practice of science. Enrollment limited to 80. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *K. Barad*

80P. War in Film and Culture. F

Explores how war films, media, and political discourses about war and violence shape and transform ideas about national identity. Focuses on how ideas about gender, sexuality, race, and class have particularly affected representations of military conflicts. (General Education Code(s): T5-Humanities and Arts or Social Sciences, E.) *N. Atanasoski*

80R. Tribes, Castes, and Women. S

Examines historical constructions and contemporary deployments of the categories that have structured anthropological understandings of social life in South Asia, particularly those of "tribe," "caste," and "women." Students gain familiarity with the mobilization of these categories in contemporary political movements across India. Enrollment limited to 30. (General Education Code(s): T3-Social Sciences, E.) *The Staff*

80S. Women in Music. F

An exploration of the sociological position of women as composers and performers in Western and non-Western musics, with a focus on both ethnographic and historical sources. (Also offered as Music 80S. Students cannot receive credit for both courses.) Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A.) *L. Miller*

80Y. Violence Against Women of Color. *

Examines violence against women of color and analyzes the relationship between sexual/domestic violence and institutional structures of violence. Explores the development of organizing strategies against violence. Issues covered may include: domestic/sexual violence, colonialism and violence, prisons/INS detention, police brutality, violence and the economy, religion/spirituality and violence, medical experimentation, reproductive rights, and militarism/border violence. Enrollment limited to 40. (General Education Code(s): T5-Humanities and Arts or Social Sciences, E.) *The Staff*

Upper-Division Courses**100. Feminist Theories. W**

Core course for feminist studies. Serves as an introduction to thinking theoretically about issues of feminism within multiple contexts and intellectual traditions. Sustained discussion of gender and its critical connections to productions of race, class, and sexuality. Focus will change each year. Enrollment restricted to sophomores, juniors, and seniors. *A. Arondekar*

102. Feminist Critical Race Studies. *

Working from the perspective that race is a cultural invention and racism is a political, economic, and social relation, investigates how "race" is produced as a meaningful and powerful social category, examines the effects of racism as a social relation, and argues for the necessity of combining feminist and critical race studies. By considering different historical periods and places, aims to equip students with the tools necessary to critically examine the production and reproduction of race and racism in the U.S. Prerequisite(s): one course from feminist studies. Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

103. Writing Women's Lives. *

Examines various ways of representing women's lives, including autobiography, oral history, community studies, fiction, etc. Particular attention to intersections of gender, race, ethnicity, class, and sexuality, to the ways in which individuals are situated in communities, and to the relationship between author and subject. *The Staff*

110. Women Writers of the African Diaspora. *

Advanced introduction to contemporary writings of black women in U.S., Africa, and the Caribbean, focusing on relationship between these different sites of production in context of struggles against colonialism and patriarchy. Organized around theme of perception, divided into three main parts: Part I treats texts directing our attention to different orders of perception; Part II includes three novels with psychological problems at their center; and Part III turns to issue of tradition and conflicts of contemporary black women in relation to gender, class, and nationality. Enrollment limited to 25. (General Education Code(s): E.) *G. Dent*

112. Women and the Law. F

Interdisciplinary approach to study of law in its relation to category "women" and production of gender. Considers various materials including critical race theory, domestic case law and international instruments, representations of law, and writings by and on behalf of women living under different forms of legal control. Examines how law structures rights, offers protections, produces hierarchies, and sexualizes power relations in both public and intimate life. (Also offered as Politics 112. Students cannot receive credit for both courses.) Enrollment restricted to feminist

studies, politics, legal studies, and Latin American and Latino studies/politics combined majors during priority enrollment only. *G. Dent*

115. Gender, Sexuality, and Transnational Migration Across the Americas. *

Examines migration as a mode of inquiry into transnational practices across geographic locales and temporal zones. Analyzes migration in relation to the transnational formation of gender, race, and sexuality as well as processes of neocolonialism, the state, and globalization. Prerequisite(s): course 1, 80C, 100, or 145. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 25. (General Education Code(s): E.) *F. Schaeffer-Grabiel*

116. Ethnographies of Transnational Feminisms. S

Examines recent approaches to the ethnographic representation of transnationalism as both a conscious strategy for feminist alliance and as a condition of global political economy. Topics covered include feminist anthropology, non-governmental organizations, human and reproductive rights, and international peace movements. Prerequisite(s): course 1 or 80C. Enrollment limited to 30. *The Staff*

117. Gender and Africa. *

Considers both the research on gender in African studies and the role of gender in the production of the idea of Africa. Focuses attention through the humanities on the meaning-making of and about Africa in its global context. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirement. Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): W, E.) *G. Dent*

120. Transnational Feminisms. *

Explores the emergence of transnational feminism through U.S. women of color and postcolonial feminism. Underscores the role of globalization, nationalism, and state formation in relation to feminist theorizing, activism, and labor across the Global South. In an attempt to understand the salience of inequalities, the course interrogates the continuation of feminist critique that is attentive to the war on terror, neocolonialism, and empire. Prerequisite(s): course 1 or 80C. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 40. (General Education Code(s): E.) *F. Schaeffer-Grabiel*

123. Feminism and Cultural Production. *

Explores relationship between feminism and culture. Topics will vary and include different forms of cultural production such as film and literature. Regional/national focus will also vary. Prerequisite(s): course 1 or 80C. Enrollment restricted to sophomores, juniors, and seniors. May be repeated for credit. (General Education Code(s): A, E.) *The Staff*

124. Technologies and Latinidad: Cyberspace and Beyond. *

Introduction to analyzing technology as it is produced through gender, race, class, and sexualized differences. Examines film and the Internet through the genealogy of these technologies in relation to U.S. nationalism, development, and empire, creating social communities and new identities, and the global production of labor. Examines interdisciplinary methods (ethnography, media analysis, cultural studies and, literary analysis) to broaden understanding of Latina/o subjectivity as historical construct mediated through various modes of visual production. Enrollment restricted to sophomore, junior, and senior feminist studies majors during priority enrollment only. Enrollment limited to 25. (General Education Code(s): E.) *F. Schaeffer-Grabiel*

126. Images, Power, and Politics: Methods in Visual and Textual Analysis. W

Introduces the analysis of visual images and text with particular emphasis on feminist critical methodologies. Using case studies from photography, film, TV, advertising, and new media, students learn how to read and analyze culture. Enrollment restricted to sophomore, junior, and senior feminist studies majors during priority enrollment only. Enrollment limited to 25. *N. Atanasoski*

127. Non-Governmental Organizations (NGOs). W

Introduces transnational networks of non-governmental organizations (NGOs) working on a variety of issues. Critical feminist tools applied to aims, rhetoric, and outcomes of organizations in areas of student's individual interest. Topics and NGO orientation covered include sustainable development, microfinance, indigenous rights, and women's empowerment. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to sophomore, junior, and senior feminist studies majors during priority enrollment. Enrollment limited to 20. (General Education Code(s): W.) *The Staff*

132. Gender and Postcoloniality. *

Postcolonial feminist studies. Explores how discourses of gender and sexuality shaped the policies and ideologies of the historical processes of colonialism, the civilizing mission, and anticolonial nationalism. Considers orientalism as a gendered discourse as well as colonial understandings of gender and sexuality in decolonialization. Explores Western media representations, literature, the law, and the place of gender in the current debate between cultural relativism and universalism. Provides an understanding of some key terms in postcolonial studies and an in-depth examination of the place of gender in these processes. Prerequisite(s): courses 80C or 80F and course 100 or permission of instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

133. Science and the Body. F

Contemporary technoscientific practices, such as nano-, info-, and biotechnologies, are rapidly reworking what it means to be human. Course examines how both our understanding of the human and the very nature of the human are constituted through technoscientific practices. Prerequisite(s): course 1 or 80C; and course 100. Enrollment restricted to juniors and seniors. Enrollment limited to 20. *K. Barad*

139. African American Women's History. W

Considers African American women as central to understanding of U.S. history, focusing on everyday survival, resistance, and movements for social change. Discussion of critical theories for historical research, gender, and race. Emphasis on biography, cultural history, and documentary and archival research. Enrollment restricted to sophomores, juniors, and seniors. (General Education Code(s): E.) *B. Aptheker*

145. Racial and Gender Formations in the U.S. S

Introduces the defining issues surrounding racial and gender formations in the U.S. through an understanding of the term "women of color" as an emergent, dynamic, and socio-political phenomenon. Interrogates organizing practices around women of color across multiple sites: film and media, globalization, representation, sexuality, historiography, and war, to name a select few. (General Education Code(s): E.) *A. Arondekar*

150. Women's Culture. S

Philosophical, historical, and aesthetic implications of women's consciousness of social reality. Both the sexual

division of labor and the subordination of women in society give rise to distinctive categories of thought. Course objectives: locate and consider these categories of thought as they are presented in women's expressive culture; redefine culture, beauty, and artistry from a feminist perspective; and propose a praxis for creating and transmitting culture. Prerequisite(s): course 1 or 80C. Enrollment restricted to juniors and seniors. Recommended for students with a background in feminist studies, cultural, and/or ethnic studies. Enrollment limited to 20. *B. Aptheker*

151A. Chicana Feminism. *

Students are introduced to the writings of Chicana feminists to identify the gender issues that produce conflict and cooperation in their communities. The course also makes linkages to gender issues in other U.S. communities of color and Latin America. (Formerly course 157A.) (Also offered as Psychology 157. Students cannot receive credit for both courses.) Prerequisite(s): courses 1 or 80C or Psychology 3. (General Education Code(s): E.) *A. Hurtado*

151B. Advanced Topics in Chicana Feminism. *

Course is a continuation of course 151A which introduces students to the writings of Chicana feminists to identify the gender issues that cause conflict and cooperation in their communities. The seminar format allows students an opportunity for extensive discussion. (Formerly course 157B.) (Also offered as Psychology 159K. Students cannot receive credit for both courses.) Prerequisite(s): courses 1, 80C, 100, or 151A or Psychology 1, 40, or 157A, or consent of instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 30. *A. Hurtado*

168. Topics in Feminist Philosophy. W

Topics in feminist philosophy, which may include: the nature of feminist philosophy, feminist approaches to philosophical issues, social and political philosophy, theories of knowledge, ethics, aesthetics, and science, technology, and medicine studies. Presupposes some familiarity with philosophy or feminist scholarship. (Also offered as Philosophy 147. Students cannot receive credit for both courses.) *J. Hoy*

185. Psychoanalysis and Feminism. *

Introduction to Freudian and Lacanian theories of sexuality and the construction of the self as well as to feminist critiques and rewritings of those theories. An attempt is made to place psychoanalytic theory in socioeconomic, racial, and colonialist contexts. Appropriate prior work in theory is recommended as preparation. Enrollment restricted to juniors and seniors. Enrollment limited to 25. *H. Moglen*

189. Advanced Topics in Feminist Theory. *

Focus on a particular problem in feminist theory. Problems vary each year but might include theorizing the gendered subject, racializing gender, the meeting points of psychoanalysis and social-political analysis in theorizing gender, the relationship between queer theory and feminist theory, postcolonial feminist theory. Prerequisite(s): course 100. Enrollment restricted to juniors, seniors, and graduate students. Enrollment limited to 20. May be repeated for credit. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) *The Staff*

193. Field Study. F,W,S

Individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor. Students

submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Senior Seminar.

Discussion classes providing a broad overview of some general "area of concentration." Discussion of assigned readings, focus on oral presentations, and a final 20- to 25-page paper. Satisfies the senior comprehensive requirement in feminist studies. Enrollment limited to 20.

194A. Feminist Jurisprudence. *

Approaches legal reasoning from a feminist and intersectional perspective with attention to structures and jurisdiction, case materials, and emerging international frameworks for gender justice. Designed to facilitate completion of a substantial research essay based in feminist legal philosophy. Instructor permission required to enroll. Prerequisite(s): course 112 or Politics 112. Enrollment restricted to senior feminist studies majors. Enrollment limited to 20. *G. Dent*

194D. Feminist Science Studies. S

Examines different feminist approaches to understanding the nature of scientific practices. Particular attention paid to notions of evidence, methods, cultural and material constraints, and the heterogeneous nature of laboratory practices. Considers the ways in which gender, race, and sexuality are constructed by science and how they influence both scientific practices and conceptions of science. Also examines the feminist commitment to taking social factors into account without forfeiting the notion of objectivity. Prerequisite(s): course 1 or 80C; and course 100. Enrollment restricted to senior feminist studies majors. Enrollment limited to 20. *K. Barad*

194E. History of Sexuality. *

Explores one of the central texts of dialogue and contestation in sexuality studies today: Michel Foucault's *The History of Sexuality*. Considers the epistemic challenges outlined in Foucault's early work and engages its instantiations in the proliferating scholarship on gender, sexuality, and critical race studies. Readings challenge the marginalization of empire in Foucault's work and demonstrate that a history of 19th-century European sexuality must also be a history of race. Interview with instructor required. Enrollment restricted to senior feminist studies majors. Enrollment limited to 20. *A. Arondekar*

194F. Chicana/Latina Cultural Production. *

Traces the intersection between Chicana studies and Latin American studies through transnational forms of cultural production, imaginaries, and empowerment. Analysis of theories of cultural production and discussion of the political salience of culture as a site for resistance, critique, and creativity. Prerequisite(s): course 100. Enrollment restricted to seniors. Enrollment limited to 20. (General Education Code(s): E.) *F. Schaeffer-Grabiel*

194G. Images of Africa. *

Explores questions of colonialism, empire, race, gender, and geopolitics in the proliferating images—filmic, televisual, and media—of Africa in the United States. Facilitates the completion of a substantial research essay based on the study of popular culture. Enroll-

ment restricted to seniors. Prerequisite(s): course 100; enrollment by permission of instructor. Enrollment limited to 20. *G. Dent*

194I. Feminist Oral History and Memoir. *

Designed to train students in oral history and memoir writing. Emphasizes the specialness of transgressive voices; race, class, and sexuality, women's silence, erasure, censorship, and marginalization are addressed. The politics of memory, narratives, storytelling, and editorial judgment are considered. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 1 or 80C; and course 100. Enrollment restricted to senior feminist studies majors. Enrollment limited to 20. (General Education Code(s): W.) *B. Aptheker*

194J. Advanced Feminist Philosophy. *

Focuses on issues in epistemology and ontology: the construction of knowledge and objectivity, rationality and emotions, subjectivity and personal identity, and the body and sexuality. (Also offered as Philosophy 190T. Students cannot receive credit for both courses.) Prerequisite(s): course 100 or 168. Enrollment limited to 20. *J. Hoy*

194M. Empire and Sexuality. *

Explores the production of sexualities, sexual identification, and gender differentiation within multiple contexts of colonialism, decolonization, and emerging neo-colonial global formations. (Formerly course 118.) Prerequisite(s): course 100 or 145. Enrollment restricted to senior feminist studies majors and to graduate students. Enrollment limited to 20. (General Education Code(s): E.) *A. Arondekar*

194N. Gender, Class, and Sex in Shanghai. W

Focusing on Shanghai, course examines issues of gender, class, and sex in modern urban Chinese history. Given Shanghai's history as a treaty port, particular attention paid to ways in which its semi-colonial status inflected the articulation of gender identities, class formations and issues of sexuality (particularly sexual labor). Also looks at Shanghai during the Maoist period and in the context of more contemporary economic reforms. (Also offered as History 194A. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; and course 80C, or History 140C, or History 140D, or History 140E, or permission of instructor. Restricted to junior and senior feminist studies majors. Enrollment limited to 20. (General Education Code(s): W.) *Emily Honig*

194P. Religion, Gender, and Politics. W

Addresses the relationship between religious identities and movements, gender and sexuality, and feminism. Analyzes how media discourses, popular culture, and scholarly writing represent the role of religion and gender in shaping contemporary geopolitics. Prerequisite(s): courses 1 and 100. Enrollment restricted to senior feminist studies majors. Enrollment limited to 20. *N. Atanasoski*

194R. Global Health and Reproduction. F

Examines the institutions and discourses of global health and reproduction from a perspective informed by feminist reimagining of the relationship between the body and society, with special focus on links between conceptions of health and international development projects. Prerequisite(s): courses 1 and 100. Enrollment restricted to senior feminist studies majors. Enrollment limited to 20. *The Staff*

195. Senior Thesis or Project. F,W,S

The senior thesis/project which satisfies the major requirement. Course is for independent research and writing. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; students submit petition to sponsoring agency. May be repeated for credit. (General Education Code(s): W.) *The Staff*

196. Feminist Methods of Teaching. F

Practicum for undergraduates assisting in the teaching of course 1, *Introduction to Feminisms*, to conduct sections and evaluate student papers. A weekly seminar considers issues relating to experiential and critical thinking, authority in the classroom, effective facilitation of group process, racial diversity, violence against women. Prerequisite(s): interview with instructor the quarter before course is offered and course 1 or 80C. Students must be upper-division and have a background in feminist studies and/or ethnic studies. Enrollment limited to 25. *B. Aptheker*

198. Independent Field Study. F,W,S

Provides for individual study program off campus for which faculty supervision is not in person. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for individual study program off campus for which faculty supervision is not in person. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual directed study for upper-division undergraduates. Students submit petition to sponsoring agency. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual directed study for upper-division undergraduates. Students submit petition to sponsoring agency. *The Staff*

Graduate Courses**201. Topics in Feminist Methodologies. ***

Explores feminist theorizing across disciplinary and cultural contexts for both methodology (theories about the research process) and epistemology (theories of knowledge). Goal is to orient students toward changes in organization of knowledge and provide them with different feminist methodologies in their pursuit of both an "object" of study and an epistemology. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *A. Arondekar*

203. Feminist Pedagogies. *

Examines feminist pedagogies as projects in transgressing traditional disciplinary boundaries. Examines historical examples of alternative pedagogies and contemporary models for creating communities dedicated to social justice. Designed to assist graduate students develop teaching strategies in multiple fields. Enrollment restricted to graduate students. Enrollment limited to 15. *B. Aptheker*

205. Feminism, Nationalism, and Sexuality in the Third World. *

Focus on the historical construction and articulation of feminism in the Third World. Explores the relationship of feminist and nationalist movements, considering such questions as whether Third World women's political movements are necessarily "feminist," how these political movements define feminism, and the tensions between nationalisms and feminisms. Particular attention to issues

of sexuality, the effects of colonial institutions and policies on sexual identities in Third World countries, the notions of womanhood and female sexualities articulated within nationalist ideologies and movements, the consequences of such constructions for women, and the formulation of sexual issues among feminists. Offered every two or three years. Enrollment restricted to graduate students. Enrollment limited to 15. *E. Honig*

206. Feminism and Psychoanalytic Theory. *

After studying essays by Freud, Lacan, and Melanie Klein which have been central to the construction of feminist theory, considers the writings of such feminist theorists as Jessica Benjamin, Judith Butler, Julia Kristeva, Juliet Mitchell, Jaqueline Rose, Carolyn Steedman, and Maria Torok. Enrollment restricted to graduate students or seniors with permission of instructor, based on narrative evaluations and sample essays. Enrollment limited to 15. *H. Moglen*

207. Topics in Queer/Race Studies. *

Explores the interrelated epistemological frameworks of critical race studies and queer studies. Through the study of a range of philosophical, scientific, literary, and cinematic texts, course historicizes and theorizes discourses of race and sexuality. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Arondekar*

211. Sexuality, Race, and Migration in the Americas. *

Analyzes the ways transnational processes intersect with changing notions of gender, sexuality, and race. Examines processes such as tourism, the Internet, capitalism, and labor spanning Brazil, the Dominican Republic, and the United States. Enrollment restricted to graduate students. Enrollment limited to 15. *F. Schaeffer-Grabiell*

212. Feminist Theory and the Law. *

Interrogation of the relationship between law and its instantiating gendered categories, supported by feminist, queer, Marxist, critical race, and postcolonial theories. Topics include hypostasization of legal categories, the contest between domestic and international human rights frameworks, overlapping civil and communal codes, cultural explanations in the law, the law as text and archive, testimony and legal subjectivity. (Also offered as History of Consciousness 212. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *G. Dent*

214. Topics in Feminist Science Studies. W

Graduate seminar on feminist science studies. Topics will vary and may include: the joint consideration of science studies and poststructuralist theory; the relationship between discursive practices and material phenomena; and the relationship between ontology, epistemology, and ethics. Enrollment restricted to graduate students. Enrollment limited to 15. *K. Barad*

225A. Theories of Slavery. *

Explores philosophical, legal, and socio-historical analyses of slavery. Focus on Atlantic slavery and the production of race and gender formations, complemented by discussion on contemporary forms of slavery. Impact of historical slavery on prevailing discourses and institutions. (Also offered as History of Consciousness 205A. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

225B. Theories of Slavery. *

Writing-intensive course based on readings in History of Consciousness 205A and Feminist Studies 225A. (Also offered as History of Consciousness 205B. Students cannot receive credit for both courses.) Prerequisite(s):

course 225A or History of Consciousness 205A. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

232. Topics in Postcolonial Studies. S

Variable topics that could include postcolonial approaches to questions of epistemology and knowledge production, theories of nationalism and nation-state formation, subaltern historiography, analyses of modernization and developmental theory, postcolonial approaches to globalization, and transnationalism. Significant component of feminist contributions to these literatures. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Arondekar*

240. Culture and Politics of Human Rights. *

Examines the role of feminist activism and jurisprudence in the expansion of human rights since the *Universal Declaration of Human Rights*. Addresses challenges of accommodating women's specificity within international human rights law. Focus on application of international and regional human rights conventions and new human rights standards. (Formerly *Feminism and the Culture and Politics of Human Rights*.) (Also offered as Latin American&Latino Studies 240. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *R. Fregoso*

251. Feminist Theory and Social Psychology. *

Course bridges feminist theory and social psychological research to explore connections between theory covered and empirical studies on various topics in social psychology. Seminar format allows students opportunity for extensive discussion. (Also offered as Psychology 251. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *A. Hurtado*

264. The Idea of Africa. W

Examines the position of Africa in cultural studies and the simultaneous processes of over- and under-representation of the continent that mark enunciations of the global and the local. Themes include defining diaspora, the West as philosophy, and Africa in the global economy. (Also offered as History of Consciousness 264. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *G. Dent*

297. Independent Study. F,W,S

Independent study and research under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

Film and Digital Media

101 Communications Building
(831) 459-3204
film@ucsc.edu
<http://film.ucsc.edu>

Faculty and Professional Interests**Professor**

SHARON DANIEL
Community-based public art in information and communications environments, social and political aspects of information technology, community networks, participatory culture, digital inclusion, net art, human-computer interface design

ELI E. HOLLANDER

Film and video directing; ethnographic documentary directing, editing, cinematography, and videography; digital image generation; screenwriting

CHARLES L. LORD

Film and video directing and editing, video theory and history, video installation, screenwriting, documentary production

MARGARET MORSE

Digital and electronic media theory and criticism, media art, media history, technology and culture, film history and theory, German cinema, documentary, science fiction, and silent comedy

SHELLEY STAMP

Film history, theory, and criticism; silent cinema; women's filmmaking; film censorship; histories of moviegoing; feminist approaches to cinema

Associate Professor**LAWRENCE ANDREWS**

Film, video, installation and media art

AMELIE HASTIE

Film theory and history, feminist film and television studies, Chinese cinemas, issues of authorship, interdisciplinary approaches

WARREN SACK

Software design and media theory

GUSTAVO VAZQUEZ

Film and video production, directing drama, documentary and experimental cross-cultural experiences in film, film curator

Assistant Professor**CAETLIN BENSON-ALLOTT**

Distribution studies; technology and culture; film history and theory; new media studies; queer and feminist theory; horror.

DAVID CRANE

Film and media theory, discourses on technology, digital culture, experimental media, critical and psychoanalytic theory

IRENE GUSTAFSON

Producing across the boundaries between "theory" and "practice," non-fiction, gender and queer studies, production design

L. S. KIM

Television history and theory, racial discourse, feminist criticism, Asian-American media production, industrial practices and social change in both mainstream Hollywood and alternative media

PETER LIMBRICK

International cinemas; intersections of race, gender, and sexuality; theories of globalization, transnationalism, and postcoloniality; queer theory

IRENE LUSZTIG

Film and video production, experimental documentary, ethnographic film, autobiographical film, editing

YIMAN WANG

Film history and theory; colonial/semi-colonial/postcolonial/postsocialist modes of media production and exchange; border-crossing film remakes; silent cinema; translation theory and cinema; acting theory/practice and ethnic star studies; transnational connections and ramifications of Chinese cinema and documentary; cybernetic fan culture

**Professor****JULIANNE BURTON-CARVAJAL, Literature**

Twentieth- and 21st-century Latin(o) American visual media, particularly film; melodrama as a transnational form; gender and authorship; history, cultures, and representations of California, particularly the Central Coast

TERESA DE LAURETIS, History of Consciousness

Semiotics, psychoanalysis, feminism, film theory, literary theory, queer studies

ROSA LINDA FREGOSO, Latin American and Latino Studies

Cultural studies, transnational feminist theories, Chicano/a and Latino/a cinema, issues of human rights and gender violence

HERMAN S. GRAY, Sociology

Cultural studies, media and television studies, black cultural politics, social theory

DONNA J. HARAWAY, History of Consciousness and Feminist Studies

Feminist theory, cultural and historical studies of science and technology, relation of life and human sciences, human-animal relations, and animal studies

B. RUBY RICH, Community Studies

Documentary film and video, post-9/11 culture, new queer cinema, feminist film history, Latin American and Latino/a cinema, U.S. independent film and video, the essay film, the politics of film festival proliferation and the marketing of foreign films in the U.S.

Associate Professor**DAVID S. MARRIOTT, History of Consciousness**

Literary theory, psychoanalysis, black cultural theory and philosophies of race, literary and visual cultures of modernism

RENEE TAJIMA-PEÑA, Community Studies

Documentary film and video focusing on Asian American and immigrant communities, media, and social change

Program Description

The film and digital media major at UCSC offers an integrated curriculum involving theory, criticism, and cultural analysis, as well as a production program in the aesthetics and techniques of film and digital media. This bachelor of arts degree program provides students with the critical skills, theoretical concepts, and historical knowledge necessary to conduct informed analysis of cinema, television, video art, and new media, along with the up-to-date technical knowledge, practical skills, and artistic contexts needed for the production of film, video, and digital media. The major provides a course of study that develops an understanding of moving image and digital media as essential tools of communication and artistic practice.

Students in the general film and digital media major develop an understanding of major movements in world cinema and different aesthetic approaches to the medium, while studying the cultural impact of television and the rise of video and digital art in recent decades. The critical studies concentration is designed for film and digital media majors who have a special aptitude for and interest in the history and theory of film, television, video, and digital media. This rigorous program can help prepare undergraduates for graduate work in critical studies. Students in the highly selective production concentration are encouraged to demonstrate technical proficiency and creative vision in film and digital media production while also studying the histories and theories of these media.

Students in all facets of the major acquire skills in media analysis while maintaining a broadly based liberal arts perspective. The UCSC program is interdisciplinary, combining theory and practice in film, video, and digital media with study in other areas of the arts, humanities, and social sciences that help students understand the role these media play in society.

As the technologies of film and video have merged with digital computer-based moving images and interactive media, and as digital media continues to expand into everyday experience, students in the major are uniquely positioned to excel in these fields. Graduates of the UCSC film and digital media program have enjoyed considerable success both in the professional world and in gaining admission into top graduate schools in the field.

Students enrolled in film and digital media production classes have access to audio, video, and digital production and postproduction equipment. Facilities include a digital media lab; audio recording studio, sound stage with green screen; digital nonlinear editing rooms; video format conversion rooms; a computerized sound effects library; and student equipment checkout. Additionally, computer laboratories equipped for digital image manipulation, web authoring, and interactive interface design and viewing rooms are available. The critical studies facilities include classrooms equipped for high-end film, video, and data projection. The library holdings in film and video history, theory, and literature are complemented by a large collection of films, videos, laser disks, and DVDs, including a diverse range of international feature films, experimental film and video work, animation, silent films, and documentaries.

Some courses offered by the Film and Digital Media Department are restricted in enrollment; admission is based on completion of prerequisites and other specific written application requirements. Admission to advanced production courses is generally restricted to third- and fourth-year students and is based on the submission of a portfolio of work produced in the introductory production class (Film 170B) and other production workshops.

Upper-division digital media and production studio courses require coursework to be completed on computers. The department recognizes that students often purchase a new computer on their arrival at the university during their freshman year. It is strongly suggested that students who plan to apply for the production concentration wait until their second or third year of studies before making this investment. Delaying the purchase until this time allows a student to have the most up-to-date hardware and the fastest machine at the price they can afford at the moment they enter into the production concentration. Laptop computers are strongly encouraged for our production students, and laptop computers may become required in the near future. Instruction in and software for production courses are based on the Apple OS X platform. Compatibility with the department's operating system for instruction is strongly advised. Students are encouraged to consult with the department office or the web site for list of recommended computers, software packages, range of options, and prices.

Declaring the Film and Digital Media Pre-Major

Students who have completed one lower-division course (20A, 20B, or 20C) with a grade of B- or better may declare the film and digital media pre-major. Pre-majors are expected to complete the requirements to declare the major by the end of their second year. Transfer

students must declare the pre-major no later than their second quarter in residence.

Declaring the Film and Digital Media Major

Prior to declaring the film and digital media major, students must complete Film 20A, and either 20B or 20C, with a grade of B- or better. Film 20A, 20B, and 20C must be taken for a letter grade by students intending to major in film and digital media. Students who have met the B- grade minimum for declaration of the major, may choose to take Film 20P as the third lower-division requirement.

- 20A *The Film Experience*
- 20B *Introduction to Television Culture and Society*
- 20C *Introduction to Digital Media*
- 20P *Introduction to Production Technique*

Students are encouraged to complete the lower-division courses early in their studies so that the petition to major status is accomplished no later than the first quarter of the junior year. Acceptance into the film and digital media major does not constitute acceptance into either the production concentration or the critical studies concentration. Transfer students should consult the Transfer Student section for instructions about declaring the major.

Students who feel that there were extenuating circumstances which prevented them from meeting the requirements for declaring the major may appeal their denial by submitting a letter to the Film and Digital Media Department. The appeal must be filed no later than 15 days after the denial notification was mailed or the 10th day of classes in the quarter of the denial, whichever is later. For further information regarding this process, contact the Film and Digital Media Department.

Program of Study

The general film and digital media major requires three lower-division and 10 upper-division courses in residence and satisfaction of the senior comprehensive requirement. Students must include among these 13 courses at least one upper-division 5-credit course that focuses on diversity (i.e., non-Western; underrepresented ethnicity, gender, or sexual orientation). A list of courses satisfying the department's diversity requirement is available at the department office. Students in the general film and digital media major may apply for admission to the critical studies concentration (see Critical Studies Concentration below) or to the highly selective and competitive production concentration (see Production Concentration below) within the major.

Lower-Division Requirements

Students must take the lower-division classes 20A, 20B, and 20C for a letter grade, and they must earn a B- or better in two of these three lower-division classes (20A and either 20B or 20C) to petition for the major. A third lower-division course is required to satisfy major requirements.

- 20A *The Film Experience*, and two of the following three courses are required for all majors:
- 20B *Introduction to Television Culture and Society*
- 20C *Introduction to Digital Media*
- 20P *Introduction to Production Technique* (cannot be used to satisfy the B- grade minimum)

General Film and Digital Media Major

Students must complete the upper-division core curriculum by completing one course from each of the following five groups in film and digital media:

- 120 *Introduction to Film Theory and Criticism*
- 130 *Silent Cinema* or
- 132A *International Cinema to 1960* or
- 132B *International Cinema, 1960 to Present* or
- 132C *Gender and Global Cinema*
- 134A *American Film, 1930–60* or
- 134B *American Film, 1960–Present*
- 136A *Experimental Film and Video* or
- 136B *History of Television* or
- 136C *Visual Culture and Technology: History of New Media*
- 194A *Film Theory Seminar* or
- 194B *Electronic Media Theory Seminar* or
- 194C *New Media Theory Seminar* or
- 194D *Film History Seminar* or
- 194E *International Cinemas* or
- 194F *Film and the Other Arts: Music and Dance* or
- 194G *New(s) Media* or
- 194S *Senior Seminar: Special Topics*

Five upper-division elective courses are to be chosen from the following:

- up to five additional upper-division history/critical studies courses in film and digital media;
- up to two upper-division courses in film and digital media production (170A, 170B, one from the 171 series, 172, 173, 175, 176, or 177, one from the 178 series);
- Film 150 or 151;
- up to two upper-division courses offered by other departments; course substitutions must be pre-approved by the Film and Digital Media Department.

Film and Digital Media Major Planners

The following are two recommended academic plans for students to complete during their first two years as preparation for the film and digital media major. Plan One is a guideline for students who are committed to the major early in their academic career; Plan Two is for students who are considering the major.

Students who are interested in either the production concentration or the critical studies concentration should seriously consider Plan One to be better prepared for application to production studio classes or the critical studies concentration in their junior year.

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	college core gen ed Film 20A	low-div Fidm* req gen ed (declare pre-major)	low-div Fidm* req gen ed (declare major)
2nd (soph)	Film 120 gen ed	Fidm* critical studies core gen ed	Fidm* critical studies core gen ed

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	college core gen ed	low-div Fidm* req gen ed	low-div Fidm* req gen ed (declare pre-major)

Plan Two			
2nd (soph)	low-div Fidm* req gen ed (declare major)	Fidm* critical studies core gen ed	Fidm* critical studies core gen ed

*film and digital media

Critical Studies Concentration

The critical studies concentration provides a more rigorous pathway through the film and digital media major and offers classes specifically reserved for seniors who have exceptional abilities. Students are eligible to apply for the critical studies concentration in spring quarter of their junior year, provided they have completed FILM 120 and at least three other upper-division critical studies classes. Applicants must already be declared Film and Digital Media majors in good standing.

Students will be asked to submit the following application materials:

- a completed application form
- a one-page statement of purpose
- a sample essay
- copies of narrative evaluations for all courses taken in film and digital media

Application materials and instructions are available at the Film and Digital Media Department office. Student application materials are reviewed by a committee of film and digital media critical studies faculty. Admission to the Critical Studies Concentration will be granted to students who have overwhelmingly excellent evaluations, an outstanding writing sample, and a clear statement of purpose. Students may reapply a second time if not accepted, but not later than the first quarter of their senior year.

Requirements for the Critical Studies Concentration

The critical studies concentration curriculum adds the following requirements to those already established for the film and digital media major. Students are required to take two upper-division electives, rather than the five electives currently required for the film and digital media major. Film 190, an *Advanced Critical Studies Seminar*, replaces the current requirement for one of the Film 194 seminars, and serves as an exit requirement in the major.

Students in the critical studies concentration complete the following required upper-division core curriculum (9 courses):

- 120 *Introduction to Film Theory and Criticism*
- 130 *Silent Cinema* or
- 132A *International Cinema to 1960* or
- 132B *International Cinema, 1960 to Present* or
- 132C *Gender and Global Cinema*
- 134A *American Film, 1930–60* or
- 134B *American Film, 1960–Present*
- 136A *Experimental Film and Video* or
- 136B *History of Television* or
- 136C *Visual Culture and Technology: History of New Media*
- 165A *Film, Video and Gender* or
- 165B *Race on Screen* or
- 165C *Lesbian, Gay and Queer Film and Video* or
- 165D *Asian Americans in Media*
- 187 *Advanced Topics in Television Studies* or
- 189 *Advanced Topics in Electronic and Digital Media Studies*
- 190 *Advanced Critical Studies Seminar*
- 191 *Critical Studies Thesis Preparation Seminar*

- 192 *Student-Directed Seminar* or
195 *Senior Thesis*

Two upper-division elective courses are to be chosen from the following:

- up to two additional upper-division history/critical studies courses in film and digital media;
- one upper-division course in film and digital media production (150, 151, 170A, 170B, one from the 171 series, 172, 173, 175, 176, 177, or one from the 178 series);
- one upper-division course offered by other departments; course substitutions must be pre-approved by the faculty adviser.

Production Concentration

Admission to the production concentration is highly selective, based on promise and accomplishment shown in the student's work. After completing Film 170B, students may apply to the production concentration by submitting works created in Film 170B to a portfolio review conducted at the end of each quarter. These student works are reviewed by a committee of film and digital media production faculty. Application materials and instructions are available at the Film and Digital Media Department office. Students should note that production courses are in high demand and that faculty/student ratios and equipment resources limit the number of applicants accepted into the production concentration. Students may reapply a second time if not accepted. A student accepted into the production concentration who is unable to meet all the requirements for the concentration may instead be able to satisfy the graduation requirements of the general major.

Requirements for the Production Concentration

Students in the production concentration complete the following required upper-division core curriculum (six courses):

- 120 *Introduction to Film Theory and Criticism*
170B *Fundamentals of Film and Video Production*
two of the following production courses:
- 150 *Screenwriting*
151 *Film Directing*
170A *Fundamentals of Digital Media Production*
171A *Special Topics Workshop: Sound*
171C *Special Topics Workshop: Found Footage*
171D *Social Information Spaces*
172 *Film and Video Studio*
173 *Narrative Workshop*
175 *Documentary Video Workshop*
176 *Experimental Video Workshop*
177 *Digital Media Workshop: Computer as Medium*
178A *Personal Computers in Film and Video*
178B *Advanced Personal Computers in Film and Video*

and two critical studies courses—one each from two of the three following groups:

- 130 *Silent Cinema* or
132A *International Cinema to 1960* or
132B *International Cinema, 1960 to Present* or
132C *Gender and Global Cinema*
134A *American Film, 1930–60* or
134B *American Film, 1960–Present*
136A *Experimental Film and Video* or
136B *History of Television* or
136C *Visual Culture and Technology: History of New Media*

and four upper-division elective courses from the following:

- up to two upper-division courses in film and digital media production (150, 151, one from the 171 series, 172, 173, 175, 176, 177, or one from the 178 series);
- at least two upper-division film and digital media history/critical studies courses;
- up to two upper-division critical studies elective courses from another department; course substitutions must be pre-approved by the faculty adviser.

and one course from the following:

- 194A *Film Theory Seminar*
194B *Electronic Media Theory Seminar*
194C *New Media Seminar*
194D *Film History Seminar*
194E *International Cinemas*
194F *Film and the Other Arts: Music and Dance*
194G *New(s) Media*
194S *Senior Seminar: Special Topics*
195 *Senior Thesis*
196A *Senior Project in Film and Video Production*
196B *Senior Project in Screenwriting*
197 *Senior Digital Media Workshop*

Comprehensive Requirement

All seniors in the general film and digital media major or in the production concentration may select one of three options to satisfy the campus exit requirement.

- *Senior seminar*: The senior seminars (courses in the 194 series) are restricted to majors in their senior year and are writing intensive. Students in the general major are required to complete one senior seminar. Students in the production concentration may complete the senior seminar to satisfy the senior exit requirement or as an elective.
- *Senior thesis*: With prior faculty approval, a student may elect to do a *Senior Thesis* (Film 195). The student must contact a faculty member at least one quarter in advance to submit a proposal and to obtain faculty approval for a senior thesis. The proposal may involve writing a screenplay, expanding on a paper from a previously completed upper-division critical studies course in film and digital media, or writing an original paper in a particular area resulting in a work of substantial research.
- *Senior project*: A limited number of students in the production concentration may participate in the senior project (Film 196A or 196B, or 197). Admission is by application, with review of previous works and evaluation of the proposed final project by film and digital media production faculty.

Seniors in the critical studies concentration must complete the following to satisfy the campus exit requirement: Film 190, *Advanced Critical Studies Seminar*

Transfer Students

All transfer students must enroll in at least one lower-division course (20A, 20B or 20C) during their first quarter in residence. Transfer students are encouraged to enroll in 20A during the Summer Session preceding their first quarter in residence. After completion of one lower-division course (20A, 20B or 20C) with a grade of B- or better, transfer students may declare the film and digital media pre-major.

All transfer students must earn a B- or higher in two 20-level courses, Film 20A and either 20B or 20C (at least one must be taken at UCSC) to declare the major. Appeal procedures are the same as for non-transfer students. Three lower-division and 10 upper-division

courses are required for completion of the major. With some lower-division preparation, transfer students should be able to complete the upper-division course work and the major within two years. As preparation, prospective transfer students are encouraged to fulfill at least one lower-division film and digital media major requirement (Film 20 series) through UCSC Summer Session prior to their transfer. Transfer students must petition the department to have equivalent lower-division courses taken at their current institution count toward their UCSC major requirements provided they have earned a B- or higher in that course.

Students who have completed none of the lower-division major requirements prior to transfer to UCSC, students who are interested in graduating with a double major, and students who must finish general education requirements may need additional time to complete their studies.

Transfer students are strongly encouraged to speak with an academic adviser at the department office prior to enrolling in classes to determine their status and to begin the declaration of major process as soon as possible.

Honors

Honors in film and digital media are awarded to graduating seniors whose academic performance in their major coursework is judged by a faculty committee to be consistently excellent to outstanding. Students must also do excellent work on their senior exit requirement. Both narrative evaluations and letter grades will be considered; to be considered for Honors, students must have at least a cumulative GPA of 3.5 in the major or the relative equivalent in narrative evaluations, as determined by the faculty committee.

Minor Requirements

The minor in film and digital media offers a foundation in visual culture and contributes important scholarly techniques of value to other disciplines. Students earn a minor in film and digital media by completing eight courses: two lower-division courses as prerequisites for the minor and six upper-division courses including four from the core curriculum of the general major and two electives. There is no production component in the minor, nor is there a comprehensive requirement.

Lower-Division Requirements

Students must complete at least two lower-division courses prior to petitioning for the minor:

- 20A *The Film Experience*, and one of the following three courses:
- 20B *Introduction to Television Culture and Society*
20C *Introduction to Digital Media*
20P *Introduction to Production Technique*

Requirements for the Minor

Students in the minor must complete the upper-division core curriculum by completing one course from each of the following four categories in film and digital media:

- 120 *Introduction to Film Theory Criticism*
130 *Silent Cinema* or
132A *International Cinema to 1960* or
132B *International Cinema, 1960 to Present* or
132C *Gender and Global Cinema*
134A *American Film, 1930–60* or
134B *American Film, 1960–Present*
136A *Experimental Film and Video* or
136B *History of Television* or

136C *Visual Culture and Technology: History of New Media*

Two upper-division elective courses to be chosen from the following: Any two additional upper-division film and digital media history/critical studies courses other than production studio courses (170A through 178A, and 178B) that have not been used to satisfy the above core curriculum. One of the electives may be substituted from another department or institution. Course substitutions must be approved by the Film and Digital Media Department.

Lower-Division Courses

20A. The Film Experience. F,S

An introduction to the basic elements, range, and diversity of cinematic representation and expression. Aesthetic, theoretical, and critical issues are explored in the context of class screenings and critical readings. Students are billed a course fee. Enrollment restricted to first-year students, sophomores, and juniors. (General Education Code(s): IH, A.) *P. Limbrick, The Staff*

20B. Introduction to Television Culture and Society. W

Introduction to the basic forms of televisual presentation, including differing narrative structure from movies and situation comedies to soap opera, plus modes of direct discourse in news, advertising, sports, music, television, and other genres. Alternative forms and modes in electronic media, such as independent video art and documentary, public television, cable, and electronic networks are explored, with their potential for expressing cultural diversity set in relation to social, cultural, and political conditions. Students are billed a course fee. Enrollment restricted to first-year students, sophomores, and juniors. (General Education Code(s): IH, A.) *L. Kim*

20C. Introduction to Digital Media. F

Introduces fundamental features of digital media and examines the immense visual, social, and psychological impact of the "digital revolution" on our culture. Topics include the concepts and forms of the digital hypertext interface, Internet, and web, and the impact of digital media on conceptions of the self, body, identity, and community. Students are billed a course fee. Enrollment restricted to first-year students, sophomores, and juniors. (General Education Code(s): IH, A.) *W. Sack*

20P. Introduction to Production Technique. F,S

Introduction to production process with emphasis on low-budget, independent film and video making. Explores conceptualization, planning, shooting, editing of documentary, personal essay, and feature narrative works. Emphasis on visualization and shooting style, and scriptwriting, but not hands-on editing. Open to students of varied backgrounds and goals. Students are billed a course fee. (General Education Code(s): A.) *I. Lusztig, I. Gustafson*

42. Student-Directed Seminar. F,W,S

Seminars on selected topics taught by upper-division students under faculty supervision (see course 192). Students submit petition to sponsoring agency. *The Staff*

80A. Technothrillers. F

Examination of recent films classified as "thrillers" that approach technology (computers, robotics, biotech, the Internet, etc.) through suspense, anxiety, and paranoia. It will also address how technologically produced popular culture negotiates attitudes towards technological change.

Students are billed a course fee. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *D. Crane*

80S. Special Topics in Film and Digital Media. S

Study of selected aspects of film, television, and/or digital media. Includes weekly screenings and historical/theoretical readings. May be repeated for credit. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *C. Benson-Allott, A. Hastie*

Upper-Division Courses

120. Introduction to Film Theory and Criticism. F

An introduction to classical and contemporary film theory and those theoretical paradigms and methods that have illuminated the media: formalism, realism, structuralism, semiotics, psychoanalysis, Marxism, feminism, and issues of identity and difference. Students are billed a course fee. Prerequisite(s): course 20A, satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to film and digital media majors, pre-majors, and minors during priority enrollment; may be opened if space allows. (General Education Code(s): W.) *A. Hastie*

130. Silent Cinema. *

Presents the development of silent film as a cultural form from the early period to the beginning of sound, addressing its historical evolution, technological development, aesthetic transformations, and varied cultural contexts. Students are billed a course fee. Usually offered in alternate academic years. Prerequisite(s): course 20A. *S. Stamp*

132A. International Cinema to 1960. F

A survey of significant developments in narrative film outside Hollywood from the advent of sound technology to the late '50s. Differing inter/national contexts, theoretical movements, technological innovations, and major directors are studied. Students are billed a course fee. Usually offered alternate academic years. Prerequisite(s): course 20A. (General Education Code(s): A.) *P. Limbrick*

132B. International Cinema, 1960 to Present. *

A survey of significant developments in narrative film outside Hollywood from 1960 to the present. Major film movements and directors from around the world are studied. Students are billed a course fee. Usually offered in alternate academic years. Prerequisite(s): course 20A. (General Education Code(s): A.) *P. Limbrick*

132C. Gender and Global Cinema. S

Offers students historical and critical tools to investigate global film through the framework of gender. Focused in particular on contemporary film (from 1960 to present), the class is structured both chronologically and via national industries. Students cannot receive credit for this course and Latin American and Latino Studies 80I. Students are billed a course fee. Prerequisite(s): course 20A. (General Education Code(s): E.) *Y. Wang*

134A. American Film, 1930–1960. W

A survey of American narrative cinema from 1930 to 1960. Examines developments in film style, film technology, and the film industry in relation to American cultural history. Students are billed a course fee. Prerequisite(s): course 20A or 20B. Offered in alternate academic years. *S. Stamp*

134B. American Film, 1960–Present. *

A survey of American narrative cinema from 1960 to the present. Examines developments in film style, film technology, and the film industry in relation to

American cultural history. Students are billed a course fee. Prerequisite(s): course 20A or 20B. Offered in alternate academic years. *The Staff*

136A. Experimental Film and Video. S

A survey of various experimental styles and practices in film and video, addressing the historical developments of these media formats. The course situates experimental film and video work within the larger contexts of artistic traditions as well as networks of production and reception. Students are billed for a course fee. Prerequisite(s): course 20A. (General Education Code(s): A.) *D. Crane*

136B. History of Television. *

Survey of the historical development of broadcast television from its origins to the present day phenomena of cable, satellite, and electronic networks. Examination of major genres, forms, and modes of production and consumption within cultural, social, and economic contexts. Offered every other year, alternating with course 136A. Students are billed for a course fee. Prerequisite(s): course 20B. (General Education Code(s): A.) *L. Kim*

136C. Visual Culture and Technology: History of New Media. W

Explores the relationship between technology and change and surveys the history of various technologies of visual culture from print to computer based imagery and the Internet. Students are billed a course fee. Prerequisite(s): course 20C. *C. Benson-Allott*

142. Beyond Cybernetics: Advanced Topics in New Media Technologies. *

Analysis of the effects of communication and information technologies on culture and cultural production through the study of systems and networks. Assignments may include papers, Internet presentations, development/participation in virtual communities, interactive multimedia. Emphasis on advanced critical and experimental approaches. Students are billed a course fee. Prerequisite(s): course 20C. Enrollment restricted to film and digital media majors. Enrollment limited to 40. *S. Daniel, L. Andrews*

150. Screenwriting. F

Problems in writing for film and television are explored through the writing of original material and analysis of existing works. Various film genres, conventions, and styles, both fictional and nonfictional, are examined. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Admission by application process which may begin prior to start of quarter; application materials generally available final week of preceding quarter. See enrollment conditions section in quarterly *Schedule of Classes* for application dates and other application instructions that may apply. May be repeated for credit. (General Education Code(s): W.) *E. Hollander*

151. Film Directing. F

Workshop that explores the director's involvement in film and video production. Topics will include the manipulation of time and space, continuity, script planning and blocking, and working with actors and crew. Students will participate in group and individual exercises in pre-production and scene direction. Prerequisite(s): courses 20A, 20P, and/or 170B are recommended. Admission by application process which may begin prior to the start of the quarter; application materials generally available final week of preceding quarter. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Enrollment limited to 30. (General Education Code(s): A.) *G. Vazquez*

152. Script Analysis. F

Students analyze diverse narrative techniques, dramatic structures, and genre forms to understand the craft of screenwriting and prepare for their own creative writing and filmmaking. Students read finished scripts and view films. Prerequisite(s): course 120. Enrollment restricted to film and digital media majors and film and digital media pre-majors. Enrollment limited to 25. *H. Dam*

160. Film Genres. F,S

Concentrated study of films from one cinematic grouping with similar themes and narrative structures such as westerns, musicals, or science fiction, or a comparative study of different genres. History, theory, and criticism of the genre are covered. Students are billed a course fee. Prerequisite(s): course 132A, 132B, 132C, 134A or 134B. May be repeated for credit. (General Education Code(s): A.) *B. Faunce, S. Stamp*

161. Documentary Film and Video. F

Explores the category of nonfiction through a historical and theoretical study of documentary in film and video. Addresses ethnographic film, Soviet and Griersonian documentary, cinema verité and/or other selected documentary texts and the issues of representation they raise. Students are billed a course fee. Prerequisite(s): course 20A or 20B. Offered in alternate academic years. *I. Gustafson*

162. Film Authors. W

Intensive critical study of the work of one film auteur (director, screenwriter, actor, cinematographer). Themes, style, and structure are explored using various critical modes of analysis. Students are billed a course fee. Prerequisite(s): course 120. May be repeated for credit. *Y. Wang*

162A. Cinema and History: Film Author Satyajit Ray. *

Satyajit Ray is widely acclaimed as a master of world cinema. Course considers his work to examine "authorship" at multiple levels: the cultural, historical, social, and familial contexts and the relationship of his film to fiction, the politics and poetics of his vision, and its relationship to colonial, nationalist, and postcolonial India. Also studies the question of gender and the underclass. (Also offered as History 148. Students cannot receive credit for both courses.) (General Education Code(s): E.) *The Staff*

165A. Film, Video, and Gender. *

A study of texts, theories, and issues of gender in film and/or video. Changing focus on one or more topics, including production and authorship, representation, reception, theories of identification, sexual preference, and related issues. Students are billed a course fee. Usually offered in alternate academic years. Prerequisite(s): course 20A or 20B. (General Education Code(s): A.) *I. Gustafson*

165B. Race on Screen. S

Review of historical and critical tools to interpret representations of race on cinematic, television, and computer screens. Class will consider the place of race in theoretical and historical scholarship and examine the debates about race produced within and across film and digital media. Students are billed a course fee. Usually offered in alternate academic years. Prerequisite(s): course 20A or 20B. (General Education Code(s): E.) *The Staff*

165C. Lesbian, Gay, and Queer Film and Video. *

An overview of homosexuality in American film. Explores a baseline Hollywood homophobia and the formal and historical attempts to change it. Recent independent queer film and video discussed. Topics include authorship, spectatorship, genre and genre reappropriation,

historical gender constructs, the "art" film, mainstream vs. independent production, the relationship of film to popular music. Students are billed a course fee. Usually offered in alternate catalog years. *I. Gustafson*

165D. Asian Americans and Media. *

Examines media representations about, as well as by, Asian Americans. Using critical essays on film theory, racial studies, feminist criticism, and independent cinema, students develop the skills necessary to conduct critical analysis of Asian Americans in film and television. Students are billed a course fee. Enrollment restricted to juniors and seniors. (General Education Code(s): E.) *The Staff*

168. National Cinema and Culture. F,W,S

Study of a specific cinematic or other media tradition of a region, nation, language, diasporic collectivity or other unifying cultural entity. Not a survey, this course selects one focus or offers a comparative of cross-cultural framework. Students are billed a course fee. Prerequisite(s): course 130, 132A, 132B, or 132C. May be repeated for credit. *The Staff, P. Limbrick, Y. Wang*

170A. Introduction to Digital Media Production. F

Introduction to the conceptual and technical fundamentals of making digital media. Covers principles of digital image manipulation, basic web authoring, and interface design through projects that introduce production techniques and methods. Students are billed for a materials fee. Prerequisite(s): course 20C Enrollment limited to 20. (General Education Code(s): A.) *The Staff*

170B. Fundamentals of Film and Video Production. F,W,S

An introduction to the art and craft of making films and videos. Covers principles of cinematography, videography, editing, production planning, and lighting involving both production and techniques and methods. Students are billed a materials fee. Prerequisite(s): course 20A or 20B and one other film/video and digital media critical studies or history course required. Completion of additional upper-division film and digital media critical studies or history courses improves students' ability to be admitted to this course. Admission by application and entrance essay. Application process may begin prior to start of quarter; application materials generally available final week of preceding quarter. See enrollment conditions section in quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Enrollment limited to 25. (General Education Code(s): A.) *E. Hollander, G. Vazquez, The Staff, C. Lord*

171. Special Topics Workshops.

Study of selected aspects of film, video, and/or digital media production.

171A. Sound. W

The cinematic equation equals images plus sound. What are sound-specific properties? What is the relationship between sound and image? Examines these and other questions through the creation of audio and audiovisual pieces. Students are billed a materials fee. Prerequisite(s): priority given to students who have been accepted into the production concentration. Admission is by application process which may begin prior to the start of the quarter; application materials generally available final week of preceding quarter. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170A or 170B may apply by submitting an application and sample of production

work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 25. *L. Andrews*

171C. Special Topics Workshop: Found Footage. S

Students will consider the practice of "recycling" images perhaps not intended by the original "owner" or "creator." In addition to assigned readings and technical workshops, students produce three video projects and give a presentation on a specific issue or artist/group. Prerequisite(s): course 170A or 170B; priority given to students who have been accepted into the production concentration. Admission is by application process which may begin prior to the start of the quarter; application materials generally available final week of preceding quarter. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170A or 170B may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 25. *G. Vazquez*

171D. Social Information Spaces. *

Investigates how information spaces can be designed to be inhabited, socially navigable spaces. Emphasizes the social navigation of information spaces, a set of techniques and ideas from computer-supported cooperative works, human-computer interaction, and architecture. Prerequisite(s): course 170A. Enrollment limited to 25. *W. Sack*

172. Film and Video Studio. F,W,S

Intermediate workshop in film and video production. Topics include cinematography, sound, and non-linear digital editing techniques. Each student is responsible for the completion of a short project utilizing 16mm film or video. Students must bear the cost of materials and are billed a materials fee. Prerequisite(s): priority given to students who have been accepted into the production concentration. Admission is by application process which may begin prior to start of quarter; application materials generally available final week of preceding quarter. See enrollment conditions section in quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170A or 170B may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 25. *G. Vazquez, I. Lusztig, E. Hollander*

173. Narrative Workshop: Reconfiguring Narrative within the Digital Realm. *

Analysis of cinematic codes and narrative structure through digital video, Internet and interactive multimedia projects. Required readings address contemporary research in narratology and hyper-media, exploring the potential of digital technology to reconfigure the role of both author and audience. Students billed a course fee. Prerequisite(s): course 170A. Enrollment limited to 25. *G. Vazquez, L. Andrews*

175. Documentary Video Workshop. F,W

Workshop in documentary video production, development of critical standards, ethical issues, and technical methods. Each student is responsible for the completion of short documentaries for assignments. Students must bear the cost of materials and are billed a materials fee. Prerequisite(s): priority given to students who have been accepted into the production concentration. Admission

is by application process which may begin prior to the start of the quarter; application materials generally available final week of preceding quarter. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170A or 170B may apply by submitting an application and sample of production work at first class meeting; applications will be considered on a space-available basis. Enrollment limited to 25. *C. Lord, E. Hollander*

176. Experimental Video Workshop. S

Introductory workshop in video production (non-narrative, experimental). Topics include a survey of non-narrative experimental video from a historical/theoretical perspective and an introduction to videography, fundamentals of video editing, and sound. Students complete several short projects and are billed a materials fee. Students must bear the cost of all materials. Prerequisite(s): course 170B; priority given to students who have been accepted into the production concentration. Admission is by application process which may begin prior to the start of the quarter; application materials generally available final week of preceding quarter. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170B may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 25. (General Education Code(s): A.) *C. Lord*

177. Digital Media Workshop: Computer as Medium. W

Introduction to the computer as a medium as well as a tool. Students explore art practice within digital imaging and information and communications environments through projects, readings, and "screenings." Assignments may include designing virtual communities and / or interactive, multimedia web works. Students are billed a course fee. Prerequisite(s): course 170A. Enrollment limited to 25. *The Staff*

178A. Personal Computers in Film and Video. W

Introduction to the specific applications of computers for film and video. By using computer-generated, enhanced and imported graphics, animation, text, sound, and moving video, students create still and time-based works in a computer environment. Prerequisite(s): course 170B; priority given to students who have been accepted into the production concentration. Admission is by application process which may begin prior to start of quarter; application materials generally available final week of preceding quarter. See enrollment conditions section in quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170B may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Students are billed a materials fee. Enrollment limited to 20. *L. Andrews*

178B. Advanced Personal Computers in Film and Video. *

Study of advanced computer tools in digital media, including exploration, creation, and manipulation of sound with the same level of complexity as required in composing the moving image. Students produce a final project that demonstrates skills learned. Prerequisite(s): course 170A; priority given to students who have been

accepted into the production concentration. Admission is by application process which may begin prior to the start of the quarter; application materials generally available final week of preceding quarter. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions that may apply. Students who are not in the production concentration and who have completed course 170A may apply by submitting an application and sample of production work at first class meeting; these applications will be considered on a space-available basis. Enrollment limited to 20. *The Staff*

180. Writing About Film, Television, and Digital Media. S

Improves students' ability to write and edit, and invites students to explore different kinds of writing related to film, television, and digital media including historical, theoretical, cultural criticism, popular reviews, grant proposals, online forums, and publishing. Prerequisite(s): course 20A, 20B, or 20C. Enrollment restricted to sophomore and junior film and digital media majors. Enrollment limited to 20. *L. Kim*

185. Special Topics in Film and Video.

Study of selected aspects of film and/or video history, theory, or criticism. Students are billed a course fee.

185D. Sound and Image in Theory and Criticism. *

Explores theories and critiques of sound in culture and analyzes sound in relation to media images in film, video, digital media, and music/image practices such as Vjaying. Voice, noise, and music are addressed (but not scores). Students are billed for a course fee. Prerequisite(s): courses 20A and 120. Enrollment restricted to film and digital media majors and minors during priority enrollment; may be opened if space allows. (General Education Code(s): A.) *The Staff*

185E. Chicana/o Cinema, Video. *

Examines emergence of Chicana/o cinema and video from a place of social displacement, resistance, and affirmation. Looks at Chicana/o representation and spectatorship as it pertains to ethnicity, class, gender, and the beginning of a new Chicana/o film aesthetic. Students are billed for a course fee. Prerequisite(s): course 20A. Enrollment limited to 60. (General Education Code(s): E.) *The Staff*

185R. The Film Remake. *

History and theory of the remake through case studies across cultural, gender, and genre boundaries. Examines changing cultural, social, stylistic, and technical values and explores notions of originality, repetition, homage, allusion, quotation, and intertextuality from Feuillade and Hitchcock to Raimi and Johnny To. Students are billed a materials fee. Prerequisite(s): courses 20A and 120. Enrollment restricted to film and digital media majors and minors during priority enrollment; may be opened if space allows. *The Staff*

185S. Advanced Topics in Film Studies. W

Study of a selected aspect of film history, theory, or criticism. Includes weekly screenings and historical/theoretical readings. Usually offered in alternate academic years with rotating topics. Students are billed a materials fee. Prerequisite(s): courses 20A and 120. Enrollment restricted to film and digital media majors and minors. May be repeated for credit. *A. Hastie, C. Benson-Allott*

185X. EyeCandy Seminar. W

Seminar and workshop on writing, producing, and publishing a journal. Students engage in assignments

and exercises directly and indirectly related to the production of a web launch as well as a print copy of *EyeCandy*. Permission of instructor required based upon student's participation in *EyeCandy* in fall and winter quarters. Preference given to film and digital media majors and minors; others may apply based on qualifications and as space allows. Students are billed a materials fee. May be repeated for credit. *The Staff*

187. Advanced Topics in Television Studies. *

Study of a selected aspect of television history, television criticism, or national television. Includes weekly screenings and historical/theoretical readings. Usually offered in alternate academic years, with rotating topics. Students are billed a course fee. Prerequisite(s): course 20B. Enrollment restricted to junior and senior film and digital media majors and minors. May be repeated for credit. *The Staff*

189. Advanced Topics in Digital and Electronic Media Studies. *

Study of a selected aspect of digital and/or electronic media history and criticism. Topics can include virtual environments, electronic networks, video installations, computer games, and hyper-media. Usually offered in alternate academic years. Students are billed a course fee. Prerequisite(s): course 20C. Enrollment restricted to junior and senior film and digital media majors and minors during priority enrollment; may be opened if space allows. May be repeated for credit. *S. Daniel*

190. Advanced Critical Studies Seminar. *

Intensive research and writing on a changing topic chosen to demonstrate critical mastery in a specific area of film and/or digital media studies. Prerequisite(s): course 120. Enrollment restricted to senior film and digital media majors accepted into the critical studies concentration. Enrollment limited to 15. *A. Hastie*

191. Critical Studies Thesis Preparation Seminar. *

Intensive seminar prepares students for writing a critical studies thesis. Designed to be taken prior to enrolling in course 195, seminar guides students through the process of choosing a thesis topic, preparing a bibliography, and drafting a detailed outline. Prerequisite(s): course 190. Enrollment restricted to senior film and digital media majors accepted into the critical studies concentration. Enrollment limited to 15. *S. Stamp*

192. Directed Student Teaching. F,W,S

Teaching a lower-division course under faculty supervision (see course 42). Proposal supported by a faculty sponsor and department. *The Staff*

194A. Film Theory Seminar. F,S

Advanced senior seminar examining classical and contemporary film theory and those theoretical paradigms and methods that have illuminated the medium: formalism, realism, structuralism, semiology, psychoanalysis, Marxism, feminism, and phenomenology. Primary texts are read. Students are billed a course fee. Prerequisite(s): course 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20. *A. Hastie, L. Kim*

194B. Electronic Media Theory Seminar. *

Study of the major theoretical approaches to electronic media and their critical application to texts from television, independent video art and documentary, and electronic networks. Readings include a range of theoretical approaches selected from semiotic, ideological, feminist, cultural studies, reception theory, postmodernist, and other critical traditions. Students are billed a course

fee. Prerequisite(s): courses 20B and 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20. *D. Crane*

194C. New Media Theory Seminar. W

Study of theories of emerging genres of electronic culture, with emphasis on the discourse about computer-assisted and computer-generated forms of art and mass culture such as digital imagery, virtual environments, telematics, hyper- and multimedia, and electronic networks. Students are billed a course fee. Prerequisite(s): courses 20C and 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20. *D. Crane*

194D. Film History Seminar. S

In-depth study of film history investigating developments in cinematic style, technological innovation, and industrial practice against the broad canvas of cultural history. Students will acquire the basic tools necessary to conduct informed film historical research. Students are billed a course fee. Prerequisite(s): course 120 and either 130 or 134A or 134B. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20. *S. Stamp*

194E. International Cinemas. W

In-depth study of the history and theory of international cinemas with changing topics such as globalism and resistance, postcolonial theory, international productions and querying race, the "national," and cinema. Students are billed a course fee. Prerequisite(s): course 120 and either 132A, 132B, or 132C. Enrollment restricted to senior film and digital media majors. Enrollment limited to 16. *P. Limbrick*

194F. Film and the Other Arts. *

Examines the use of artistic media within films and of films that thematically are about other media. What do other art forms allow for—in terms of the story, the film's meaning, the gaze, and the spectator? Students are billed a course fee. (Formerly *Film and the Other Arts: Music and Dance*.) Prerequisite(s): course 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 16. *L. Kim*

194G. New(s) Media. *

Addresses the role of new media technologies in the production, distribution, and reception of the news, especially international news. Examines software and network technologies as amplifying, filtering, extending, and countering the forces of media. Students are billed a course fee. Prerequisite(s): courses 20C and 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 16. *W. Sack*

194S. Special Topics Seminar. S

Intensive research and writing on a changing topic chosen to demonstrate critical mastery in a specific area of film and digital media studies, for example, film adaptations and their literary sources, documentary/reality shows, or networked new media texts. Students are billed a materials fee. Prerequisite(s): course 120. Enrollment restricted to senior film and digital media majors. Enrollment limited to 20. May be repeated for credit. *The Staff*

195. Senior Thesis/Project. F,W,S

An individually supervised course, with emphasis on independent research, to culminate in a senior thesis/project/production. Proposals should be submitted to adviser one quarter in advance. Petition required, approved by instructor and department; thesis petitions available in the department office. *The Staff*

196A. Senior Project in Film and Video Production. W,S

Students accomplish a range of production work including script development, casting, and rehearsing to shooting and postproduction work. Students are billed a materials fee. Admission by application during the preceding quarter. Students may apply a maximum of two times. See the enrollment conditions section in the quarterly *Schedule of Classes* for application dates and other application instructions. Enrollment limited to 18. *I. Gustafson, L. Andrews*

196B. Senior Project in Screenwriting. W

Students write a full-length (75–100 page) screenplay in this seminar while studying structural concepts and character development in selected films. Scheduling, outlining, pitching ideas, and critique are all part of the workshop format of the class. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 150 or another screenwriting course. Interview only; petition required; special application should be submitted to adviser one quarter in advance; see department office for more information. Enrollment restricted to senior film and digital media majors. Enrollment limited to 16. (General Education Code(s): W.) *C. Lord*

197. Senior Digital Media Workshop. S

Independent projects using the computer as a medium as well as a tool. Students will design and implement projects in digital imaging, information, and communications environments. Students' projects may include designing virtual communities, building collaborative networks, and/or interactive, multimedia web works. Students are billed a course fee. Admission by application during winter quarter. See department office for more information. Enrollment limited to 20. *W. Sack*

198. Independent Field Study. F,W,S

Provides for department-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Students engaging in field study must complete application procedures for such study by the fifth week of the previous quarter. Field study may not be used to satisfy major requirements. Petition required, approved by instructor and department; petitions available in the department office. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for department-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Students engaging in field study must complete application procedures for such study by the fifth week of the previous quarter. Field study may not be used to satisfy major requirements. Petition required, approved by instructor and department; petitions available in the department office. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual study in areas approved by sponsoring instructors. Tutorial may not be used to satisfy major requirements. Petition required, approved by instructor and department; petitions available in the department office. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual study in areas approved by sponsoring instructors. Tutorial may not be used to satisfy major requirements. Petition required, approved by instructor and department; petitions available in the department office. May be repeated for credit. *The Staff*

Graduate Courses

222. Critical Methodologies in Film and Television. *

Core course introduces graduate students to critical methodologies in media studies and offers sustained examination of theoretical approaches to media studies. Methodologies may include (but not limited to) contemporary theory (semiotic, psychoanalytic, ideological), cultural studies, intertextuality, feminist film, and television theory. Enrollment restricted to graduate students. Enrollment limited to 14. *A. Hastie*

223. The Film/Video Essay. S

Focuses on "essayistic" approaches to scholarship and production, emphasizing relationships between theory and praxis that this mode of production requires. Enrollment restricted to graduate students. Enrollment limited to 15. *I. Gustafson*

224. Mediating Difference. W

Considers theoretical and strategic, situated "difference" in the era of (semi-)colonialism, post-colonialism, and globalism, examining theoretical writing alongside media works on the topic. Enrollment restricted to graduate students. Enrollment limited to 15. *Y. Wang*

283. New Media Art and Digital Culture. *

A study of new media art in the context of digital culture. Electronic, digital and online technology art are set in critical relation to discourse on history, aesthetics, hypermedia, the interface, hacks, embodiment, robotics, artificial life and other topics. Students are billed a course fee. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Morse*

284. Film, Culture, and Modernity. *

Traces the rise of motion picture culture from the late 19th century through the end of the 1920s, looking at film's emerging visual and narrative grammar, its changing cultural status, and its engagement with shifting registers of class, ethnicity, gender, and sexuality. Enrollment restricted to graduate students. Enrollment limited to 15. *S. Stamp*

297. Independent Study. F,W,S

Either study related to a course being taken or a totally independent study. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. May be repeated for credit. *M. Morse, C. Lord, S. Stamp, L. Andrews*

French

Language Program
239 Cowell College
(831) 459-2054
<http://language.usc.edu>

Faculty and Professional Interests

Professor

CARLA FRECCERO (Literature)
Renaissance studies, French and Italian language and literature, early modern studies, postcolonial theories and literature, contemporary feminist theories and politics, queer theory, U.S. popular culture

PASCAL GAITET (Literature)

Nineteenth- and 20th-century French literature, sociolinguistics, political history, Celine, Genet

SHARON KINOSHITA (Literature)

Intercultural relations in 12th- and 13th-century literature, Mediterranean studies, globalism, postcolonial theory, world literature and cultural studies

RICHARD TERDIMAN (Literature)

Nineteenth- and 20th-century French and European literature and culture, literary and cultural theory, contemporary critical theory, cultural globalization

Lecturer

ANGELA ELSEY

Francophonie, 19th-century French history and civilization, French and Francophone cinema

CHRISTIANE GAUTIER

International and multicultural education; second-language acquisition; language pedagogy and teacher training; educational technology; linguistics; sociolinguistics; French phonetics; 20th-century French culture and civilizations

GRETA HUTCHISON

Foreign language pedagogy, second language acquisition, medieval French literature, and 19th-century literature and art

NORA MEGHARBI

Second and foreign language acquisition, applied linguistics, pedagogical grammar, technology and multimedia, sociolinguistics, TA training, course supervision, business French, scientific French, francophone literature, translation

Program Description

Students interested in acquiring proficiency in French can enroll in language courses from beginning to advanced levels. In addition, students may select from among the following programs: a major in language studies, a major in literature with an emphasis in French literature, or a major in global economics. An individual major in French and Francophone studies is also available to qualified students (see French faculty for details).

Lower-division courses 1-6 are taught entirely in French and prepare students for advanced study either on campus or abroad. They are designed to develop proficiency in aural comprehension, speaking, reading, and writing skills.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Study Abroad

The UC Education Abroad Program offers both semester and one-year programs in many regions of France, including Bordeaux, Lyon, Grenoble, Toulouse, and Paris. With the approval of an adviser, some French courses taken abroad may be applied to major requirements. For more information on the program, see UC Education Abroad Program, page 40.

Lower-Division Courses

1. Instruction in the French Language. F,W,S

Introduction to French language and culture with practice in all four language skills: listening, speaking, reading, and writing. Intended for students with no previous study of French. *The Staff*

2. Instruction in the French Language. F,W,S

Further development of cultural competence and basic French language skills, both written and spoken. Students learn past tenses in this course. Prerequisite(s): course 1 or placement by interview. *The Staff*

3. Instruction in the French Language. F,W,S

Final quarter of first-year sequence. Students complete study of French language basics, including the future tense and the conditional and the subjunctive mood, while continuing to learn about French and Francophone cultures. Prerequisite(s): course 2 or placement by interview. *The Staff*

4. Intermediate French. F,W,S

First course in intermediate sequence. Students review and expand upon their previous study of the language through short literary readings, vocabulary building, grammar study, composition, and discussions. Prerequisite(s): course 3 or placement by interview. (General Education Code(s): IH.) *The Staff*

5. Intermediate French. F,W,S

Further development of intermediate-level oral and written skills through study of vocabulary and structures. Students also read and discuss a French or Francophone play. Prerequisite(s): course 4 or placement by interview. (General Education Code(s): IH.) *The Staff*

6. Intermediate French. F,W,S

Final course of intermediate sequence includes grammar study, vocabulary building, extensive writing, and discussion. Reading of a French or Francophone novel is an integral part of course. Prerequisite(s): course 5 or placement by interview. (General Education Code(s): IH.) *The Staff*

13F. Oral Fluency Through Cultural Study (2 credits). F,W,S

A course for any student beyond level 3, developing oral fluency through discussion of a variety of cultural topics. Listening comprehension and speaking are emphasized through exploration of situations common to France and Francophone countries. May be offered more than once per year. Prerequisite(s): course 3, 4, 5, 6, or placement by interview. May be repeated for credit. *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

111. Stylistics. W

Intensive work in French composition with the aim of attaining grammatical correctness and excellence of expression. May be repeated for credit with consent of instructor. Prerequisite(s): course 6. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. *The Staff*

114. French Phonetics. F

Contrastive analysis of French and English sound systems and their practical application. Intensive conversation. Language laboratory. Prerequisite(s): course 6. Enrollment limited to 20. *The Staff*

125A. French Civilization: 19th Century. S

Survey of the important historical events, social changes, and artistic movements contributing to the development of French culture during the 19th century. Prerequisite(s): course 6. *The Staff*

125B. French Civilization: 20th Century. *

A survey of the important historical events, social changes, and artistic movements contributing to the development of French culture during the 20th century. Prerequisite(s): course 6. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Geology and Geophysics

See Earth and Planetary Sciences, page 176.

German

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Associate Professor

LOISA NYGAARD (Literature)

Eighteenth- and early 19th-century German literature; romanticism; aesthetics and politics of landscape; military theory

Assistant Professor

A. HUNTER BIVENS (Literature)

Twentieth- and 21st-century German literature and film, Marxism and critical theory, psychoanalysis, lyric poetry, literary realism, the novel

Lecturer

WALTER CAMPBELL

Language teaching, 18th- and 19th-century German literature, history of German

JUDITH HARRIS-FRISK

German language and cultural studies; German literature and intellectual history, 1750–present; turn-of-the-century Vienna and Weimar German; German issues of national identity and multiculturalism

Program Description

Students interested in acquiring proficiency in German can enroll in language courses from beginning to advanced levels. In addition, students may select from among the following programs: a major or minor in language studies, a major in German studies, a major in literature with an emphasis in German literature, or a major in global economics.

The sequence of lower-division courses 1–6 is aimed at enabling students to gain proficiency in aural comprehension, speaking, reading, and writing. Another sequence of lower-division courses, equivalent to levels 1, 2, and 3, is courses 1A and 1B, offering accelerated German language instruction. Courses 1A and 1B are taught sequentially, winter and spring quarters. Instruction takes place almost exclusively in German.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Study Abroad

The University of California maintains Education Abroad Program (EAP) centers in Göttingen, Potsdam, and Berlin, Germany. Students may spend fall or spring semesters or a full academic year in Göttingen, a spring semester in Potsdam (beginning German language program or intermediate German language and culture program), or a semester or year in Berlin (regular course of study). Language requirements for admission to these programs range from little or no German required (beginning German program in Potsdam) to one year of college-level German required (intermediate German language and culture program in Potsdam) to two years of college-level German required (regular course study in Göttingen) to three years of college-level German required (regular course study in Berlin). The Potsdam program courses may also be used to fulfill the language requirement for the year-long program in Göttingen. Selected students may continue directly from the spring semester in Potsdam to the one-year program in Göttingen.

Academic and professional internship opportunities are also available to all EAP students in Germany.

Students may apply to any of these programs at any point in their student career. For the year-long programs, students generally apply in their sophomore year for a junior year abroad. As an exception, some students apply in their junior year for a senior year abroad; such students must sometimes spend an additional quarter at UCSC in order to satisfy all requirements for their major. Courses taken abroad can, with approval of an adviser, be applied to major requirements.

For more information on these programs, see UC Education Abroad Program. For information on credit applied to a major, contact the appropriate department.

Lower-Division Courses

1. Instruction in the German Language. F

Teaches beginning-level competence in speaking, reading, writing, and listening comprehension. Elementary sequence (1-2-3) starts in fall quarter only. (An accelerated sequence, course 1A-1B, begins winter quarter.) Not all levels are available each quarter. Check the quarterly *Schedule of Classes* for exact quarter(s) of offering. *The Staff*

1A. Intensive Elementary German. W

Accelerated instruction in elementary German language. Taken in conjunction with German 1B, the two courses are equivalent to levels 1-2-3. Accelerated pace allows a more rapid acquisition of reading, writing, listening, and speaking skills. *The Staff*

1B. Intensive Elementary German. S

Sequential to course 1A, completes the equivalent instruction offered through German 1-2-3. Prerequisite(s): course 1A or 2, or placement by interview. For students completing course 2, course 3 is preferable. *The Staff*

2. Instruction in the German Language. W

Teaches beginning-level competence in speaking, reading, writing, and listening comprehension. Not all levels are available each quarter. Check the quarterly *Schedule of Classes* for exact quarter(s) of offering. Prerequisite(s): course 1 or 1A; or placement by examination. Students interested in a course who have not taken the prerequisites should meet with the instructor prior to the first class meeting. *The Staff*

3. Instruction in the German Language. S

Teaches beginning-level competence in speaking, reading, writing, and listening comprehension. Not all levels are available each quarter. Check the quarterly *Schedule of Classes* for exact quarter(s) of offering. Prerequisite(s): course 2; or placement by examination. Students interested in a course who have not taken the prerequisites should meet with the instructor prior to the first class meeting. *The Staff*

4. Intermediate Studies in German Language. F

Intermediate composition and conversation based on the reading of selected prose and related cultural material. Speaking, reading, writing, and listening comprehension skills are developed by extensive use of media materials. Conducted entirely in German. Not all levels are available each quarter. Check the quarterly *Schedule of Classes* for the exact quarter(s) of offering. Prerequisite(s): course 1B or 3; or placement by examination. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): IH.) *The Staff*

5. Intermediate Studies in German Language. W

Intermediate composition and conversation based on the reading of selected prose and related cultural material. Speaking, reading, writing, and listening comprehension skills are developed by extensive use of media materials. Conducted entirely in German. Not all levels are available each quarter. Check the quarterly *Schedule of Classes* for the exact quarter(s) of offering. Prerequisite(s): course 4; or placement by examination. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): IH.) *The Staff*

6. Intermediate Studies in German Language. S

Intermediate composition and conversation based on the reading of selected prose and related cultural material. Speaking, reading, writing, and listening comprehension skills are developed by extensive use of media materials. Conducted entirely in German. Not all levels are available each quarter. Check the quarterly *Schedule of Classes* for the exact quarter(s) of offering. Prerequisite(s): course 5; or placement by examination. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

119. German Media. W

Articles of current interest in German newspapers, news magazines, and World Wide Web sites are read and discussed. News videos from Germany are viewed and discussed also. Conducted entirely in German. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 5. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

German Studies

Department of History
201 Humanities
(831) 459-2982
<http://history.ucsc.edu/>

Program Faculty

AMY BEAL, Associate Professor, Music
American music, 20th-century music, experimental and improvisatory performance practices, postwar and Cold War culture, German new music festivals and radio stations, piano performance, contemporary music ensemble

A. HUNTER BIVENS, Assistant Professor in Literature
Twentieth- and 21st-century German literature and film, Marxism and critical theory, psychoanalysis, lyric poetry, literary realism, the novel

WALTER CAMPBELL, Lecturer in German Language
Language teaching, 18th- and 19th-century German literature, history of German

MARK CIOC, Professor of History
German history, modern European history, environmental history

JUDITH HARRIS-FRISK, Lecturer in German Language

German language and cultural studies; German literature and intellectual history, 1750–present; turn-of-the-century Vienna and Weimar German; German issues of national identity and multiculturalism

THEO HONNEF, Lecturer in German Literature

JOCELYN HOY, Lecturer, Philosophy
Feminist philosophy, 19th- and 20th-century continental philosophy

DONNA HUNTER, Associate Professor of History of Art and Visual Culture

European painting (especially French) from 1600 to the 1960s; German art and visual culture between the two world wars; art as social practice, portraiture

VIRGINIA JANSEN, Emerita, History of Art and Visual Culture

MARGARET MORSE, Professor, Film and Digital Media

Digital and electronic media theory and criticism, media art, media history, technology and culture, film history and theory, German cinema, documentary, science fiction, and silent comedy

LOISA NYGAARD, Associate Professor of Literature
Eighteenth- and early 19th-century German literature; romanticism; aesthetics and politics of landscape; military theory

Program Faculty Advisers

MARK CIOC, Professor of History

LOISA NYGAARD, Associate Professor of German Literature

Program Description

German studies is a transnational and transdisciplinary major that deals with the various German-speaking regions of central Europe. Whether one thinks of philosophy, music, art, education, religion, or political and social history, German culture has exercised a profound and often decisive influence on Europe. Some of the most important ideological debates in Western culture have arisen in the German-speaking area, and changes in German culture and society have sometimes had devastating effects on world history. Events and political developments of recent years—such as the unification of East and West Germany and the emergence of the German-speaking region of Europe as a major player in world affairs—have had important impacts.

A German studies major provides students with an intellectually diverse program—covering history, history of art and visual culture, literature, and philosophy—in which students and faculty come together in exciting and demanding pursuits.

The German studies major is administered by the History Department. For additional information on curriculum and advising, go to <http://history.ucsc.edu>.

Major Requirements

All students are required to take a total of 10 courses, including a minimum of three courses in German literature and two courses in German history. No more than two of the 10 required courses may be lower-division courses, and no more than two may come from the Germany in a European or World Context list. A minimum of five of the 10 required courses must be taught in German or principally through German-language texts. Language competency to level five is required in order to pursue a German studies major.

All students must complete a senior oral examination (given by two faculty members) or an appropriate senior seminar in literature or history that has been approved by their adviser. The senior seminar must be taken in addition to the other 10 courses required for the major.

Enrollment in a two-credit comprehensive examination preparatory course, History 199F, is required in the same quarter that the senior oral examination will be given. The preparatory course will be taken with the chair of the student's examination committee.

German 5 is a prerequisite for all upper-division courses taught in German. Students are encouraged to take German 1-5 as early as possible in their academic program.

Regular consultation with a program faculty adviser is required.

It is strongly recommended that students spend time in residence in Germany through the University of California Education Abroad Program (EAP) to further enrich their program of study and ensure a command of the language. Students are allowed to transfer up to five courses taken at German universities toward the requirements for the major. However, the five core courses in German literature and history must be taken at UCSC.

Core Courses

German

119 *German Media*

German Literature

- 102 *Introduction to German Literature*
120 *Fear of the Foreign: Xenophobia in German Literature and Culture*
150 *German Romanticism*
155 *German Drama*
159 *German Comedy*
164 *Modern German Fiction*
167 *Modern German Literature and Film*

History

- 172A *German History*
172B *German Film, 1919-1945*
196P *The Holocaust: The Destruction of European Jewry*

History of Art and Visual Culture

136 *German Art, 1905-1945*

History of Consciousness

- 80O *Hitler, National Socialism, and Religion*
123 *Culture in Crisis: Weimar Germany*

Context Courses (sample)

History

- 65A *Medieval Europe, 300-1200*
70A *Modern European History, 1500-1789*
70B *Modern European History, 1789-1914*
70C *Modern European History, 1914-Present*
80W *The Holocaust: The Destruction of European Jewry*
183 *Fascism and Resistance in Italy*

History of Art and Visual Culture

- 164 *Early Medieval and Romanesque Architecture*
165B *Gothic Beyond*
190Q *Portraiture: Europe and America, 1400-1990*

Modern Literary Studies

- 190N *Topics in Modern Literary Studies: Bertolt Brecht*

Philosophy

- 106 *Kant*

108 *19th-Century Philosophy*

110 *Heidegger*

138 *Wittgenstein*

139 *Freud*

Politics

105B *Early Modern Political Thought*

105C *Modern Political Thought*

175 *The New Europe*

176 *International Political Economy*

Global Economics

Students wishing to pursue a course of study in global economics should consult the global economics major under Economics, page 186.

Greek

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Professor

KAREN BASSI (Literature)
Greek and Latin literatures, Greek drama, Hellenistic poetics, feminist interpretation, literary and cultural theory, pre- and early modern studies, historiography

MARY-KAY GAMEL (Literature)
Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

CHARLES W. HEDRICK JR. (History)
Greek and Roman history, epigraphy, historiography, political theory

JOHN P. LYNCH (Literature), Emeritus

Associate Professor

DANIEL SELDEN (Literature)
Afroasiatic languages and literatures, Greek and Latin, Hellenistic culture, the classical tradition, history of criticism, literary theory

Lecturer

GILDAS HAMEL (History)
History of Judaism and Christianity; Hebrew and Greek Bible; classical languages

Program Description

The Language Program offers instruction in elementary Greek for students wishing to pursue a course of study in Attic Greek. It consists of a two-course sequence that begins in the fall quarter only. Students interested in Greek literature should see the course listings under Literature. Those interested in classical studies should see the classical studies program description.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Lower-Division Courses

1. Elementary Ancient Greek. F

Instruction in the grammar of Attic Greek, together with readings, mostly in Plato, designed to prepare for the study of classical literature. The sequence begins in the fall quarter only. *The Staff*

2. Elementary Ancient Greek. W

Instruction in the grammar of Attic Greek, together with readings, mostly in Plato, designed to prepare for the study of classical literature. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Greek Literature

Students wishing to pursue a course of study in Greek Literature should consult the concentration in national/transnational literatures under Literature, page 337.

Health Sciences

See Biological Sciences, page 135.

Hebrew

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Lecturer

TAMMI ROSSMAN-BENJAMIN
Hebrew language and culture, biblical Hebrew syntax and semantics, the Hebrew Bible, Jewish thought, psycholinguistics, second-language acquisition and bilingualism

Program Description

Students interested in acquiring proficiency in Hebrew can enroll in language courses from beginning to intermediate levels. In addition, credits from these courses may be counted toward the minor in Jewish studies. Lower-division courses are aimed at enabling students to gain proficiency in aural comprehension, speaking, reading, and writing. Attention is also given to developing an understanding of the culture, history, and religion that have been expressed through the Hebrew language from antiquity until today. Some instruction takes place in Hebrew from the beginning level.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Lower-Division Courses

1. Instruction in the Hebrew Language. F

Speaking, listening comprehension, reading, and writing fundamentals. The use of Modern Hebrew is encouraged through classroom practice supplemented by language laboratory work. Elementary sequence (1-2-3) begins in fall quarter only. *The Staff*

2. Instruction in the Hebrew Language. W

Speaking, listening comprehension, reading, and writing fundamentals. The use of Modern Hebrew is encouraged through classroom practice supplemented by language laboratory work. Prerequisite(s): course 1. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. *The Staff*

3. Instruction in the Hebrew Language. S

Speaking, listening comprehension, reading, and writing fundamentals. The use of Modern Hebrew is encouraged through classroom practice supplemented by language laboratory work. Prerequisite(s): course 2. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. *The Staff*

4. Intermediate Hebrew. F

Development of the students' familiarity with the spoken and written language through grammar review, discussions, and vocabulary building. Varied readings on literary and cultural topics related to modern Israel. Prerequisite(s): course 3. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): IH.) *The Staff*

5. Intermediate Hebrew. W

Development of the students' familiarity with the spoken and written language through grammar review, discussions, and vocabulary building. Varied readings on literary and cultural topics related to modern Israel. Prerequisite(s): course 4. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. (General Education Code(s): IH.) *The Staff*

80. Introduction to Biblical Hebrew. W

Introduces students to the basic lexicon and grammatical structures of biblical Hebrew, with an emphasis on the development of a set of useful translation strategies. Throughout the course, students will be applying their emergent skills to translating a variety of biblical texts. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

106. Israel's Struggle for Identity as Seen Through Israeli Cinema. S

Examines, through the medium of film, Israel's struggle for identity since its founding as a modern state. Taught in English with a weekly discussion section in Hebrew. Readings in English and Hebrew; writing, film analysis, cultural commentary, and other assignments in Hebrew. Students may not receive credit for this course and Languages 80F. Prerequisite(s): course 5 (or equivalent). May be repeated for credit. (General Education Code(s): E.) *T. Rossman-Benjamin*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. Enrollment limited to 10. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Hindi

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Lecturer

JOHN MOCK
Language pedagogy, Hindi and Urdu fiction, Urdu poetry, languages and cultures of Northern Pakistan and Afghanistan, orality and literacy, discourse analysis, areal linguistics

Program Description

Hindi and Urdu are the national languages of India and Pakistan. They are virtually identical in grammar and as spoken languages, but they differ substantially in vocabulary and use different writing systems. Students interested in acquiring proficiency in Hindi/Urdu can enroll in beginning and intermediate courses. The sequence of courses 1-6 is aimed at enabling students to gain proficiency in listening, speaking, reading, and writing. Classes are taught in Hindi from the beginning level, with Urdu script offered as an elective.

Students may select an individual major in South Asian studies through their college.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program, page 317.

Lower-Division Courses

1. Elementary Hindi. F

An in-depth introduction to modern Hindi including the Devanagari script. Through a combination of graded text, written assignments, audiovisual material and computer-based exercises, provides cultural insights and increases proficiency in understanding, speaking, reading and writing Hindi. Emphasis on spontaneous self-expression. *The Staff*

2. Elementary Hindi. W

An in-depth introduction to modern Hindi including the Devanagari script. Through a combination of graded text, written assignments, audiovisual material and computer-based exercises, provides cultural insights and increases proficiency in understanding, speaking, reading and writing Hindi. Emphasis on spontaneous self-expression. Prerequisite(s): course 1 or permission of instructor. *The Staff*

3. Elementary Hindi. S

An in-depth introduction to modern Hindi including the Devanagari script. Through a combination of graded text, written assignments, audiovisual material and computer-based exercises, provides cultural insights and increases proficiency in understanding, speaking, reading and writing Hindi. Emphasis on spontaneous self-expression. Prerequisite(s): course 2 or permission of instructor. *The Staff*

3A. Urdu Script (2 credits). S

Introduction to writing and reading Urdu script (a modified Perso-Arabic right-to-left script) through the medium of Devanagari script (a Sanskrit-based left-to-right script). Urdu and Hindi are grammatically equivalent languages that differ most noticeably in their writing systems. Prerequisite(s): course 2 or equivalent; knowledge of Devanagari script. Enrollment limited to 20. *The Staff*

4. Intermediate Hindi. F

Continuation and completion of in-depth introductory sequence in modern Hindi including Devanagari script. Through combination of graded text, written assignments, audiovisual material, and computer-based exercises, provides cultural insights and increases proficiency in understanding, speaking, reading, and writing Hindi. Emphasis on spontaneous self-expression. Prerequisite(s): course 3 or equivalent; familiarity with Devanagari script. Enrollment limited to 25. (General Education Code(s): IH.) *The Staff*

5. Intermediate Hindi. W

Readings in Devanagari of Hindi and Urdu prose and poetry. Introduction to variety of literary forms and styles aimed at developing cultural competence along with language skills. Oral and written composition, coupled with video and web-based material, to develop communicative proficiency. Prerequisite(s): course 4. Enrollment limited to 25. (General Education Code(s): IH.) *The Staff*

6. Intermediate Hindi. S

Readings in Devanagari of Hindi and Urdu prose and poetry. Introduction to variety of literary forms and styles aimed at developing cultural competence along with language skills. Oral and written composition, coupled with video and web-based material, to develop communicative proficiency. Prerequisite(s): course 5. Enrollment limited to 25. (General Education Code(s): IH.) *The Staff*

99. Tutorial.

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

History

201 Humanities
(831) 459-2982
<http://history.ucsc.edu>

Faculty and Professional Interests

Professor

JONATHAN F. BEECHER

French history, European intellectual history, Russian intellectual history, utopian socialism

ROBERT F. BERKHOFFER JR., Emeritus

EDMUND BURKE III

Islamic history, modern Middle East and North African history, French history, European imperialism, world history

MARK CIOC

German history, modern European history, environmental history

DANA FRANK

Late 19th- and 20th-century U.S. social history; women's, labor, and working-class history; race and ethnicity; modern Central America

CHARLES W. HEDRICK JR.

Greek and Roman history, epigraphy, historiography, political theory

GAIL B. HERSHATTER

Modern Chinese social and cultural history; labor history; gender history; history of sexuality; feminist theory; history, memory, and nostalgia

PETER KENEZ

Russian history, Eastern Europe, 20th-century Europe, Soviet film

NOEL Q. KING, Emeritus

BRUCE LEVINE, Emeritus

RICHARD MATHER, Emeritus

GARY B. MILES, Emeritus

BUCHANAN SHARP

English history

DAVID G. SWEET, Emeritus

MARK TRAUOGTT

Social and economic history, 19th-century France, French revolutions, European working class, historical methods, workers' autobiographies

MARILYN J. WESTERKAMP

British America, American revolution/early national U.S., U.S. religious history, early modern cultural and religious history, women/gender

Associate Professor

DAVID HENRY ANTHONY III

African and African American history, art, music, literature, and cinema; eastern and southern Africa; African languages; Indian Ocean world; African and African American linkages; Islamic civilization; African diaspora studies; world history

DILIP K. BASU

Modern South Asia, modern China, world history: colonial and post-colonial; film and visual culture

PEDRO G. CASTILLO

Chicana/o history and culture; American social and urban history; race, class, and gender in California history, immigration history

BRIAN A. CATLOS

Pre-modern Mediterranean; medieval Iberia and Europe and the Middle East; Christian-Muslim-Jewish relations, ethnicity, minorities, social, and economic theory; world history

ALAN S. CHRISTY

Early modern and modern Japan; history of social sciences, colonialism, nationalism

MARIA ELENA DIAZ

Colonial Caribbean and Latin America; social and cultural history; ethnohistory; slavery, race, and gender

LISBETH HAAS

U.S.-Mexico borderlands, Chicano and Native American history; visual culture in the colonial Americas; the U.S. West and California; historical memory, theory, and historical methodology

CYNTHIA POLECRITTI

Medieval, Renaissance, and Modern Italy, Mediterranean urban and cultural history, ritual and popular devotion

ALICE YANG MURRAY

Historical memory, Asian American history, gender history, race and ethnicity, 20th-century U.S., oral history

Assistant Professor

NORIKO ASO

Japanese social and cultural history, women's history, race and ethnicity, colonialism, nationalism, Korean history

MINGHUI HU

Late Imperial China (1600–1900)

CATHERINE A. JONES

U.S. civil war and Reconstruction; slavery and emancipation; the American South; history of children; history of education; women and gender

MATTHEW D. O'HARA

Modern Latin America and Mexico; late colonial Latin America; religion, spirituality, and ritual; urban history; race, ethnicity, and identity; political culture

GREGORY O'MALLEY

Colonial British America and the Caribbean; the Atlantic World; slavery and the slave trade; race, ethnicity, and identity; revolutionary America; colonization and intercultural contact

ASSAF YASUR-LANDAU

Archeology of Israel, Bronze-Age Aegean, archeology of complex societies

Lecturer

GILDAS HAMEL

History of Judaism and Christianity; Hebrew and Greek Bible; classical languages

MATTHEW LASAR

U.S. and international telecommunications; political, social, and economic history

NÚRIA SILLERAS-FERNÁNDEZ

Medieval and early modern Iberia, Europe and the Mediterranean: women's history, queenship, politics, religion, society and culture

BRUCE THOMPSON

European intellectual and cultural history, French history, Jewish intellectual and cultural history, British and Irish history, history of cinema, history of espionage, environmental history



Professor

BETTINA APTHEKER (Feminist Studies)

Women's history, feminist oral history and memoir; feminist pedagogy; African-American women's history; queer studies; feminist Jewish studies; feminist critical race studies

RAOUL BIRNBAUM (HISTORY of Art and Visual Culture)

Buddhist studies, especially Chinese practices from medieval times to the present; religion and visual culture in China

CHRISTOPHER CONNERY (Literature)

World literature and cultural studies, globalism and geographical thought, the 1960s, Marxism, pre-modern and modern Chinese cultural studies, cultural revolution

JOHN DIZIKES, Emeritus (American Studies)

BARBARA L. EPSTEIN (History of Consciousness)
Social movements and theories of social movements, 20th-century U.S. politics and culture, Marxism and related theories of social change

JOHN HAY (History of Art and Visual Culture)

Visual and conceptual representation in pre-modern China, especially landscape painting; Asian art history

EMILY HONIG (Feminist Studies)

Gender, sexuality, and ethnicity in modern Chinese history; comparative labor history; Chicana history, nationalism, and sexuality in the Third World; oral history

VIRGINIA JANSEN (History of Art and Visual Culture)

Medieval visual culture, urbanism, and secular building; Gothic architecture; campus planning and architecture

SHARON KINOSHITA (Literature)

Intercultural relations in 12th- and 13th-century literature, Mediterranean studies, globalism, postcolonial theory, world literature and cultural studies

PAUL M. LUBECK (Sociology)

Political sociology; political economy of development, globalization, labor and work; logics of methodology; religion and social movements; Islamic society and identities; information and networks

JOHN P. LYNCH (Literature), Emeritus

DANIEL SELDEN (Literature)

Afroasiatic languages and literatures, Greek and Latin, Hellenistic culture, the classical tradition, history of criticism, literary theory

Assistant Professor

JUDY YUNG, Emerita (American Studies)

Associate Professor

DAVID T. BRUNDAGE (Community Studies)

American working-class and immigration history, history of U.S. social movements, Irish history and politics

BERNARD L. ELBAUM (Economics)

Economic history

PAUL ORTIZ (Community Studies)

African American history, U.S. social and political history, social documentary, oral history, subaltern studies and theories of resistance, U.S. South, Latino studies, social movements, working-class history; history of farm labor, African diaspora

GABRIELA ARREDONDO (Latin American and Latino Studies)

U.S. social and cultural history; Chicano/o history; critical race and ethnicity theories; immigration history; Latin/os in the U.S.; Chicana feminisms; "borderlands" studies, modern Mexico history

Program Description

History is the attempt to understand the meanings of the human life experience, not generally and abstractly, but in terms of specific individuals, events, and circumstances. Consequently, of all academic pursuits, it is the one best equipped to help us locate phenomena in their specific contexts, whether we are concerned with political events, social changes, the production of art, the development of technologies, scientific discoveries, or life stories. In this sense, the study of history can also be an invaluable complement to any other major.

The history program at UCSC is designed to bring about an understanding of the ideas, experiences, and events that have shaped this country and the world at large. The program's main emphases are in social and cultural history, with additional strengths in intellectual and political history.

A degree in history opens up a wide range of career possibilities. Some careers fall within the historical profession, including teaching at the university, college, and high school levels and working in various areas of public and applied history, such as historic preservation, archives, libraries, and museums. For careers in fields as diverse as law, business, government, foreign service, publishing, journalism, and communications, a degree in history lays the foundation in research, analytic, and writing skills upon which later professional training can be built.

Requirements for the Major

A minimum of 12 courses is required for the major. The history major does not require an exam for entrance and does not limit the number of students accepted into the program. It is advisable to complete at least one introductory history course before declaring the major.

At UCSC, the history curriculum offers three broad, geographically defined regions of concentration:

- the Americas and Africa
- Europe
- Asia and the Islamic World

Course requirements. Each history major selects one of the three regions of concentration listed above. History majors who enter UCSC during fall 2002 or later are required to take at least one lower-division survey course within their chosen region of concentration.

- Americas/Africa: History 10A, 10B, 11A, 11B, or 30
- Asia/Islamic World: History 40A, 40B, 41, or 43
- Europe: History 70A, 70B, 70C, 65A, or 65B

Transfer course work may or may not apply toward the survey course requirement; consult the History Department.

In consultation with the history undergraduate adviser and a faculty adviser, the student plans a program of study that will also fulfill the following distribution of courses:

- five courses in the region of concentration, one of which must be the lower-division survey course; three of the remaining courses must be upper-division;
- two courses from each of the remaining two regions of concentration;
- two upper-division history electives based in any of the regions of concentration;
- one comprehensive exit requirement (see below) in the student's chosen region of concentration.

Students may also choose to organize their course selections according to some general theme of special interest to them. Faculty and staff advisers will assist students who choose this option.

In addition to all course work, history majors must complete a senior check and exit survey in the first quarter of their senior year. For details, see the department web site.

Distribution requirements. Among the 12 courses required for the major, at least three must meet chronological distribution requirements. One must be set before 600 A.D., and two must be set in periods prior to the year 1800 A.D. Also, no more than four of the minimum 12 courses may be lower-division.

Interdisciplinary course work. The History Department encourages its majors to take upper-division courses in disciplines related to history, including sociology, literature, community studies, American studies, politics, Latin American and Latino studies, and others. Students who wish to substitute one or two such appropriate upper-division courses for history electives must meet with their history faculty adviser and complete a course substitution form (available at the History Department office and online). These courses are subject to the limitations described below under the "Transfer credits and substitutions" section and may not be applied toward a second major or a minor from another department.

Comprehensive requirement. A comprehensive exit requirement in the student's chosen region of concentration can be fulfilled by completing an exit seminar (one quarter: 190-series, 194-series, or 196-series) or a senior thesis (two quarters: courses 195A and 195B). Please consult the department web site for a more detailed description of these courses.

Language recommendation. Proficiency in a foreign language is strongly recommended for all history students and is essential for those who plan to pursue graduate studies in history. Many Ph.D. programs in history require applicants to read one or two languages besides English. The University of California Education Abroad Program (EAP) is appropriate for history majors as a means to both enhance language skills and take history courses elsewhere.

UC Education Abroad Program. Subject to the limitations described below under "Transfer credits and substitutions," up to three courses in history completed through EAP may be applied toward major requirements. Consult the History Department web site, and speak with the undergraduate adviser for further details.

Transfer credits and substitutions. Students may apply up to three courses taken at another institution. A minimum of five regularly scheduled history courses plus the comprehensive requirement must be taken from members of the UCSC History faculty. Subject to the

limits indicated in parentheses, a total of three courses from the following categories may also be applied to the history major:

- Education Abroad Program (limit of 3)
- UCDC (limit of 2)
- UC in Sacramento (limit of 2)
- Related courses taken in another UCSC department (limit of 2)
- Independent and field studies (limit of 2)

Requirements for the Minor

Students whose major area of interest is not history may nonetheless find that a minor in history makes an invaluable contribution to their studies. For the minor in history, eight history courses, four of which must be upper division, are required. There is no senior comprehensive requirement for the minor.

Graduate Program

The Ph.D. program in history at UCSC emphasizes an interdisciplinary and cross-cultural approach to historical studies. The History Department offers a rigorous program of instruction and independent work that trains students in the techniques of original historical research and equips them to teach university-level courses in history. The department only admits those highly motivated students who are most qualified to pursue advanced studies in history. The department also only admits those applicants who can best benefit from the specific strengths of our faculty.

Just as the work of most professional historians centers around research and teaching, training in these areas constitutes the two essential poles of the graduate program in history.

Research and Teaching

In preparing graduate students for research and teaching at the university level, the department offers training in four geographically and chronologically defined fields: U.S. history, European history since 1500, East Asian history since 1600, and world history since 1500. U.S., European, and East Asian history are defined as primary teaching fields; each graduate student is required to choose one. Students of U.S. history may incorporate Latin American history in their course work, while students of European history might include the history of European colonialism and imperialism. Every year the faculty in each field offer introductory readings seminars and, when possible, classes on more specific topics (see below for information about course offerings). Each graduate student also prepares a second teaching field different from the primary field and can choose from among U.S., European, East Asian, or world history. Students may also petition the graduate committee to prepare a secondary teaching field in African or Latin American history.

Research Clusters

The History Department has created a series of thematic research clusters to coordinate the training of graduate students in historical research. Each research cluster is composed of History Department faculty and graduate students as well as faculty outside the department who share broad scholarly interests. The clusters serve as a way to coordinate the research of faculty and graduate students whose work encompasses different geographic regions and chronological periods. Although the nature and number of the research clusters may change over time, the department currently offers two basic groupings: (1) colonialism, nationalism, and race; and (2) the history of gender.

The faculty of each cluster provide at least one research seminar every other year in addition to readings courses. All the affiliated graduate students must take at least one research seminar during their first two years; they are encouraged to take more than one.

Faculty and graduate students also participate in interdisciplinary forums outside the department. These include programs sponsored by The Chicano/Latino Research Center, the Pre- and Early Modern Studies Group, the Center for Cultural Studies, and the UCSC Institute for Humanities Research. Advanced graduate students may also have the opportunity to work in programs sponsored by the University of California Humanities Research Institute at UC Irvine. Finally, multi-campus groups in which students and faculty are involved include the Bay Area Seminar in Early American Studies, the Bay Area Pre- and Early Modern Studies Group, and the French Studies Group at Stanford.

Courses

Until they pass the qualifying exam and are formally advanced to candidacy for the Ph.D. degree, students must be in residence at UCSC and are expected to complete a minimum of 12 units each quarter to maintain normal academic progress. Completion of a minimum of 12 courses of 5 credit each (in addition to History 280A, 280B, and 280C) is required for advancement to candidacy. Courses taken are graduate seminars, independent study courses, and most upper-division undergraduate courses.

Students are required to take the following before advancing to candidacy:

- History 200 (year 1, fall quarter); History 201 (year 2, winter quarter); History 280A, 280B, 280C (year 1);
- one research seminar during the first four quarters: History 204A, 204B, or 204C;
- second teaching field: two courses in American, European, East Asian or world history;
- outside courses: two quarters of graduate course work outside the History Department;
- readings courses in the appropriate field: East Asia—History 230A, 230B, 230C; Europe—History 250A, 250B; U.S.—History 210A, 210B, 210C.

Foreign Language Requirement

No prior foreign language preparation is required for admission with a primary teaching field in U.S. history. Two to three years of college work, or its equivalent, in at least one foreign language is required for admission to the European program. Students who choose East Asian history as their primary teaching field will be required to have completed at least three years of college-level Chinese or Japanese prior to admission; more years are recommended. Depending upon the student's intended field of research, Japanese language study may also be required of China specialists as part of the graduate program of study.

Students with a primary teaching field in U.S. history are expected to demonstrate a reading competency in at least one foreign language prior to taking the Ph.D. qualifying exam. Students in all other teaching fields must demonstrate a reading competency in at least two foreign languages prior to taking the Ph.D. qualifying exam; competency in one of the languages must be demonstrated by the end of the sixth quarter of enrollment. Usually, competency will be demonstrated by passing a reading exam administered by a member of the History faculty. Students who believe that they have

already demonstrated competency through previous course work or through their performance on a standardized test should petition the graduate director.

M.A. Degree

The M.A. degree is awarded to all Ph.D. students after two years in residence, successful completion of 12 courses of 5 units each, demonstrated competency in one foreign language (for those in primary teaching fields other than U.S. history), removal of all Incomplete notations (I) on record, and approval of a substantial essay of 25-30 pages.

The M.A. Essay

Students are required to produce a substantial research essay grounded in original research in primary historical documents. A successful essay will reflect a general understanding of the field of inquiry along with a critical grasp of the scholarship that currently defines the field; deep knowledge of the specific subject under investigation; the application of appropriate analytical models; and a well-supported interpretation of the materials explored. This essay could (but need not) be a segment of a larger project; but it must be a complete, self-contained essay in and of itself.

Students enroll in course 201, *Directed Research Colloquium*, the winter quarter of their second year. While taking course 201, students work intensively with a reader (who may or may not be their faculty adviser, but cannot be the 201 instructor) in the preparation, crafting, and revising of the essay. The final draft, accompanied by an evaluation from the reader, must be submitted to the Graduate Committee by the spring quarter deadline (usually mid-April). The deadline will be noted in the department's call for M.A. essays.

Qualifying Exam

The qualifying exam (QE) emphasizes field mastery, integration of material from different fields, and focused preparation for dissertation research. The QE is a three-hour meeting during which a student presents and discusses a dossier that has been submitted to the student's committee at least three weeks in advance. The exam is normally taken by the spring quarter of the third year, but no later than the end of the 10th quarter of residency. Prior to taking the QE, all Incomplete notations (I) must be cleared from the student's record. Additionally, the student must be registered the quarter the exam is taken. The four exam fields are designed in consultation with the student's QE committee members. Students prepare for the exam through regularly offered courses and independent readings courses sponsored by the examiners. Students are required to take at least two courses in each of the four fields. The fields are as follows:

- *Primary Field of Concentration.* One of three fields: American history; European history 1500 to the present; East Asian history 1600 to the present.
- *Research Field.* Normally a subfield of the primary field with a focus on the student's specific area of research interests. This field is most closely connected to the student's work in a specific research cluster.
- *Second Teaching Field.* Chosen from the above list of primary fields, with the addition of world history, or, where appropriate, a comparative, thematic field such as gender, colonialism, etc.
- *Outside Field.* One field outside history, such as American studies, anthropology, literature, feminist studies, politics, sociology, or history of consciousness. Students select a field of topical, thematic, or methodological relevance to their dissertation. The

student's faculty adviser must approve the outside field.

The four exam fields must be defined and preliminary reading lists (see below) filed with the department no later than the student's eighth quarter of residency.

A pass or fail will be given after the exam based on the student's knowledge and research preparation as demonstrated by his or her dossier. All areas must receive passing marks from all members of the committee. Immediately following the exam, the QE committee will complete and submit to the History Department the Report on Qualifying Examination form. If a student does not pass the QE the first time, they may retake only those sections not passed. No one will be permitted to take the QE more than twice.

Qualifying Exam Dossier Requirements

The QE dossier includes four parts, each of which should be prepared in consultation with the student's primary academic adviser and with the advice of the examiners. The exam will focus upon the dossier. All examiners, including the examiner from outside the department, will participate in all segments of the exam.

The dossier includes:

1. An essay (15-20 pages) reviewing the state of the scholarship in the student's primary field of concentration. This essay should reflect the student's general, broad competence in his or her field as well as a mastery of the theoretical issues and historiographic debates in four to five areas that represent their primary area of expertise. The essay may reflect the thematic focus of the student's chosen research cluster as well as work completed in an outside field (literature, anthropology, etc.).
2. One syllabus or, at most, two syllabi (the number to be decided in discussion with the student's primary adviser) that demonstrates the student's preparation to teach across the breadth of their primary field at the introductory level. The syllabus should be annotated to show how each class session would be prepared: principal sources for lectures, principal questions for discussion, reasons for assigning particular readings, etc.
3. A syllabus (annotated in the same fashion as described in section #2 above) in the student's second teaching field, accompanied by a brief (three- to five-page) statement of principal issues. The exact content of these items will be decided in consultation with the examiner in the secondary teaching field.
4. A 10- to 15-page research prospectus that includes an evaluative survey of the literature relevant to the student's proposed research topic, a detailed discussion of the archival resources, and a consideration of the theoretical issues to be engaged.

NOTE:

- Although no specific segment of the dossier focuses upon the course work completed outside the History Department, it is expected that this work will be incorporated into different sections of the portfolio, particularly the research prospectus.
- Complete bibliographies must be appended to each piece of the QE dossier.

Dissertation

Students are required to prepare a dissertation prospectus within one year after the qualifying exam. Ideally, the prospectus will be completed by the end of the next quarter. The prospectus must be approved by the dis-

sertation reading committee and placed on file with the department. The prospectus lays out, in reasonable detail, the direction of research the student intends to pursue for the dissertation. The prospectus includes the following information:

- title page with signatory lines for the dissertation committee members and the graduate director
- three- to four-page description of the overall argument of the project, including a discussion of the research base and the appropriate methodological/theoretical models
- two- to three-page outline, tracking the research and analysis chapter by chapter
- substantive bibliography with complete citations

The dissertation represents an extensive, book-length project grounded in research in original historical documents. A successful dissertation will reflect a broad and deep understanding of the field of inquiry, a mastery of the scholarship that currently defines the field, detailed knowledge of the subject of study growing out of dedicated research, and the incorporation (and explicit rejection of) appropriate interpretive models.

M.A. in History (Terminal)

The Department of History offers an M.A. degree in history for those individuals who are interested in post-graduate work, but who are not planning to complete a Ph.D. It is a degree program that can fulfill in-service education requirements for current teachers as well as for future teachers earning a single-subject credential in social studies. Part-time enrollment is allowed.

Each student will be required to choose one of four areas of specialization (U.S., Europe, East Asia, world) and select one of two topical research areas—colonialism, nationalism, and transnational migration or history of gender. To complete the degree, each student must pass a total of 12 courses of 5 credits each and six courses of 2 credits each including courses 280A, 280B, and 280C. Students must also write an M.A. paper of 25-30 pages. For students specializing in Europe, U.S., and East Asia, the curriculum will be nearly identical to that taken by Ph.D. students in their first two years, except that there will be no language requirement. Those specializing in world history will take History 270A and 270B instead of the corresponding courses in other fields (courses 250A, 250B, and so on), but otherwise their curriculum will be the same as that of a typical incoming Ph.D. student.

Course Requirements

- History 200 (year 1, fall quarter); History 201 (year 2, winter quarter)
- one research seminar during the first four quarters: History 204A, 204B, or 204C
- six courses of 2 credits each including History 280A, 280B, 280C (year 1)
- seven electives of 5 credits each, two of which must be taken outside the History Department. Courses taken are graduate seminars, most upper-division undergraduate courses, and independent study courses.
- two reading seminars in the area of specialization:
U.S.: History 210A, 210B, 210C
Europe: History 250A, 250B
World: History 270A, 270B
East Asia: History 230A, 230B; 230C, 242

The History Department does not normally provide financial support to students pursuing the M.A. degree; however, students may apply for available teaching

assistantships. Admission to the M.A. program does not constitute admission to the Ph.D. program. Students must reapply for the Ph.D. program.

Further details about the graduate program are available from the Department of History web site: <http://history.ucsc.edu>.

Lower-Division Courses

1. Theories of History/Theories of Society.

European social thought understands society to be the product of the historical process. Readings from early-modern natural law thinkers (Hobbes, Lock, Rousseau), 19th-century theorists of the democratic and industrial revolutions (Tocqueville, Marx), and 20th-century social scientists (Weber, Braudel), explore the nature of this fertile connection. (General Education Code(s): IH.)
M. Traugott

2A. The World to 1500. F

Surveys the rise of complex societies: the formation of classical civilizations in Afroeurasia and the Americas, post-classical empires and cross-cultural exchange, technology and environmental change, the Mongol Empire, and oceanic voyages and the origins of the modern world. (General Education Code(s): IH.)
B. Carlos

2B. The World Since 1500.

Examines major world issues over the past 500 years. Topics include European expansion and colonialism, the Muslim empires, East Asia from Ming to Qing, the Americas, Africa, the scientific-technological revolution, decolonization, and modern environmental problems. Designed primarily for first- and second-year students, it provides a time frame for understanding events within a global framework. (General Education Code(s): IH.)
K. Simonton

5A. Early Muslim World.

Surveys the history of the Muslim world from its beginnings through the Caliphal period. Islam is approached as a religious, social, political, and cultural phenomenon. Special emphasis on understanding Islam in the context of contemporary developments in the Near East, Europe, Africa, and Central Asia. (General Education Code(s): IH, E.)
B. Carlos

5B. Early Christianity: First to Fourth Century A.D.. W

Christianity from its origins as a Jewish messianic movement, its expansion in multiple forms in the Greco-Roman world, to its transformation into the major religion of the Roman and Byzantine empires. (General Education Code(s): IH.)
G. Hamel

7. Archives and Public History. S

Through readings on local history topics and bi-weekly field expeditions, students discover different types of archives and historical repositories, the diversity of sources that they contain, and the varied uses to which they can be put. Course also explores the range of career opportunities open to history majors (sometimes loosely grouped together under the rubric "public history"). Students are billed a materials fee. Enrollment restricted to freshmen and sophomores, or by permission of instructor. Enrollment limited to 35.
M. Traugott

10A. United States History to 1877.

A survey of the political, social, and cultural history of the U.S. from the founding of the North American colonies to 1877. Satisfies American History and Institutions Requirement. (General Education Code(s): IH.)
M. Westerkamp

10B. United States History, 1877 to 1977. F

A survey of the political, social, and cultural history of the U.S. from 1877 to 1977. Satisfies American History and Institutions Requirement. (General Education Code(s): IH.) *M. Lasar*

11A. Latin America: Colonial Period. W

Introduces the social, cultural, economic, and political history of the New World through a close examination of the process of European "conquest" in the 16th century and its consequences for both native and settler peoples. Medieval and Renaissance European and African backgrounds; Inca, Maya, Aztec, plains, woodland, and tropical rainforest native American societies; processes of military and cultural conquest; epidemics and ecological changes; native resistance and the establishment of the fundamental institutions of colonial society. (General Education Code(s): IH.) *M. Diaz*

11B. Latin America: National Period.

An introduction to the study of Latin American history from the Independence Wars in the early 19th century to the present. Topics include changing economic models of development, U.S. role, rural and urban life, women, nationalisms, populism, revolution, the military in politics, and the problem of democracy. (General Education Code(s): IH, E.) *M. O'Hara*

13. Introduction to American Religious Culture. S

Introduction to the many communities found within the American religious landscape, balancing extraordinary diversity characterizing American pluralism against the dominant religious culture. Proceeds historically, engaging major problems and developments including utopianism, the rise of evangelicalism, religion and reform, manifest destiny, secularization and modernity, and the intersection of politics and religion. (General Education Code(s): IH.) *M. Westerkamp*

14. Race and Ethnicity in the U.S.

An introductory course on the racial/ethnic history of the U.S. Of central concern are issues of race, ethnicity, oppression, resistance, mass migrations, city life in urban America, and power and protest in modern America. Priority enrollment to freshmen and sophomores. (General Education Code(s): IH, E.) *P. Castillo*

30. The Making of Modern Africa.

Examines the loss and reassumption of local and state autonomy in Africa during the 19th and 20th centuries. Delineates the modalities of the colonial state and society, modes of resistance to alien occupation, and the deformation of social, class, and gender relations. (General Education Code(s): IH, E.) *D. Anthony*

40A. Early Modern East Asia. F

Surveys the history of East Asia from 1500 to 1894. Covers political, social, economic, and cultural histories of China, Japan, and Korea with the goal of perceiving a regional history that encompassed each society. (General Education Code(s): IH, E.) *M. Hu, A. Christy*

40B. The Making of Modern East Asia.

A broad introductory survey of the political, social, economic, philosophical, and religious heritage of modern China, Japan, and Korea. Emphasis on the historical foundations of modern nationalism, the colonial experience, and revolutionary movements. (Formerly course 40.) (General Education Code(s): IH, E.) *A. Christy*

41. The Making of the Modern Middle East.

History of the modern Middle East from 1800 to the present, with special reference to the 20th century and forces which have shaped the area. The impact of im-

perialism, nationalism, and revolution in the area, with particular attention to the history of four countries: Turkey, Iran, Egypt, Israel. (General Education Code(s): IH, E.) *E. Burke*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

43. Traditional India. W

A survey of the early histories of Indus Valley, Vedism, the epics, Buddhism, Jainism, with an exploration among original sources: archaeological, visual, ritual, literary, and epic texts. Thematic focus on communities, social systems, elite and popular cultures, and their mutual interaction. (Formerly *Histories of Traditional India*) (General Education Code(s): IH, E.) *D. Basu*

44. Introduction to Cultures of the Ancient Near East.

Offers an introductory survey of the political, social, economic, and religious heritage of the cultures of the ancient Near East from the dawn of history to the days of Alexander the Great. Discussions include the cultures of Mesopotamia (from the Sumerians to the neo-Babylonians); ancient Egypt and Nubia; Anatolia and Syria (from the Hittites to the Arameans); and Canaan and Israel. (General Education Code(s): IH.) *A. Yasur-Landau*

45. Japanese Pop Culture.

Introduction to Japanese popular culture from the Tokugawa era to the present. Pursues the role of mass media on Japanese society through analyses of popular movies, animation, comic books, music, and other artifacts in historical context. (General Education Code(s): E.) *N. Aso*

62A. Classical World: Greece.

An overview of Greek history from the beginnings through the Hellenistic period, with emphasis on the Archaic and Classical periods (ca. 800 B.C. through 323 B.C.). (Formerly course 20A.) (General Education Code(s): IH.) *C. Hedrick*

62B. Classical World: Rome.

A lecture course offering an overview of Roman history and civilization from the legendary founding of Rome in 753 B.C. to the collapse of the Roman Empire's central administration in the West in 476 A.D. (General Education Code(s): IH.) *C. Hedrick*

65A. Medieval Europe: 200–1000. F

A survey of Europe from the third through 10th centuries. Emphasizes cultural conflict and assimilation (Roman and Germanic, pagan and Christian, East and West). Topics include the rise of Christianity, Germanic migrations, Byzantium and Islam, feudal society, the cult of saints and relics, Vikings, and gender roles. (General Education Code(s): IH.) *C. Polecristi*

65B. Europe, 1000–1500. S

Reviews major social, political, economic, and cultural developments in Europe from 1000 to 1500 and themes including gender, warfare, ethnicity and religion, through primary sources and secondary readings. Primary focus is Western Europe: England, France, the Iberian Peninsula, the Holy Roman Empire, the Low Countries, and Italy. (General Education Code(s): IH.) *N. Silleras-Fernandez*

66. Amazons, Queens, Witches, and Saints: Medieval and Early Modern Women.

Examines women's roles and the perception of women in Medieval and Early Modern Europe—a time when women participated widely in religious, economic, political, and even military spheres. Investigates the

foundations of female power and vulnerability through thematic units and case studies. (General Education Code(s): IH.) *N. Silleras-Fernandez*

70A. Modern European History, 1500–1789. S

A survey of economic, social, and political history of Europe since the late 15th century: 1500–1789. A is not prerequisite to B, nor B to C. (Formerly Modern European History.) (General Education Code(s): IH.) *B. Thompson*

70B. Modern European History, 1789–1914.

A survey of the economic, social, and political history of Europe from the era of the French Revolution to the outbreak of the first World War: 1789–1914. Course 70A is not prerequisite to 70B, nor 70B to 70C. (General Education Code(s): IH.) *J. Beecher*

70C. Modern European History: 1914 to Present. W

A survey of the economic, social, and political history of Europe since the outbreak of the first World War: 1914–present. Course 70A is not prerequisite to 70B, nor 70B to 70C. (General Education Code(s): IH.) *P. Kenz*

74. Introduction to Modern Jewish History. S

Examines major turning points in Jewish history from the 17th century through the 20th: the challenge of modernity, the rise of political anti-Semitism, the migration of European Jews to America, the nearly total destruction of European Jewry in the 20th century, and the origins and development of the conflict between Israel and its Arab neighbors. (General Education Code(s): E.) *B. Thompson*

74A. American Jewish History. S

American Jewish history from 1654 to the present. Traces social, political, religious, and economic history of Jews from colonial America to the present. Topics include the influence of government, immigration, religion, anti-Semitism, and acculturation on Jewish life in America. (General Education Code(s): E.) *A. Yang-Murray, L. Rosenzweig*

75. Film and the Holocaust.

Examines a series of distinguished documentary and feature films about the destruction of European Jewry. Each film is placed in its historical context, and wherever possible, the readings include the original documents on which films were based. Emphasis is placed on the strategies the filmmakers used to address the problem of representing genocide with succumbing to mere melodrama. (General Education Code(s): E.) *B. Thompson*

80H. Class, Gender, and Community in China, 1700–Present.

Examines gender, sexuality, and family across classes in late imperial China, and the transformation of all three by revolution (and vice versa). Concentrates throughout on gender as a category of historical analysis that has remained largely invisible in the construction of conventional Chinese history. (General Education Code(s): T4-Humanities and Arts, E.) *G. Hershatter*

80K. Spies: History and Culture of Espionage.

Examines the "golden age" of espionage during the early 20th century, the Second World War, and the Cold War, emphasizing not only the origins and development of intelligence agencies but also images of spies in modern popular culture. (General Education Code(s): T4-Humanities and Arts.) *B. Thompson*

80N. Topics in U.S. Women's History: Women at Work. S

Focusing on women at work, uses women's films and excellent historical writings to examine how work has shaped conditions of womanhood, and how women from distinct backgrounds have encountered, defined, and given meaning to their labor. Engages students in reconceptualizing history while it introduces a century of vivid patterns of change in women's worlds of work. (General Education Code(s): T4-Humanities and Arts.) *L. Haas*

80W. The Holocaust: The Destruction of European Jewry. S

Focus is on the destruction of the Jews of Europe by Nazi Germany. Issues are historically grounded, and include works of literature, social sciences, philosophy, and film. (Also offered as Literature 80L. Students cannot receive credit for both courses.) (General Education Code(s): T4-Humanities and Arts, E.) *M. Baumgarten, P. Kenez*

80Y. World War II Memories in the U.S. and Japan. S

Examines how the meaning of such issues as war origins, war responsibility, the atomic bomb, reparations, and racism have been subjects of contention in postwar U.S. and Japan. Students explore the relations between history, memory, and contemporary politics. (General Education Code(s): T4-Humanities and Arts, E.) *A. Christy*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***100. Historical Skills and Methods.**

Designed to train students in the fundamental skills required for advanced historical research. Students read historical theory and learn the basics of historical analysis, research, and disciplinary writing. Recommended to majors but open to all interested students. *A. Christy*

101A. The Making of the Modern World, 1400–1750.

Focuses on the transformation of many different societies of Asia, Africa, and the Americas from 1400 to 1750 through case histories and the comparative study of European colonial hegemony, labor systems, global economic exchange, missions, and warfare. (General Education Code(s): E.) *E. Burke*

101B. The Making of the Modern World, 1750–1950. W

The history of the world from 1750. Focuses on the liberal project (the industrial and democratic revolutions) and its impact on the world—slavery and abolition, self-strengthening movements, race and class, imperialism, colonialism, and nationalism. (General Education Code(s): E.) *E. Burke*

102A. The Crusades, 1000–1300. F

Examines history of Middle East and Latin Europe from 1000–1300, in particular, Latin Crusade and colonization and Muslim response. Format is chronological; topics such as acculturation, Holy War, and ethnicity examined through lectures and writing. *B. Catlos*

102C. The Mediterranean in the Modern Era, 1730–1930. W

The cultural transformation of the Mediterranean region in comparative historical perspective from the rise of the Hapsburg and Ottoman empires to modern times.

Topics include orientalism, political and economic transformations, social movements, cultural change, gender, colonialism, and imperialism. *E. Burke*

103. Medieval Spain, 600–1500.

History of the Iberian Peninsula and Northwest Africa from the Visigoths through the reign of the Catholic Monarchs. Political and economic history form the basis, with special attention paid to religious and social history, particularly the interrelation between the peninsula's ethno-confessional groups. Prerequisite(s): one history course; course 65A and/or course 65B recommended. *B. Catlos*

106A. Vietnam War Memories.

Compares memories and interpretations of war in Southeast Asia by diverse groups in France, America, and Vietnam. Topics include war origins, military strategies, propaganda, combat, civilians, media, activism, MIAs, refugees, mixed race children, memorials, textbooks, films, music, literature, and art. (General Education Code(s): E.) *A. Yang-Murray*

106B. Asian and Asian American History, 1941–Present. F

Analyzes immigration, race relations, war, gender ideology, family life, acculturation, political activism, interracial marriage, multiracial identity, and cultural representations between 1941 and the present. Emphasis on discussion, writing, research, and group presentations. (General Education Code(s): E.) *A. Yang-Murray*

108. Social Movements in Historical Perspective.

Readings examine 18th- through 20th-century social movements and related phenomena in Europe/America: examples include Tulipomania; revolutionary action in France; U.S. Civil Rights movement; and the environmental and feminist movements. Lectures focus on social science frameworks used to explore the social base, tactics, success or failure, and inter-relationships of social movements as a distinctive mode of social change. *M. Traugott*

109A. Race, Gender, and Power in the Antebellum South. W

Examines how ideologies of race and gender shaped the development of slavery and empire in the American South from European colonization to the eve of the American Civil War. (General Education Code(s): E.) *C. Jones*

110A. Colonial America, 1500–1750.

Explores the social, economic, cultural, and political development of British North America from the first European/Amerindian contacts in the late 16th century through the establishment of a provincial British colonial society. Course 110A is not a prerequisite to course 110B. (Formerly *Colonial and Revolutionary America*.) Satisfies American History and Institutions Requirement. *M. Westerkamp*

110B. Revolutionary America, 1740–1815. S

Explores the political, social, economic, and cultural development of British North America from the first stirrings of resistance to the establishment of the U.S. Course 110A is not a prerequisite to course 110B. (Formerly *Colonial and Revolutionary America*.) Satisfies American History and Institutions Requirement. *G. O'Malley*

110D. The Civil War Era. F

Social, political, and economic history of the American Civil War and Reconstruction, focusing on the war's changing nature and significance, emancipation, and the postwar struggle over the future of the South and the nation. (Formerly *The Second American Revolution: The Civil War and Reconstruction*.) *C. Jones*

110E. What Is a Nation? The U.S. from 1877 to 1914.

History of the U.S. during what was perhaps its most socially turbulent era, the period following Reconstruction through the First World War. What did it mean to be a nation in the post-Reconstruction era? How did a country that had only recently unified itself under one system of labor now resolve the question of national identity? Was America truly a nation by 1914? *M. Lasar*

110F. Crossroads for American Capitalism: The U.S., 1914 to 1945.

Between the First and Second World Wars, American society accepted the need for a regulatory state to save capitalism from itself. Takes an in-depth look at many aspects of U.S. politics and culture during these years. *M. Lasar*

110G. The U.S. After the Second World War. W

From the Good War to the Cold War, the Sixties to the rise of the New Right, the post-1945 American experience has been one of extremes. This survey course looks for evidence of commonality during those times. *M. Lasar*

111. Popular Conceptions of Race in U.S. History, 1600–Present. W

Explores how race has been constructed and perceived, examining Americans' use of race to describe themselves and to label others. Particularly concerned with ordinary people and how and why their ideas of race have changed over time. Prerequisite(s): One upper-division history course. (General Education Code(s): E.) *G. O'Malley*

112. American Feminist Thought, 1750–1950.

Traces history of feminist thought in the United States from the 18th century Enlightenment to the mid-20th century. Focusing on questions of social identity, gender difference, and legal/political status, examines writings of philosophers, activists, novelists, and ordinary women that challenged religious, political, and scientific beliefs underlying gender inequality. *M. Westerkamp*

113A. Religion in Early America.

Explores major trends and developments in the history of American religion from the founding of the British colonies to the mid-19th century. Examines institutional, social, and theological components within the context of American colonization, revolution, and expansion, both geographic and economic. *M. Westerkamp*

113B. Modern American Religion.

Explores the growth and transformation of American religious culture from 1870 to the present. While investigating individual church institutions, leaders, and theologians, focuses upon religion as part of the larger, pluralistic American culture. *M. Westerkamp*

113C. Women and American Religious Culture.

Historical introduction to religious culture of U.S. as experienced and created by women. Explores religious ideas about women, the treatment of women by mainstream institutions and religio-social communities, and female religious leaders and followers. Takes an explicitly feminist analytical approach and uses a variety of "texts," including historical and literary scholarship, sacred texts, fiction, autobiography, material artifacts, visual art, and music. *M. Westerkamp*

115A. U.S. Labor History to 1919. F

Explores the history of work, working-class people, and the labor movement in the U.S., with attention to race and gender dynamics as well as to the development of

workers' organizations. (Formerly *U.S. Labor History, Colonial Period to 1919*.) Satisfies American History and Institutions Requirement. *J. Illingworth*

115B. U.S. Labor History, 1919 to the Present.

Explores the history of work, working-class people, and the labor movement in the U.S. in global perspective with attention to race and gender dynamics and political-economic changes. Satisfies American History and Institutions Requirement. *D. Frank*

117. Wired Nation: Broadcasting and Telecommunications in the U.S. from the Telegraph to the Internet.

Explores the history of telecommunications systems in the US starting with the telegraph, the telephone, wireless telegraph, radio, television and the Internet. Students learn about the development of these systems and the cultures that they foster. *M. Lasar*

121A. African American History to 1877. F

A survey of pre-contact Africa, indigenous social structures, class relations, the encounter with Europe, forced migration, seasoning, resistance, Africa's gift to America, slavery and its opponents, industrialization, emigration vs. assimilation, stratification, Convention Movement, Black feminism, Civil War, and Reconstruction. (General Education Code(s): E.) *D. Anthony*

121B. African American History: 1877 to the Present. W

A survey of the period from 1877 to present, highlighting Jim Crow, Militarism, Black feminism, WWI, New Negro, Garveyism, Harlem Renaissance, Black Radicalism, Pan Africanism, Depression, WWII, Desegregation Movement, Black Power, 1960s, Reaganism. Cultural and economic emphases. (General Education Code(s): E.) *D. Anthony*

123A. U.S. Immigration History, 1600-1877. F

Examines immigration and settlement patterns of early British immigrants to colonial North America; the large-scale immigration of the 19th century that brought Irish, Italian, and German immigrants to the urban areas of the eastern U.S.; and Chinese and Mexican immigrants who settled in the West and Southwest. *K. Simonton*

123B. U.S. Immigration History, 1800-1940.

Traces the history of immigration to the United States with emphasis on the 19th and early 20th centuries. Examines the causes and contexts of large-scale immigration; the similarities and differences in immigration and settlement patterns of different immigrant groups; how the process of immigration has been complicated by issues of race, ethnicity, gender, and class; and the ways in which U.S. immigration policy has influenced American's ideas of citizenship and freedom. (Formerly course 123). (General Education Code(s): E.) *K. Simonton*

125. California History.

Offers a comprehensive view of California history, beginning with a study of native societies, Spanish conquest, and the vast changes wrought by the U.S.-Mexican war and the gold rush. Ecological, social, cultural, and urban change to the present are traced. *L. Haas*

126. History of the Southwest: Colonial Period to 1920. S

Examines the social organization of Spanish colonial, Mexican, and early American society in the Southwest. Themes include colonization, popular culture, religion, work, gender relationships, and immigration. (General Education Code(s): E.) *L. Haas*

127. Race and the American City.

History of racial and ethnic minorities in the American city in the 19th and 20th centuries. Examines the experiences of several non-white groups, with analyses of race, class, culture, gender, acculturation, and implications for social policy in the urban environment. Satisfies American History and Institutions Requirement. (General Education Code(s): E.) *P. Castillo*

128. Chicana/Chicano History.

A survey course on the social history of the Mexican (Chicana/o) community and people in the U.S. through the 20th century. Themes include resistance, migration, labor, urbanization, culture and politics. Satisfies American History and Institutions Requirement. (General Education Code(s): E.) *P. Castillo*

130. History of Modern Cuba. S

Covers from the Cuban sugar revolution (late 18th century) to the socialist revolution and its aftermath (1959-present). It is intended to be not only a modern history of Cuba but also a broader history of Latin America through the case of Cuba. (General Education Code(s): E.) *M. Diaz*

131. Women in Colonial Latin America.

Introduction to the social history of Latin America through a focus on the inflections of class and ethnicity on gender in this region. First six weeks focuses on the colonial period. The last three weeks covers the 19th and 20th centuries. (Formerly *Women in Latin America*.) (General Education Code(s): E.) *M. Diaz*

132. History of the Caribbean: Colonial Period.

A study of the Caribbean from the conquest to the abolition of slavery in the 19th century. Focus on the Greater Antilles, particularly the Spanish Caribbean. Emphasis on economic and social issues such as colonialism and the role of sugar production, slavery, and race/ethnicity in these multicultural societies. (General Education Code(s): E.) *M. Diaz*

134B. History of Mexico, 1850 to Present. S

Social, cultural, economic, and political history from the triumph of Liberalism to the present day, focusing on four key periods: the dictatorship of Porfirio Diaz (1900-1910), the armed phase of the Revolution (1910-1920), the consolidation of revolutionary programs and a "single-party democracy" (1920-1940), and the developmentalist counter-revolution since 1940. Provides background for understanding the Mexican diaspora to the U.S. (General Education Code(s): E.) *M. O'Hara*

137A. Africa to 1800.

Introduction to history of Africa. Topics include states and "stateless" societies, culture, society and economy in the pre-modern era, stratification, oral traditions, long distance trade, the coming of Islam, and the evolution of the South Atlantic system and its social, political, and other consequences. Some background knowledge of Africa helpful. (General Education Code(s): E.) *D. Anthony*

137B. Africa from 1800 to the Present.

How Africa lost its continental, regional, and local autonomy in the era of European imperialism. The components of European hegemony, Christian proselytization, comparative colonial strategies and structures, nationalism, decolonization and independence and the disengagement from neo-colonial patterns and the colonial legacy. Case studies from northern and sub-Saharan Africa. Some background knowledge of Africa helpful. (General Education Code(s): E.) *D. Anthony*

137C. African Cinema. S

Historical study of modern African cinematography from the emergence of film as a tool of social control in the imperial and colonial periods to its theoretical and practical transformation by African cineastes in the post-independence era. Films and videos from northern, eastern, western, central/equatorial, and southern Africa viewed. Prerequisite(s): course 30 or 137A or 137B, or by permission of instructor. (General Education Code(s): E.) *D. Anthony*

140B. History of Qing China, 1644-1911. F

Introduces students to how Qing China arose, expanded, and struggled to enter the modern world. Focuses on what the Qing empire had in common with other agrarian empires across Eurasia, commercialization and communication networks, elite mobility and peasant revolts, political legitimacy of the alien rule, maintaining social order (such as merchants' control and gender segregation), massive population growth and internal migration, as well as its conflicts with the industrial West. *M. Hu*

140C. Revolutionary China 1895-1960. W

Explores history of China from the late 19th century to the early years of the People's Republic, focusing on the end of imperial rule, the sources and development of revolution, and early attempts at socialist transformation. (General Education Code(s): E.) *G. Hershatter*

140D. Recent Chinese History.

Explores history of China from establishment of the People's Republic of China to the present, focusing on competing strategies of socialist transformation, urban/rural relations, and the effects of the post-Mao economic reforms. (General Education Code(s): E.) *E. Honig*

141A. Classical Chinese Culture and Literature, 10th Century B.C.E. through Sixth Century C.E. *

Survey of writing and culture from the 10th century B.C.E. through the sixth century C.E., focusing on poetry, philosophical and historical writing, supernatural fiction, Buddhist/Taoist texts in contexts of fragmentation, empire building, dynastic collapse, rebellion, eremitism, and courtly society. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global, Poetry, and Pre- and Early Modern distribution requirements. (Also offered as World Lit & Cultural Studies 135. Students cannot receive credit for both courses.) (General Education Code(s): E.) *C. Connery*

141B. Classical Chinese Culture and Literature, Sixth Century through 16th Century. *

Survey of writing and culture from the Tang through early Ming dynasties (6th century C.E. through 16th century C.E.). Themes include literary, religious, and philosophical innovation; courtly life; cultural contacts with non-Chinese people; and transformations of state and society. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global, Poetry, and Pre- and Early Modern distribution requirements. (Also offered as World Lit & Cultural Studies 136. Students cannot receive credit for both courses.) (General Education Code(s): E.) *C. Connery*

142. World History of Science.

Searches for a common ground in which historians and scientists can communicate with each other from a global perspective, first situating the modern world in a long span of human history to reveal our time as a distinct stage of global development. Science and technology, the focus of this course, play a crucial role in the formation of the modern world. *M. Hu*

145. Gender, Colonialism, and Third-World Feminisms. W

Introduces the history of feminism in the third world, focusing on the ways in which colonialism (and post-colonialism) has shaped gender relations and on the feminist movements that have emerged in response to the impact of colonialism. (General Education Code(s): E.) *E. Honig*

147A. History of Premodern India.

A study of religions (Vaisnavism, Tantrism, Islam, Sikhism), art, literature, and social movements in their historical contexts from 1000 A.D. to 1800. (General Education Code(s): E.) *D. Basu*

147B. Political and Social History of Modern South Asia. S

Social, political, and religious movements in the colonial and postcolonial contexts of the 19th and 20th centuries in modern and contemporary South Asia. (General Education Code(s): E.) *D. Basu*

148. Cinema and History: Film Author Satyajit Ray. *

Satyajit Ray is widely acclaimed as a master of world cinema. Course considers his work to examine "authorship" at multiple levels: the cultural, historical, social, and familial contexts and the relationship of his film to fiction, the politics and poetics of his vision, and its relationship to colonial, nationalist, and postcolonial India. Also studies the question of gender and the underclass. (Also offered as Film and Digital Media 162A. Students cannot receive credit for both courses.) (General Education Code(s): E.) *D. Basu*

150A. Ancient Japan.

Surveys the history of the peoples of the Japanese islands from prehistorical migrations through the 15th century. Emphases include examination of social structures, political formations, cultural production, and religion. *N. Aso*

150B. Tokugawa Japan. S

Surveys the history of the peoples of the Japanese islands from the middle of the 15th century to the middle of the 19th century. Focus is on the era of civil war, the formation of the early modern federated state, social structure, and cultural production. *A. Christy*

150C. Modern Japan.

Surveys the history of the peoples of the modern Japanese nation from the Meiji Restoration to the present. Focuses on the formation of the modern state, empire, social movements, and cultural production. (General Education Code(s): E.) *A. Christy*

155. History of Modern Israel.

The conflict between Israelis and Palestinians is one of the most intractable disputes in our troubled world. Course begins with a glimpse of Palestine in the late 19th and early 20th centuries, surveys the rise and fall of utopian Zionism, pays especially close attention to the events of 1948 and 1967, and concludes by analyzing the collapse of hopes for peace after Oslo and Camp David meetings. (General Education Code(s): E.) *B. Thompson*

156. Introduction to the Archeology of Israel. W

Offers an archaeological survey that combines material culture from excavations with literary evidence from the Neolithic revolution through the formation of urban life in the 3rd millennium B.C.E. to the Babylonian conquest of Jerusalem (586 B.C.E.). *A. Yasur-Landau*

157. Archaeology of Gender in the Bronze Age Aegean and Near East.

New studies on the archaeology of the Aegean Bronze Age palatial cultures, the Minoan and the Mycenaean, now allow us to reconstruct the ways aspects of gender were negotiated by both elites and commoners. Course investigates how ancient perceptions of gender were manifested in various situations, such as warfare, religious activities, feasts, production, and commerce. Course 44, 156, or 194J is strongly suggested as preparation. *A. Yasur-Landau*

158B. African Archaeology: Development of Complex Societies. W

Introduces the evolution of African kingdoms and states from the emergence of farming communities to initial contact with Europe. Particular attention paid to the origins of social inequality and the evolution of centralized polities. Students cannot receive credit for this course and Anthropology 275B. (Also offered as Anthropology 175B. Students cannot receive credit for both courses.) Prerequisite(s): Anthropology 3; Anthropology 175A strongly recommended. *The Staff*

158C. African Diaspora. *

Introduces the African diaspora from an archaeological perspective. Focuses on examining the cultural, social, economic, and political lives of Africans and their descendants in the New World and West Africa from the 15th through 19th centuries. Students cannot receive credit for this course and Anthropology 275C. Will be offered in the 2009–2010 academic year. (Also offered as Anthropology 175C. Students cannot receive credit for both courses.) Prerequisite(s): Anthropology 3; Anthropology 175A and 175B strongly recommended. *The Staff*

159. Historical Archaeology: A Global Perspective. S

Introduces archaeology of European colonialism and the early-modern world. Topics include historical archaeological methods; the nature of European colonial expansion in New and Old Worlds; culture contact and change; and power and resistance in colonial societies. Students cannot receive credit for this course and Anthropology 278. (Also offered as Anthropology 178. Students cannot receive credit for both courses.) Prerequisite(s): Anthropology 3 or consent of instructor. *The Staff*

160A. Athenian Democracy.

Athenian democracy from foundation to the fourth century B.C., with emphasis on its practices and ideologies. Readings from ancient sources and modern theory. Topics to include foundations and development; Athenian concepts of freedom, equality, law, citizenship. Lectures and discussion. *C. Hedrick*

161B. Topics in Roman History.

Detailed consideration of some specific topic or period in Roman history, varying from year to year. Examples include Roman religion, Augustus and the Roman Empire, Julio-Claudian emperors and the principate, Roman slavery, and Christianity and Rome. Enrollment restricted to history and classical studies majors or permission of instructor. May be repeated for credit. *C. Hedrick*

163A. A History of Sin.

Ancient and modern conceptions of sin, and remedies offered for it. Course is not a theology of sin and redemption, but an invitation to reflect on ways sin and fault have been imagined and formulated. (Formerly course 163.) *G. Hamel*

163B. Genesis: A History. F

Introduction to historical, textual, source, and redaction criticism of the book of Genesis and to exegesis as science and ideology. Texts, history, and iconography of neighboring traditions (Mesopotamian, Ugaritic, Egyptian, Greek) are also studied when appropriate. Course 44, Literature 80A, or some basis in Hebrew or Greek is strongly suggested. *G. Hamel*

164A. Late-Medieval Italy, c. 1200-1400. W

Italy from the birth of the commune to the early Renaissance in Florence. Topics include urban life and social conflict, gender roles, St. Francis, the Black Death, female mystics, Dante, Boccaccio, humanism, artistic developments from Giotto through Donatello. Requires viewing several films outside of class. *C. Polecritti*

164B. Renaissance Italy, c. 1400-1600. S

Italy from the Florentine Renaissance through the Reformation. Topics include social change and political consolidation, the rise of the papacy, court life, witch hunting, Machiavelli, artistic developments from Donatello through late Venetian Renaissance. Requires viewing several films outside of class. Course 164A recommended as preparation. *C. Polecritti*

167. Imperial Spain 1469-1716. F

Examines the history of Spain from the time of the Catholic monarchs to the 18th century, focusing on Ferdinand and Isabel; the Inquisition; the conquest and colonization of America; the rise and fall of the Spanish Empire; the Catholic Reformation and Enlightenment; and internal transformations of the Spanish economy and society. *N. Silleras-Fernandez*

168. Rise of the Dutch Republic.

Focuses on the origin of the Republic in the revolt against Spanish overlordship, and its political, social, and economic development in the 16th and 17th centuries. *B. Sharp*

170A. French History: Old Regime and Revolution. F

French history from the Middle Ages through the Revolution. Focus on the rise and fall of "absolute" monarchy, the nature of Old Regime society, the causes and significance of the French Revolution. Attention to those who endured as well as to those who made events. *J. Beecher*

170B. French History: The 19th Century. W

Social, political, and cultural history of France from the Revolution to WWI. Focuses on the Revolutionary tradition, the Napoleonic myth, the transformation of Paris, and the integration of the peasantry into the national community. Readings include novels by Stendhal and Balzac. *J. Beecher*

171. Revolutions in France.

Examines the political/social upheaval in 1789, 1830, and 1848 in light of the sweeping changes brought to 19th-century France by those other great "revolutions" of the age, the democratic and the industrial. Students' written work focuses on the comparative analysis of revolution. (Formerly *Revolution in France*.) Offered in alternate academic years. *M. Traugott*

172A. German History. F

The development of German civilization, including philosophy and literature as well as politics and diplomacy in the nineteenth and twentieth centuries. *M. Cioc*

172B. German Film, 1919–1945. F

Introduction to German films from 1919 to 1945. Through combination of movies and documentaries, gain insight into political, economic, social, and cultural conditions of Weimar and Nazi Germany. *M. Cioc*

175A. Medieval Russia.

Medieval Russia. *P. Kenez*

175B. Russian History.

Imperial Russia. *P. Kenez*

175C. Russian History. F

Twentieth-century Russia. *P. Kenez*

175D. History of Soviet Film.

Does not stress questions of aesthetics or technical aspects of film making, but the changing ideology inherent in Soviet films. The goal of examining cinema is to enrich our understanding of Soviet history. Readings include works of famous directors and theorists—Eisenstein, Vertov, Pudovkin, and Kuleshov—in addition to secondary works by Denise Youngblood, Richard Taylor, Josephine Woll, and Anna Lawton. *P. Kenez*

178A. European Intellectual History: The Enlightenment.

Study of European thought and literature from Hobbes and Swift to Rousseau and Goethe. Focuses on relation of ideas to their social and cultural context. Special attention to traditions of religious conflict and criticism rising from the Protestant Reformation and to the intellectual and cultural roots of the French Revolution. (Formerly *European Intellectual History*.) *J. Beecher*

178B. European Intellectual History: The 19th Century.

Study of European thought and literature from Blake to Nietzsche. Focuses on relation of ideas to their social and cultural context. Special attention to the rise and fall of the Romantic movement, to changing conceptions of history, and to the development of socialist and aesthetic critiques of industrial civilization. (Formerly *European Intellectual History*.) *J. Beecher*

178C. European Intellectual History, 1870–1970.

Drawing on experiments in autobiography, the arts, and social theory, this course focuses on ideas and images of modernity in European culture. It also highlights the role of the intellectual as politically engaged or disillusioned witness in a violent century. Offered in alternate academic years. *B. Thompson*

178D. Russian Intellectual History. S

Focus on the emergence in 19th-century Russia of a westernized intelligentsia; its effort both to assimilate western ideas and to define the destinies of Russia; the shaping of the Russian revolutionary movement. Readings in Dostoyevsky, Turgenyev, Herzen, and representative Russian Slavophiles, Populists, and Nihilists. *J. Beecher*

178E. Modern Jewish Intellectual History. W

Surveys European Jewish intellectual history from the Enlightenment to the present. Major themes include emancipation and assimilation, the flowering of Yiddish literature, the rise of Zionism, new variations on the messianic idea, and Jewish contributions to the culture of urban modernism. Offered in alternate academic years. *B. Thompson*

180A. English History. F

Emphasis on the interaction between social, economic, religious, and political developments. An attempt to

place these phenomena in the context of the wider European and world scene. The period from 1485 to 1689. *B. Sharp*

180B. English History. W

Considers how Britain became the pacemaker of modernity in the 18th and 19th centuries; how national, regional, class, and gender identities formed and altered; and how Britain coped with loss of global power in the 20th century. *B. Thompson*

183A. Nineteenth-Century Italy.

Italian politics, culture, and society from the Napoleonic era through early leftist movements. Central emphasis on the Risorgimento and Unification. Other topics include: north-south conflict; banditry; urban change; growth of tourism; popular religion; family structures and gender; visual arts and opera. *C. Polecchiti*

183B. Fascism and Resistance in Italy.

Examines Italian politics, society, and culture from Unification to World War II, especially the Fascist regime. Interdisciplinary focus emphasizing history, literature, and film. (Formerly course 183.) *C. Polecchiti*

185A. Conflict of Interest: War, Holocaust, and Industry in the Lodz Ghetto. S

Examines how Nazi war machine exploited Jewish slave labor in the Lodz ghetto industrial complex while a state apparatus systematically exterminated the workers. Includes a visit from a survivor of ghetto factories and graphics from ghetto workshops. Prerequisite(s): one upper-division history course. Enrollment restricted to juniors and seniors. (General Education Code(s): E.) *M. Thaler*

185B. Rethinking the Holocaust: Bioscience, Race Theory, and Genocide.

Traces the Nazi "Superstate" project from its origins at the conjunction of bioscientific theory and racialist ideology to its conclusion in the Holocaust, providing a historical perspective for social and political dilemmas raised by contemporary biomedical advances. (General Education Code(s): E.) *M. Thaler*

185D. Jewish Social Movements. W

Jewish social movements of the late 19th and 20th centuries, in Europe (Eastern and Western) and the U.S.: the confrontation between Hasidism and Haskalah, tensions between socialism and Zionism, between religiosity and secularism, the mutual influences among these tendencies. (Also offered as History of Consciousness 118. Students cannot receive credit for both courses.) Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): E.) *B. Epstein*

185E. The Historiography of the Holocaust. W

Offers a comprehensive historiography of the Holocaust, distinct from the narrowly focused perspectives generally presented in Holocaust studies, to familiarize students with the origins, evolution, and major developments in the Nazi genocide and its historical consequences. Enrollment restricted to juniors and seniors. (General Education Code(s): E.) *M. Thaler*

190. Advanced Research and Reading Seminars.

An opportunity for advanced students to focus on specific research problems resulting in a substantial research paper of 25 pages, or discussion of assigned readings resulting in a series of short papers totaling 25 pages. Courses must be taken in area of concentration in order to count towards the major.

190A. Slavery and Race in Latin America. S

Covers comparative history of slavery in Latin America with questions of race in the colonial and national periods and key moments and debates in the historiography of slavery and its relation to ideologies of the past and the nations. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *M. Diaz*

190B. Race and the Nation in Latin America.

Focuses on the ways in which nation and race have been thought about in Latin America throughout the 19th and 20th centuries. These concepts were closely intertwined, albeit in differing and changing ways, since the wars of independence from Spain and Portugal (1810–1825). Compares the ways in which "black," "Indian," and "racially mixed" ("mulatto" or "mestizo") have been socially constructed, ideologized, and contended in different countries, including Brazil, the Spanish-speaking Caribbean, Mexico, Peru, and Argentina. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *M. Diaz*

190C. Race, Class, and Gender in California History.

The study of the social history of racial minorities and women in the historical development of California society. Emphasis on racial, class, and sexual conflict within the context of the history of California since 1848. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. Offered in alternate academic years. (General Education Code(s): W, E.) *P. Castillo*

190D. Tale of Two Cities. *

A comparative study of the social, economic, cultural, political, and geographical development of Los Angeles and Mexico City in the 20th century. Emphasis on the diverse peoples, changing physical environment and various images/interpretations of these two world cities. (Also offered as Latin American&Latino Studies 194P. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history and Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): W, E.) *P. Castillo*

190E. Topics in Chicana/o History.

A seminar on the history of Chicanos/Mexicans in the United States, 1848 to the present. Topics include Chicana/o labor, family, social, urban, cultural, and political history. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *P. Castillo*

190F. Research Seminar in the Americas. F

Students learn how to conduct research and write history. Primary and secondary sources are extensively

read. Research sources include a rich array of government documents, newspapers, memories and diaries, visual material and film. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *L. Haas*

190H. Myths and Models in (and of) American History.

We make a close reading of current and innovative work in U.S. history. We study how historians construct stories based upon models of the society, culture, and state, embracing certain political and moral ends which are plotted like other stories. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *L. Haas*

190I. California and the Borderlands.

Complete original research in California and borderlands history in this senior research seminar. Focus on selected problems and themes. Assignments and discussions help students frame their research and edit their writing. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *L. Haas*

190K. Wired Planet: Readings on the Global History of Broadcasting and Telecommunications.

Locates common themes in the history of broadcasting and telecommunications throughout the world. Why do certain strategies for developing broadcasting and telecommunications systems succeed or fail? Why do some nations outstrip other nations of comparable development in the growth of their communications systems? Why do national or regional communication systems suddenly become more or less open—or more or less centralized? Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Lasar*

190L. Personal Politics in the New South.

Examines the tensions between movements for political reform and reaction in the southern United States between Reconstruction and World War II. Students develop a research paper grounded in primary research that addresses these questions. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; two upper-division history courses or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *C. Jones*

190N. Topics in African History.

Examines contemporary crises in Africa: the new South Africa, refugees, HIV/AIDS, children of war, blood or conflict diamonds, civil war, and genocide in Rwanda. Seminar format where students will be prepared to undertake studies on specific subjects and two rounds of 15–20 page papers. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or

permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *D. Anthony*

190O. African American Historiography. S

Major themes in contemporary African American historiography on a topical basis. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *D. Anthony*

190P. Early American Society and Culture.

Explores subjects and themes in the political, social, and cultural history of early U.S. history from the colonial period through 1850. Includes critical reading of current scholarship and research in primary texts. The focus of this course is the production of a 25-page research paper. Recommended for senior history majors. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Westerkamp*

190R. Research in the History of American Religions. W

Readings and research in the history of religions in the United States. Readings focus on topics including the rise of evangelicalism; gender and religion; class, race, and religious diversity; and modernity. Students produce papers that culminate in a 25-page research project. Prerequisite(s): Satisfaction of the Entry Level Writing and Composition requirements and two upper division history courses. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *M. Westerkamp*

190S. Women and Social Movements in the U.S.

Examines history of women and social movements in the U.S., such as abolitionism, antilynching, Chinese and Jewish garment workers, Chicana farm labor activism, the American Indian Movement, the Ku Klux Klan, and the Civil Rights movement. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *D. Frank*

190T. Latin America in the Cold War. W

Writing-intensive seminar on Latin America during the Cold War. Particular attention given to U.S.-Latin American relations, including moments of covert or direct interventions. Students pursue advanced research using primary and secondary sources. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and two upper-division history courses. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. O'Hara*

190U. Power and Culture in the U.S. F

Students read historical monographs that explore, from a variety of race, class, and gender perspectives, how U.S. culture and thought have changed over time. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor.

Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Lasar*

190V. The Corporation and Its Critics.

Studies transformation of the U.S. corporation from limited tool in hands of state government to the central organizational unit of capitalism and crucial focus of American politics. Readings include influential histories of the corporation from Republic's early years through 1970s. Students debate impact of the corporation from Marxist, free market, anti-colonialist, and feminist perspectives. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Lasar*

190W. Who Controls Broadcasting?.

Focuses on the social and political construction of major telecommunications and broadcasting systems in the U.S. including wireless, telephone, radio, television, and the Internet. Emphasis on reading and analyzing prominent scholarly and popular works on this subject. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Lasar*

190X. History of the Atlantic World, 1492-1824. W

Explores the transatlantic societies created by Europeans' colonization of the Americas, and their exploitation of African slaves. Questions whether the cultural, economic, and political links across the ocean integrated the adjacent lands into a fundamentally "Atlantic World." Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and two upper-division history courses. Enrollment limited to 20. (General Education Code(s): W.) *G. O'Malley*

192. Directed Student Teaching.

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Students submit petition to sponsoring agency. *The Staff*

193. Field Study.

To allow promising, well-qualified undergraduates to pursue directed programs of archival or archaeological study in the field under supervision of the UCSC history faculty, concentrating their work within a single given quarter. Students may take two or three courses concurrently. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Advanced Research and Reading Seminars.

An opportunity for advanced students to focus on specific research problems resulting in a substantial research paper of 25 pages, or discussion of assigned readings resulting in a series of short papers totaling 25 pages. Courses must be taken in area of concentration in order to count towards the major.

194A. Gender, Class, and Sex in Shanghai. W

Focusing on Shanghai, course examines issues of gender, class, and sex in modern urban Chinese history. Given Shanghai's history as a treaty port, particular attention paid to ways in which its semi-colonial status inflected the articulation of gender identities, class formations and issues of sexuality (particularly sexual labor). Also looks at Shanghai during the Mao-

ist period and in the context of more contemporary economic reforms. (Also offered as Feminist Studies 194N. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; and course 140C, or 140D, or 140E, or Feminist Studies 80C, or permission of instructor. Restricted to junior and senior feminist studies majors. Enrollment limited to 20. (General Education Code(s): W.) *E. Honig*

194B. Okinawan History.

Examines the history of Okinawa with particular attention paid to the modern era. The goal is to give students a solid foundation in the historiography of major themes in the study of Okinawan society. (Formerly course 196X.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history, German studies, or classical studies majors. Enrollment limited to 20. (General Education Code(s): W.) *The Staff*

194E. Women in Japanese History.

Examines through both primary and secondary sources such issues as work, sexuality, education, class, and ethnicity in relation to constructions of female gender in Japanese society over the past several centuries, particularly focusing on the modern era. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *N. Aso*

194G. China Since the Cultural Revolution: Histories of the Present.

Explores the rapid and often destabilizing shifts that have taken place in China since the late 1970s (the "reform era"), tracing the effects of China's earlier experiment with revolutionary socialism on the market-driven present. Examines how various meanings of reform are negotiated; changes in rural and urban environments; and class, gender, and ethnic differences. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *G. Hershatter*

194H. Gender, Family, and State in China: 1600-Present.

Explores gender, family, and state power in China from 1600 to present, examining gendered norms, education, political movements, revolutionary practice, sexuality and sex work, and state interventions in contemporary families. Responses to reading and a research paper required. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *G. Hershatter*

194J. Canaanite Society, Art, and Religion. S

Examines aspects of Canaanite culture from its formation in the Middle Bronze Age, through its heyday in the shadow of the Egyptian empire, to its demise with the collapse of the Bronze Age world. An interdisciplinary approach combines texts (such as the El Amarna letters), iconography, and material culture from palace, cultic, and domestic contexts, allowing us to investigate aspects of rulership, social structure, religion, and economy. Prerequisite(s): satisfaction of the

Entry Level Writing and Composition requirements; and two upper-division history courses, or by permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *A. Yasur-Landau*

194K. History and Archaeology of the Philistines. S

Examines aspects of the Philistine migrant society from its formation during the Mycenaean post-palatial era, through the sea and land routes of migration to the final settlement in the southern coast of Canaan. Prerequisite(s): Satisfaction of the Entry Level Writing and Composition requirements, and course 156 or course 194J, and one upper-division history course, or by permission of instructor. Enrollment restricted to junior and senior History or Anthropology Enrollment limited to 20. (General Education Code(s): W.) *A. Yasur-Landau*

194M. Literati, Samurai, and Yangban: Comparative History of State and Elite in East Asia, 1600-1900. W

Critically examines the formation of political elites in East Asia. Compares literati in Ming and Qing, China; samurai in Tokugawa, Japan; and yangban in Joseon, Korea. Each group occupied specific roles and functions in their state and society but differed in scale and character. Students cannot receive credit for this course and course 294M. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Hu*

194N. Comparative Studies in Modern Asian History. F

Seminar on cultural and social changes in Asia, mainly in the 19th and 20th centuries. Topics include colonial encounters, cities, narratives of ordinary persons, nationalism and identity, visual cultures, and Orientalism. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *D. Basu*

194R. Cairo: The City Victorious, 1750-2000. S

The modernization of a world city from 1750 to the present. Cairo's social and cultural history (literature, film, music) against the background of its changing political and economic contexts. Topics include: orientalism, nationalism, imperialism, minorities, women, migration, urbanism, popular culture, tourism. Prerequisite(s): Two upper-division history courses; and course 41 or 101A or 101B; and satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 20. (General Education Code(s): W.) *E. Burke*

194S. Comparative Studies in World History.

Explores a broad topic in world history (varies from year to year) such as settler colonial nationalism, mission, involuntary labor, pre-political resistance, or defensive modernization in comparative historical perspective. (Formerly course 196W.) Enrollment limited to 20. May be repeated for credit. (General Education Code(s): W.) *The Staff*

194U. The Cold War and East Asia.

Considers through primary and secondary sources the events and aftermath of the Cold War in East Asia in

terms of state formation, domestic and foreign policy, and protest movements in China, Taiwan, Korea, and Japan with reference to Vietnam. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *N. Aso*

194Y. Memories of WWII in the U.S. and Japan. S

Research seminar comparing U.S. and Japanese memories of World War II. Topics include war origins, total war, the atomic bomb, war responsibility, reparations, memorials, museums, and monuments. Primary work devoted to research in original texts and documents. Prerequisite(s): two upper-division history courses or permission of instructor; satisfaction of the Entry Level Writing and Composition requirements; course 80Y recommended. Enrollment limited to 20. (General Education Code(s): W, E.) *A. Yang-Murray*

195A. Thesis Research.

Prerequisite(s): petition on file with sponsoring agency (students should have completed two upper-division courses, preferably in their area of concentration). *The Staff*

195B. Thesis Writing.

Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; petition on file with sponsoring agency (students should have completed two upper-division courses, preferably in their area of concentration). (General Education Code(s): W.) *The Staff*

196. Advanced Research and Reading Seminars.

An opportunity for advanced students to focus on specific research problems resulting in a substantial research paper of 25 pages, or discussion of assigned readings resulting in a series of short papers totaling 25 pages. Courses must be taken in area of concentration in order to count towards the major.

196A. Is British History Possible?.

An examination of the possibilities and problems of producing a history that is genuinely British: one that pays due attention to the histories of the four modern peoples or nations of the British archipelago. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *B. Sharp*

196C. Modern Italian Culture.

Developments in Italian culture and society from the postwar to the present. Topics include north-south divisions, family and gender, cinema and modernity, urbanization, mafia, and terrorism. Prerequisite(s): course 164A or 164B or 183, or permission of instructor and one upper-division history course; and satisfaction of the Entry Level Writing Requirement. Enrollment limited to 20. (General Education Code(s): W.) *C. Polecristi*

196E. Modern Irish History.

Aims to illuminate major themes and turning points of modern Irish history: the causes and consequences of the famine; the development of Irish nationalism; revolution, civil war, and partition; and the recent economic boom. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of

instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *B. Thompson*

196G. Modern Germany and Europe. S

A senior reading and research seminar that explores the major historiographical debates in German history during the 19th and 20th centuries. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history and German studies majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Cioe*

196I. The French Revolution.

Students conduct original research on the French Revolution of 1789 based on mix of primary and secondary courses. Classroom discussions focus on interpreting contemporary documents and addressing historiographical issues. Seminar format with significant written requirements. Presumes familiarity with the period. Prerequisite(s): course 70B or 170A or 171. Students who have taken course 70B must also have taken one upper-division history course. Enrollment restricted to history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Traugott*

196J. Autobiography and History.

Students prepare research papers using a combination of sources, both primary (the autobiographies, diaries, or memoirs of historically relevant figures) and secondary (chronologically and thematically appropriate works of synthesis that help contextualize the lives of their subjects). Seminar format with significant written requirements. Prerequisite(s): satisfaction of the Entry Level Writing requirement; Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *M. Traugott*

196K. Studies in European Intellectual History. W

Topics in European intellectual history from the French Revolution to World War I. Readings exemplifying approaches from history of ideas and intellectual biography to recent studies of rhetoric and political culture. Preparation and presentation of research paper. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *J. Beecher*

196N. Eastern European Jewish Social History. F

Study of 19th- and 20th-century Eastern European and Russian Jewish social history. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history and German studies majors. Enrollment limited to 20. (General Education Code(s): W, E.) *P. Kenez*

196O. Russian Revolution, 1917-1932.

Study of the major political, social, and intellectual conflicts and transformations of the period. Topics include February and October revolutions, Civil War, NEP, rise of Stalinism, and collectivization. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment

restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *P. Kenez*

196P. Hitler and Stalin.

A discussion of 20th-century totalitarianism. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history and German studies majors. Enrollment limited to 20. (General Education Code(s): W.) *P. Kenez*

196Q. Private Lives, Family Histories, and the Holocaust Experience.

Holocaust historiography has surveyed the broad landscape of genocide or focused narrowly on individual experience. Course examines the middle ground of family and its role in resistance during the destruction of communal existence and survival in the aftermath. Prerequisite(s): two upper-division history courses or permission of instructor. Enrollment restricted to junior and senior history, German studies, and classical studies majors. Enrollment limited to 20. (General Education Code(s): E.) *M. Thaler*

196R. Social World of Roman Palestine. S

Inquiry into the structures of Roman Palestine on the basis of parables from the synoptic Gospels, the Dead Sea Scrolls, Josephus, inscriptions, and archaeological discoveries. Physical, social, economic, and ideological conditions are researched in an ethnographic fashion. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses. Enrollment restricted to junior and senior history and classical studies majors. Enrollment limited to 20. (General Education Code(s): W.) *G. Hamel*

196S. Special Topics in Ancient History.

Seminar focuses on different topics in ancient history. In addition to assigned readings, the student is expected to do additional research that culminates in a 20-page paper on a topic of the student's choice. General topics for the course will vary from year to year. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors and classical studies majors. Enrollment limited to 20. (General Education Code(s): W.) *C. Hedrick*

196T. Topics in Medieval and Early Modern History.

Examines medieval and early modern history in Western Europe through analysis of primary and secondary sources and review of historiographical styles and techniques. Topics addressed vary, but may include gender, politics, economics, society, ethnicity, slavery, religion, and others. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, and course 103 or 164A or 164B or 167, and one upper-division history course. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *N. Silleras-Fernández*

196U. Topics in Medieval History. W

Addresses contemporary and modern interpretations of the events relation to medieval history. Through critical discussion and debate, assesses the value and limitations of various historical sources, as well as developing skills in research, presentation-making, and writing. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course

102A or 103, and one upper-division history course, or by permission. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): W.) *B. Catlos*

196W. Women and Power from 1100 to 1600. W

Analyzes female power and authority in the Late Middle Ages and the Early Modern era, focusing principally on Western Europe but including comparisons to Mediterranean areas. Examines social status, gender roles, and women's strategies for self-determination. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, two upper-division history courses, or permission of instructor. Enrollment restricted to junior and senior history majors. Enrollment limited to 20. (General Education Code(s): W.) *N. Silleras-Fernández*

196Y. Saints and Holiness in Medieval Europe. S

Examines popular religious belief and practice, including conversion, the cult of the saints, relics, pilgrimage, miracles and visions. Emphasis on Medieval Europe, but some attention also paid to modern patterns of devotion. Prerequisite(s): courses 65A, or 164A, or 164B. Students who have taken course 65A must also have taken one upper-division history course. Enrollment limited to 20. (General Education Code(s): W.) *C. Polecristi*

198. Independent Field Study.

Student's supervision is conducted by a regularly appointed officer of instruction by means other than the usual supervision in person (e.g., by correspondence) or student is doing all or most of the course work off campus. May be repeated for credit. *The Staff*

199. Tutorial.

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits).

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Methods and Theories of History. F

An overview of theories, methods, and philosophies concerning the nature and production of history. Topics vary with instructor. Enrollment restricted to graduate history students and others by permission of instructor. Enrollment limited to 20. *M. Traugott*

201. Directed Research Colloquium. W

Having already prepared a bibliography and research prospectus in a graduate research seminar, students will undertake further research on their projects, write a 25-30 page research paper, and present their work to their fellow students. Prerequisite(s): history graduate research seminar. Enrollment restricted to graduate history students. Enrollment limited to 15. *A. Yang-Murray*

204A. History of Gender Research Seminar. S

Introduction to theories and methods employed in gendered historical research. Readings are drawn from a range of chronological, national, and thematic fields and explore the intersection of gender analysis with such historical problems as the body and sexuality, modernity, national identity, and production/consumption. Enrollment restricted to graduate history majors. Enrollment limited to 15. *M. Westerkamp*

204B. Society and Culture Research Seminar.

A graduate course introducing students to research using primary historical materials to explore topics in society and cultural history from 1500 to the present. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Beecher*

204C. Colonialism, Nationalism and Race Research Seminar.

Research seminar introducing theories and methods of the comparative histories of race, ethnicity, colonialism, and nationalism. Enrollment restricted to graduate history students. Enrollment limited to 15. *M. O'Hara*

210A. Readings in U.S. History.

Introduction to major themes and controversies in the interpretation of U.S. history. Readings cover both chronological eras and topical subjects, often in a comparative context: colonial and early national periods. Enrollment restricted to graduate history majors. Enrollment limited to 15. *M. Westerkamp*

210B. Readings in U.S. History.

Introduction to major themes and controversies in the interpretation of U.S. history. Readings cover both chronological eras and topical subjects, often in a comparative context: 19th century. Enrollment restricted to graduate history majors. Enrollment limited to 15. *C. Jones*

210C. Readings in U.S. History. W

Introduction to major themes and controversies in the interpretation of U.S. history. Readings cover both chronological eras and topical subjects, often in a comparative context: 20th century. Enrollment restricted to graduate history majors. Enrollment limited to 15. *M. Lasar*

215A. Topics in American History: U.S. Labor and Working Class History.

Addresses topics in history of working people, the labor movement broadly defined, and political-economic change in the U.S. Topics include race, ethnic and gender dynamics, and U.S. labor and working-class history in global context. Enrollment limited to graduate students. Enrollment limited to 15. *D. Frank*

215B. Visions of Progress.

Explores the emergence of the welfare/regulatory state in the United States from the 1870s to World War I, examining different schools of historical thought about this period. Enrollment limited to 15. *M. Lasar*

215C. U.S. Immigration and Ethnic History.

Introduces key issues and debates in United States immigration and ethnic history. Topics include causes of immigration; constructions of race, gender and ethnicity; assimilation; transnationalism; and forces shaping immigration policy. Enrollment restricted to graduate students. Enrollment limited to 10. *D. Brundage*

220. The Atlantic World, 1500–1800.

Explores the economic, social, and cultural history of early America in terms of its Atlantic connections and intersection with the cultures of early modern Europe, Africa, and Latin America. Builds upon previous work in early America and early modern Europe, challenging students both to work comparatively and to break out of traditional geographic models. (Formerly *Topics in American History: The Atlantic World 1500–1800*.) Enrollment restricted to graduate students. Enrollment limited to 15. *M. Westerkamp*

221. Empires and New Nations in the Americas. F

Compares the history of the colonial and 19th-century Americans through a world-history perspective. Focuses

on the interrelated themes of indigenous histories, slavery and other forms of servitude, commodity production, and the meaning of equality and freedom in new nations. Enrollment restricted to graduate students. Enrollment limited to 15. *L. Haas*

225. Spanish Colonialism.

Reading-intensive graduate seminar with emphasis on theoretical and historiographical questions regarding the field of Spanish colonialism in the Americas. Students encouraged to engage in discussions of comparative colonialisms. Enrollment restricted to graduate students. Enrollment limited to 10. *M. Diaz*

230A. Readings in Late Imperial China.

Survey of the major works on and historiographical controversies about Qing Dynasty (1644–1911) China. Enrollment restricted to graduate students. Enrollment limited to 20. *M. Hu*

230B. Engendering China.

Reading seminar on the history of Chinese gender, focusing on the Qing dynasty (1644–1911) to the present. Topics include marriage and family, sexuality, work, the gendered language of politics, and major reform movements. Enrollment restricted to graduate students. Enrollment limited to 20. *G. Hershatter*

230C. Readings in 20th-Century China. F

A survey of major Western-language works and historiographical controversies in Chinese history from 1900 to the present. Weekly readings emphasize particular social and political movements as well as long-term changes in urban and rural society. Enrollment restricted to graduate students. Enrollment limited to 20. *E. Honig*

238A. Research Methods: China. S

An introduction for graduate students to the use of major research tools and sources in Chinese history since 1600, with a focus on 20th-century materials. Students complete a series of bibliographical exercises and prepare a research prospectus. (Formerly course 228A.) Enrollment restricted to graduate students. Enrollment limited to 20. *G. Hershatter*

238B. Research Methods: China.

Building on the research and bibliographic skills developed in course 228A, students develop a research topic and write a paper of 20–30 pages using primary sources as appropriate in English, Chinese, and/or Japanese. (Formerly course 228B.) Enrollment restricted to graduate students. Enrollment limited to 20. *G. Hershatter*

242. Readings in Modern Japan.

A graduate course intended to give students a fundamental understanding of the major themes in the study of modern Japanese history. Central themes include modernity and modernization, colonialism, postwar recovery, gender, race, and nationalism. (Formerly course 210.) Enrollment restricted to graduate students. Enrollment limited to 15. *A. Christy*

243. Transnational Japan. W

Examines how "Japanese" history has been forged across, outside, and beyond the boundaries of the modern nation-state of Japan. Considers how Japan has transformed the world. Students debate how the world made Japan and how Japan re-made the world. Enrollment restricted to graduate students. Enrollment limited to 10. *A. Christy*

244. Gender and Japanese History.

Examines—through primary and secondary sources—constructions of gender (masculine, feminine, and trans-

gender) in Japanese society over the past several centuries, focusing on the modern era. Enrollment restricted to graduate students. Enrollment limited to 15. *N. Aso*

250A. Readings in European Social and Cultural History. W

A readings seminar that introduces beginning graduate students to some of the major conceptual and methodological approaches to early modern European social and cultural history, 1400–1789. (Formerly course 205A.) Enrollment restricted to graduate students. Enrollment limited to 20. *B. Sharp*

250B. Readings in European Social and Cultural History.

A readings seminar that introduces beginning graduate students to some of the major problems in modern European social and cultural history, 1789 to the present. (Formerly course 205B.) Enrollment restricted to graduate students. Enrollment limited to 20. *P. Kenz*

256. Nationalism, Anti-Semitism, and Jewish Resistance in World War II.

Jewish resistance to Nazism during World War II, in Eastern Europe, and its historical context. Includes the pre-war rise in nationalism and anti-Semitism in Poland and Lithuania, Jewish integration in the Soviet Union, and the consequences for wartime resistance. (Also offered as History of Consciousness 243A. Students cannot receive credit for both courses.) Enrollment restricted to seniors and graduate students. Enrollment limited to 15. *B. Epstein*

280A. History Graduate Proseminar: Teaching Pedagogy (2 credits). F

Devoted to professionalism and socialization of history graduate students. Includes formal and informal meetings with faculty and other graduate students. Topics include TAships, designing course syllabi, pedagogy, teaching technologies, and teaching in different venues. This course is required for first-year students; however, it is open to all other history graduate students as needed. Enrollment restricted to graduate history majors. May be repeated for credit. *M. O'Hara*

280B. History Graduate Proseminar: Research Presentations and Grant Writing (2 credits).

Devoted to professionalism and socialization of history graduate students. Topics include discussion of researching grants; effective CV writing; successful grant applications and publication proposals; and conference paper and panel proposals. Required for first-year graduate students; however, open to all history graduate students as needed. This course is required for first-year students; however, it is open to all other history graduate students as needed. Enrollment restricted to history graduate students. May be repeated for credit. *B. Catlos*

280C. History Graduate Proseminar: Job Market (2 credits). S

Devoted to professionalism and socialization of history graduate students. Includes formal and informal meetings with faculty and other graduate students. Topics include researching position; preparing a CV and the job-application letter; preparing for an interview; practice interview; preparing a job talk and/or teaching presentation; and practice job talk. This course is required for first-year students; however, it is open to all other history graduate students as needed. Enrollment restricted to graduate history majors. May be repeated for credit. *G. O'Malley*

283. Foreign Language Preparation (2 credits). F,W,S

Independent study course in which history graduate student reads selected texts to fulfill foreign language requirement. Student meets with instructor to discuss readings, deepening his knowledge of the foreign language. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

284. Qualifying Examination Preparation (2 credits). F,W,S

Independent study course designed to help students prepare for qualifying exams. Students meet on regular basis with one or more members of qualifying examination committee to monitor preparation for exam. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

285. Readings in Research Field (2 credits). F,W,S

Independent study focusing on selected texts or authors in history or historical theory. Students meet on regular basis with instructor to discuss readings and deepen their knowledge of a particular author or historical theory. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

286. Research Colloquium on Colonialism, Nationalism, and Race (2 credits). F,W,S

Acquaints students with the department's thematic research clusters in their field to coordinate training in historical research. Students meet on a regular basis with a faculty member of a particular cluster to discuss most important readings in the field. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

287. Research Colloquium on Gender (2 credits). F,W,S

Acquaints students with the department's thematic research clusters in their field to coordinate training in historical research. Students meet on a regular basis with a faculty member of this cluster to discuss most important readings in their field. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

288. Teaching Assistant Preparation (2 credits). F,W,S

Independent study designed to help history graduate students prepare to teach in an area of history outside their specialization. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

289. History Colloquium (2 credits). F,W,S

Independent study designed to foster departmental and cross-disciplinary participation in campus talks, colloquia, conferences, and events. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

294M. Literati, Samurai, and Yangban: A Comparative History of State. S

Critically examines the formation of political elites in East Asia. Compares literati in Ming and Qing China; samurai in Tokugawa, Japan; and yangban in Joseon, Korea. Each group occupied specific roles and functions in their state and society but differed in scale and character. Students cannot receive credit for this course and course 194M. Enrollment restricted to graduate students. Enrollment limited to 20. *M. Hu*

297. Independent Study.

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research.

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

History of Art and Visual Culture

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Faculty and Professional Interests**Professor**

HARRY BERGER JR., Emeritus

RAOUL BIRNBAUM, Patricia and Rowland Rebele
Chair in History of Art and Visual Culture
Buddhist studies, especially Chinese practices from medieval times to the present; religion and visual culture in China

MARTIN A. BERGER
American studies and visual studies; construction of gender and race

CAROLYN DEAN
Cultural histories of the native Americas and colonial Latin America

JOHN HAY, Emeritus

VIRGINIA JANSEN, Emerita

JASPER A. ROSE, Emeritus

CATHERINE M. SOUSSLOFF, University of
California Presidential Chair
European cultural theory, aesthetics, and the historiography of art; performance studies; early modern Italian art; media history including film; Jewish identity and representation

Associate Professor

ELISABETH CAMERON
Visual cultures of central Africa, issues of gender, post-colonialism, and iconoclasm

JENNIFER A. GONZÁLEZ
Contemporary theories of visual culture, semiotics, critical museum studies, photography, public and activist art in the U.S.

DONNA M. HUNTER
European painting (especially French) from 1600 to the 1960s; German art and visual culture between the two world wars; art as social practice, portraiture

STACY KAMEHIRO
Visual cultures of Oceania; internationalism; culture contact; colonial cultures; gender studies; museums and collecting

Assistant Professor

MARIA EVANGELATOU
Medieval visual culture with emphasis on Byzantium and its periphery; manuscript illumination, Marian cult and iconography; ancient Greek and Roman visual culture; Islamic visual culture; gender studies

BORETH LY

Visual cultures of Southeast Asia and its diaspora: religions and materiality, theory of visual narrative, the politics of cultural translation; (post) colonial and cultural studies; issues of gender, sexuality, race, and trauma

Lecturers

SORAYA MURRAY

Contemporary art with emphasis in new media art and theory; African diaspora and globalization

KIRTANA THANGAVELU

Religion and visual culture in India and Asia

**Professor**

JOHN DIZIKES, Emeritus (American Studies)

SHELLY ERRINGTON (Anthropology)
Globalization of folk art, visual and social semiotics, photography, film, the Internet and digital media, Southeast Asia, and Latin America

Program Description

Visual culture, as a contemporary academic field evolving from the historical study of art, investigates the production, form, and reception of images past and present. It incorporates the painting, sculpture, and architecture conventionally defined by art history, but it extends throughout the fields of visual imagery beyond the cultural boundaries formerly drawn by academic tradition. The history of art and visual culture program at UCSC focuses its cultural and historical investigation across a wide variety of representations in the cultures of Africa, the Americas, Asia, Europe, and the Pacific Islands, from masks and mountains to mass media.

Students of visual culture at UC Santa Cruz encounter complex questions raised from a variety of viewpoints. Foremost among these are questions about the social, economic, religious, and psychological influences on those who produce visual images as well as on those who view them. Also considered is how images form beliefs and values, taking into account the issues of gender, sexuality, ethnicity, race, and class. Questions of theory and methodology are addressed throughout the range of courses, although some courses emphasize these more than others.

The history of art and visual culture curriculum guides students in acquiring skill in critical thinking about visual culture, leading to a B.A. degree. Each student majoring or minoring in visual culture devises an individual study plan with a faculty adviser. Courses are organized in four levels, with each level providing a progressively sophisticated study of materials and problems. The lower-division courses, numbered 1–99 and intended for general education students and prospective majors, provide an introduction to the field of visual culture according to geographic areas and visual traditions within those areas. Upper-division courses, numbered 100–149, cover a broad range of issues in various aspects of world culture from earliest times to the present. Advanced courses, numbered 150–189, focus on selected fields, topics, and methods. The most advanced courses, numbered 190 and 191, are taught in seminar format.

Declaring the Major

Prospective majors must complete two of the lower-division 10-series courses in history of art and visual culture before declaring the major. All students considering this major should consult with the history of

art and visual culture undergraduate adviser as soon as possible. Students must complete the worksheet for declaring the major in preparation for a meeting with a faculty adviser to finalize the Proposed Study Plan Declaration of Major/Minor petition form.

Lower-Division Requirements

Five courses, as follows:

- three survey courses 10D, 10E, and either 10F or 10G
- two courses selected from the following:
 - additional 10-series courses
 - 80-series courses
 - visual practice courses: Art 20–30, 70; Theater Arts 14, 18; Science Communication 104A-B, 106A, 107, 110
 - transfer courses—a total of 9-10 quarter credits
 - up to two upper-division history of art and visual culture courses may be substituted with prior approval of a faculty adviser.

Upper-Division Requirements

Ten 5-credit courses, as follows:

- nine upper-division history of art and visual culture courses:
 - course 100A recommended during sophomore or junior year
 - courses 101-189: six courses required
 - courses 190–191: two courses required, one of which must satisfy the senior comprehensive requirement (see Comprehensive Requirement below)
 - In courses 100–191, a student must study with four different faculty members to ensure methodological and theoretical diversity as well as study visual cultures in two of historical eras and two cultural settings (refer to the course descriptions).
- tenth course: one upper-division course from another discipline, approved by a faculty adviser. The course taken outside of the History of Art and Visual Culture Department to fulfill the upper-division major requirement should complement a student's history of art and visual culture program focus. Courses from the following departments are especially relevant: American studies, anthropology, film and digital media, history, Latin American and Latino studies, literature, philosophy, sociology, theater arts, and feminist studies. Courses from other departments may be considered.

Comprehensive Requirement

One of the two seminars, 190–191, taken to meet the requirements for the major must be taken in the senior year to fulfill the senior comprehensive requirement. Within the context of an advanced seminar, this course provides supervised work culminating in the completion of a major coherent project that meets the standards of the senior level of achievement in the history of art and visual culture. Students whose performance is outstanding are eligible for Honors. Students taking the course for Pass/No Pass who do not pass will receive a fail (F).

Concentration in Religion and Visual Culture

This program is for students who wish to pursue the study of religion in conjunction with studies of visual culture. It consists of an individually planned sequence

of courses, including a core set of lower-division courses (1–99), to provide grounding in issues, methods, and a general history of visual culture; upper-division courses (100–199) from within the department; and at least four upper-division courses from other departments that focus on the study of religion.

A student enters the concentration by proposing, in consultation with a faculty adviser, a sequence of upper-division courses to fulfill the Religion and Visual Culture requirements. Ordinarily, students complete two lower-division courses in history of art and visual culture before declaring the major. The faculty adviser for the Religion and Visual Culture concentration is Raoul Birnbaum.

Requirements

Fourteen courses are required: three lower-division and seven upper-division courses from within the department and four relevant upper-division courses from other departments.

Lower-Division Courses

- courses 10D, 10E, and either 10F or 10G

For students who have sufficient background, an upper-division history of art and visual culture course may be substituted with prior approval of a faculty adviser.

Upper-Division Courses

- seven upper-division history of art and visual culture courses (course 100A, two numbered 101–149, two numbered 150–189, and two numbered 190 or 191).
- four upper-division courses in the study of religion from programs on campus such as anthropology, history, literature, and philosophy. (A current list of courses on campus that focus on the study of religion is maintained by the History of Art and Visual Culture Department office.)
- one of the two history of art and visual culture seminars (courses 190 or 191) required for the concentration should be taken in the senior year specifically to fulfill the senior comprehensive requirement.

Double Majors

History of art and visual culture may be studied as part of a double major. A student must fulfill all of the requirements for both majors.

Minor Requirements

Nine courses, as follows:

- lower-division: three courses (10D, 10E, and either 10F or 10G);
- upper-division: six courses planned in consultation with a faculty adviser (one history of art and visual culture 80-series course may be substituted for one upper-division course).

Transfer Students

A student may transfer up to five art history courses toward the major, only two of which may be upper division. Upper-division transfer credit must be approved by the student's faculty adviser. Transfer students are invited to contact the History of Art and Visual Culture Department before enrolling at UCSC.

Study Abroad

The University of California's Education Abroad Program (EAP) operates in countries throughout the world and serves over 4,000 upper-division students from the 10 UC campuses annually. Students may receive transfer credit for a maximum of three upper-division art history courses taken through the EAP program. Credit for courses taken at other institutions is given only with permission of the student's adviser. It is strongly suggested that students consult with a faculty member about their course of study before going abroad to avoid any confusion about these transfer credits.

Careers

The preparation students receive from the B.A. in history of art and visual culture provides skills that can lead to successful careers in law, business, and social services, in addition to a more specific focus on museum curating, art restoration, studies in architecture, and studies in art history leading to a graduate degree.

Recommendations for Students Who Plan Graduate Study

There are many graduate programs of visual culture that lead to the M.A. and Ph.D. in fields such as art history, cultural history, semiotics, rhetoric, history of religions, comparative arts, theory and criticism of art, and so forth. Most graduate programs require a reading knowledge of one or two languages other than English. Students who are contemplating graduate study should consult with their adviser as early as possible in their undergraduate career.

Although history of art and visual culture is in the process of developing an interdisciplinary Ph.D. program in visual studies, the department does not anticipate matriculating the first class of students before fall 2009.

Lower-Division Courses

10. Introduction to Visual Culture.

An introduction to the history of art and visual culture. Need not be taken in sequence.

10D. Presence and Power in the Visual Cultures of Asia. S

An introduction to the art and architecture of East Asia, including China, India, Southeast Asia, and Japan. In order to achieve a fuller understanding of the arts of these countries a historical, cultural, and religious context is provided. (General Education Code(s): IH, A.) *The Staff*

10E. Africa, Oceania, and the Americas. W

A comparative study of the arts of selected cultures which developed outside the spheres of influence of the major European and Asian civilizations. Emphasis is on the function of the arts in these disparate geographic regions. Students cannot receive credit for this course and course 100E. (General Education Code(s): IH, A, E.) *E. Cameron, C. Dean, S. Kamehiro*

10F. The Nude in the Western Tradition. *

The human body without clothing in European and European-American art and visual culture from ancient Greece to the present day. Among the themes to be addressed: gender, youth and age, sexuality and sexual preference, fecundity and potency, erotic art and pornography, primitivism and the naked body of the non-European. (General Education Code(s): IH, A.) *D. Hunter*

10G. Europe. F,S

An introduction to the European tradition in visual culture, from antiquity to the present, but not in chronological order. All media, including the fine arts, architecture, film, video, and installation and performance work are incorporated. Presents the major visual regimes of representation while it probes the meanings and limits of Europe and the European tradition in the context of the visual. (General Education Code(s): IH, A.) *The Staff*

80A. Introduction to Architecture. *

Introduction to elements, technology, concepts, and semiotics of architecture in its buildings, functions, environments, societies, and history. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *The Staff*

80D. Museum Cultures: The Politics of Display. *

Explores the history of collecting and displaying art (museums, galleries, fairs) since the mid-19th century and the effect of institutional changes on aesthetic conventions. Follows the history from the origins of museums and collections to contemporary critiques of institutional exclusion and misrepresentation. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *J. Gonzalez*

80E. Ancient Mediterranean Visual Cultures. *

The role that ancient art and visual culture play in constructing social identities, sustaining political agendas, and representing various cultural, ritual, and mythological practices in Mesopotamia, Egypt, Greece, and Rome, including the sociology of ancient cultures, mythology, religious studies, gender studies and history. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *J. Darling*

80G. Religion and Visual Culture in China. *

Introduction to the study of religious currents and practices in China and their visual expression. In addition to "religious art," topics include such pivotal matters as body concepts and practices, representations of the natural world, and logics of the built environment. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A, E.) *R. Birnbaum*

80M. Indigenous American Visual Culture. *

Selected aspects of art and architecture of the first peoples of the Americas, north, central, and south, from ca. 2000 B.C.E. to present. Societies to be considered may include Anasazi, Aztec, Inca, Northwest Coast, Maya, Navajo, Plains, and others. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A, E.) *C. Dean*

80N. Indian Art: Image and Ideology. *

Examination of the ways social, religious, and political patronage have affected the production and reception of art in the Indian subcontinent. The course is designed as a series of case studies from different periods of Indian history. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A, E.) *The Staff*

80S. Western Culture and the Human Visual Imagination. *

Survey of critical themes and theoretical topics central to historical situations and visual character of Western culture from Early Modern period to present. Addresses issues of particular concern to the visual tradition in Europe and the U.S.: the beginning and end of art, visual regimes of looking and seeing, the idea of the artist, the art market, media and technologies, the role of

museums and other exhibition practices. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *C. Sousloff*

80T. Art of the Body in Oceania. F

Explores "art of the body," defined broadly, from various perspectives. Examines colonial representations of Oceanic bodies, self-representation through bodily adornment and display (including tattoo, scarification, body painting, ornament, and dress), and bodily metaphors in Oceanic visual cultures. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A, E.) *S. Kamehiro*

80V. Modern Art in Context. F

Examines the social, economic, and political significance of European and U.S. modernist art and architecture, moving from French realism to American minimalism. Provides the historical background and theoretical frameworks needed to make sense of modernist art and culture. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *M. Berger*

80X. Greek Eyes: Visual Culture and Power in the Ancient Greek. *

The role of visual communication in ancient Greek civilization. The construction of cultural, social, political, religious, and gender identities through material objects and rituals. Images of the public and private sphere, athletic and theatrical performances, mythology, pilgrimage, and magic. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *M. Evangelatou*

99. Tutorial. F,W,S

Supervised study for undergraduates. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***100A. Methods in History of Art and Visual Culture. W,S**

Introduction to major issues of method and critique in study of art and visual culture. Focuses on understanding disciplinary and critical modes of scholarly inquiry in the visual arts, including role of historical research. Emphasizes intensive reading, discussion, and writing. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to sophomore, junior, and senior history of art and visual culture majors. Enrollment limited to 18. (General Education Code(s): W,A.) *The Staff*

100E. Introduction to Visual Culture: Africa, Oceania, and the Americas. W

A comparative study of the arts of selected cultures which developed outside the spheres of influence of the major European and Asian civilizations. Emphasis on the function of the arts in these disparate geographic regions. Students cannot receive credit for this course and course 10E. Designed for selected students who need upper-division credit to complete certain majors; contact the History of Art and Visual Culture office for information. (General Education Code(s): A, E.) *E. Cameron, C. Dean, S. Kamehiro*

104A. Byzantine Visual Culture: Politics and Religion in New Rome, 300-1453 A. D.. *

Examines the power of the visual in the empire of Constantinople (330-1453 A. D.); the transition from ancient Rome to medieval Byzantium; politics and religion in courts and church ceremonial; visual expressions of Christian faith; and cultural interactions with Western Europe,

Islam, and the Slavic world. Recommended: course on ancient Greek/Roman or medieval art and visual culture. (General Education Code(s): A.) *M. Evangelatou*

105. Topics in Art History.**105E. Ritual in Asian Religious Art. ***

Examination of interaction between image and ritual in Asian religious art. Case studies from different historical periods and geographical locations (e.g., China, Tibet, Japan, Indonesia, India). Examples include mandalas, ritual bronzes, tankas, sacred caves, temples, tea ceremonies, and calligraphy. (General Education Code(s): A, E.) *The Staff, K. Thangavelu*

105P. Visual Cultures of the Pacific Islands. W

Interdisciplinary course examines visual cultures of Australia, Melanesia, Micronesia, and Polynesia from the archaeological past through contemporary periods. (General Education Code(s): A, E.) *S. Kamehiro*

105R. Northern Renaissance Art. *

Considers the painting and prints produced in Northern Europe in the 15th and 16th centuries. Major issues include the status of realism and classicism, the role of religion and religious reform, and the rise of popular imagery. (General Education Code(s): A.) *The Staff*

106. Topics in Visual Culture.**106A. Religious Traditions in Indian Art. ***

Examines ways in which religious traditions are embedded in (or embodied within) art of the Indian sub-continent. Topics include Hindu temples; Jain art; Buddhist sacred narratives and cosmology; royal elite and popular patronage; and functions of icons. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 80. (General Education Code(s): A, E.) *K. Thangavelu*

106D. Architecture as Visual Culture. *

Focusing on designers who have challenged the boundaries of architecture through the incorporation of and experimentation with diverse media, including drawing, photography, film, and new media, this course examines architecture as a critical paradigm for visual culture. (General Education Code(s): A.) *The Staff*

106I. Myth in Greek and Roman Art. W

Examines how myths were represented in the visual culture of the Greeks and Romans. Analyzes, in its cultural context, the formal language invented by artists to create narratives and identify characters. Recommended: History 21/Literature 61M; Greek and/or Roman history; and classical language courses. (General Education Code(s): A.) *M. Evangelatou*

106X. Histories of Video in the U.S.. *

Introduces students to video art and documentaries from the 1960s to the present. Topics include experiments with multi-channel and installation spaces, community television, new documentary practices, questions of interactivity and narcissism, video's role in democratizing image making by women and people of color, and the digital turn in video. Enrollment restricted to sophomores, juniors, and seniors; previous art history course strongly recommended. (General Education Code(s): A.) *S. Murray*

107. Topics in African Visual Culture.**107A. Central Africa. F**

Examination of visual cultures of Central Africa within a historical sequence from the Sanga archaeological excavations to contemporary easel painting,

Prerequisite(s): course 10E suggested. Enrollment restricted to sophomores, juniors and seniors (recommended). Enrollment limited to 90. (General Education Code(s): A, E.) *E. Cameron*

107B. West Africa. *

Explores visual cultures of West Africa through time (Nok to present). Attention paid to relationships between peoples and impact of European/Arab presence on visual cultures. Prerequisite(s): course 10E recommended. (General Education Code(s): A, E.) *E. Cameron*

110. Topics in Pre-Hispanic Visual Culture.

110A. Mexico. *

Art and architecture of selected pre-Hispanic cultures from the gulf coast, central, western, and southern Mexico including the Olmec, Zapotec, Toltec, Mixtec, Mexica (Aztec), and others. Offered in alternate academic years. (General Education Code(s): A.) *C. Dean*

110B. The Andes. S

The art of selected pre-hispanic cultures of Colombia, Ecuador, Peru, and Bolivia including the Nazca, Moche, Chimú, and Inca. (General Education Code(s): A.) *C. Dean*

114. Buddhist Visual Worlds. F

Introduction to the study of Buddhist visual traditions, from their beginnings to the present day. Case studies examined with careful attention to historical, social and cultural contexts; particular emphasis on the relation of visual traditions to Buddhist practices. Enrollment restricted to sophomore, junior, and senior students. (General Education Code(s): A.) *The Staff, R. Birnbaum*

115. Italian Renaissance: Representation and Institutions. W

Lives of Italian Renaissance people from birth to death, examining the nature and roles of the institutions which defined human existence in this period. Uses visual arts both illustratively and to study how institutions fashioned their images through art and architecture. (General Education Code(s): A.) *The Staff*

120. The Arts in Japanese History.

120A. Early Japanese Temples. *

The construction and images, and the liturgical, political, and social functions of the principal Japanese temples surviving from the formative period of Japanese history, from approximately 500 to 1100 C.E. These temples are all prime historical and social sites in modern Japan. Most of them are mainly Buddhist, but the religious context of the course will be the general one of Japan during this period, including Shinto. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

121. The Arts in Chinese History.

121A. Early Chinese History. *

Neolithic to the first extended age of imperial China (the Han Dynasty, 206 B.C.–220 A.D.). Themes, such as ritual and technology in the language of form, within a cultural and historical framework concluding in the age when representation of everyday life first became prominent. (General Education Code(s): A.) *The Staff*

121C. Later Chinese History. *

The arts of China, from the second century A.D. to the 20th century. Architecture, sculpture, ceramics, calligraphy, and painting, setting these in contexts of

social structure, political, and cultural values. Enrollment limited to 45. (General Education Code(s): A, E.) *The Staff*

121D. Twentieth-Century Chinese Art. *

Chinese art during the socially and politically tumultuous 20th century, a period when artists were challenged by an increased awareness of world art and the need to adapt to politically-motivated artistic constraints. General narrative history, leading artists, decisive moments, and poignant questions. (General Education Code(s): A, E.) *The Staff*

124. Contemporary Architecture and Critical Debates. S

Examination of practitioners, projects, issues, and theories in contemporary architecture circa 1968 to the present. Topics include the architecture of aftermath, the ethics of memory and memorialization, the corporatization of museums, the role of criticism and exhibitions, and the cult of the brand-name architect. (Formerly *Contemporary Architecture, 1968-Present*) (General Education Code(s): A.) *The Staff*

126. America in Art. *

Introduction to American visual arts: architecture, painting, photography, sculpture, and performance art, from the 19th through the 21st century. Explore social and political meanings of art and what art reveals about our nation's values and beliefs, in particular, gender and race. (General Education Code(s): A.) *M. Berger*

131. Media History and Theory. *

An introductory examination of the writing about the issue of "medium" and media theory in visual culture. Technologies, discourses, and practices from all periods that use the comparison of media as a major approach to understanding the problems of the visual are highlighted. New media, film, television, video, traditional arts are also treated. (General Education Code(s): A.) *The Staff, C. Soussloff*

136. German Art, 1905-1945. *

Expressionism, agitprop, the Bauhaus, New Objectivity, attacks on modernism, National Socialist realism. Painting, sculpture, graphic art, and some architecture and film, studied in the context of political events from the eve of World War I to the end of World War II. (General Education Code(s): A.) *D. Hunter*

137. Impressionism to Pop Art: Art in Modern Culture. S

Critical reading of modernism as a high art tradition. Emphasis on context: culture of capitalism, shift in power from Europe to the U.S., role of gender and race, and the aesthetic as either apolitical refuge or site of disruption and critique. Third in a sequence of three courses on French art and its historical context; see courses 176 and 177. (General Education Code(s): A.) *D. Hunter, M. Berger*

138. Modern Architecture, 1880-1968. F

Examines the rise of international modernism in the 20th Century and the complex political/social motivations behind its ideologies/movements. Topics include the legacy of the Beaux-Arts tradition, Expressionism, Constructivism, the primacy of Le Corbusier, Weimar Germany, Fascist architecture, Corporate Modernism, Socialist Realism, Post-Modernism, among others. (General Education Code(s): A.) *The Staff*

139. The Art and Architecture of Islam. S

Study of Islam as a religious and political entity and analysis of how the Islamic world has defined itself in the realm of cultural production. Presentation of a va-

riety of Islamic artistic media from different historical periods and geographic areas provides a general overview of artistic production in diverse Islamic lands. (General Education Code(s): A, E.) *The Staff*

140. Surrealism to Postmodernism, Paris-New York. W

From Paris to New York, World War II to Vietnam, consumerism to conceptualism, an introduction to visual arts and theories of representation produced in the U.S. and Western Europe between 1930 and 1990, with attention to the social and political role of the art market, criticism, and censorship. (General Education Code(s): A.) *J. Gonzalez*

140A. The Power of Images in the Roman World. *

Exploration of major visual media of the Roman Republic and Empire focusing on political and social ideology that examines the context of artistic products. Examines public monuments, domestic architecture, funerary vocabulary, and plebeian images as examples of the imagery of Roman culture. (General Education Code(s): A.) *The Staff, J. Darling*

142. Activist Art Since 1960. W

An examination of art produced for social change in the U.S. since 1960 focusing on five cases: the Vietnam war, Chicano civil rights, the women's movement, environmental protection, and AIDS activism. (General Education Code(s): A, E.) *The Staff, J. González*

149A. Histories of Photography. *

Introduction to the histories of photography and the critical debates around different photographic genres such as medical photography, art photography, and political photography. Students will develop a critical language in order to analyze photographs while considering the importance of social and institutional contexts. (General Education Code(s): A.) *J. González*

150. Advanced Studies in Pre-Hispanic Visual Culture.

150A. The Maya. F

The art and architecture of the Maya of southern Mesoamerica from the first century C.E. to ca. 1500. Courses 10E, 80M, 100E, or 110A recommended as preparation. Enrollment limited to 35. (General Education Code(s): A.) *C. Dean*

151. Topics in Colonial/Postcolonial Visual Culture.

151A. The Native in Colonial Spanish America. *

Indigenous contributions to colonial Spanish American visual culture including architecture, manuscripts, sculpture, painting, textiles, feather-work, and metallurgy. Focus on colonial Mexico, the Andes, and California. Enrollment limited to 35. (General Education Code(s): A, E.) *C. Dean*

153. History of the Book. W

History of book production and use in the West from antiquity to modern times. Development from roll to codex and from script to print. Emphasis on the relationship between text and image. Class conducted in Special Collections, McHenry. Exhibition as class project. Enrollment limited to 25. (General Education Code(s): A.) *E. Remak-Honnet*

154. Environments and Religion in China.**154A. Sacred Geography of China. ***

An examination of the close relationship of religious traditions and the natural world in China, and its expression in visual representation. Particular emphasis on the ways in which competing groups sought to define or re-envision an understanding of the terrain. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A.) *R. Birnbaum*

154B. Architecture and Religion in China. *

An examination of the built environment—houses and palaces, shrines and temples, walls and gates, monuments and tombs, village and city plans—in relation to cosmological views and religious traditions. Special focus on the Chinese Buddhist monastery. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A.) *R. Birnbaum*

154C. Chinese Buddhist Monasteries. *

Consideration of Buddhist monasteries in China: as built environments set within architectural traditions; as centers for the realization of specific religious aims and practices, with distinctive visual programs to support those aims; and as nodes within social and economic landscapes. Enrollment limited to 35. (General Education Code(s): A.) *R. Birnbaum*

154D. Buddhist Pure Lands. *

Conceptions of "pure lands" have engaged the imaginations of Mahayana Buddhists for more than two millennia. Course considers literary and visual representations of pure lands and their inhabitants, as well as related practice traditions. Special emphasis on Chinese traditions. Previous courses in Asian visual cultures and/or Buddhist studies recommended. Enrollment limited to 35. (General Education Code(s): A.) *R. Birnbaum*

155. Constructing Lives in China: Biographies and Portraits. S

Consideration of biographies and portraits in China as representations of human types and individuals, and the use of these representations as models for constructing lives. Attention to historical and social contexts, early times to present. Special focus on Chinese Buddhist traditions. A previous course that focuses on traditional China or Buddhist studies strongly recommended. Enrollment limited to 35. (General Education Code(s): A, E.) *R. Birnbaum*

156. Race and American Visual Arts. *

Investigation of the role played by visual arts in fashioning racial identities of European-Americans, African Americans, Native Americans, and Latinos in the United States. Enrollment limited to 35. (General Education Code(s): A, E.) *M. Berger*

159. Thematic Topics in Chinese Art.**159B. Chinese Landscape Painting. ***

Examines the history and significance of the subjects most prominent in Chinese painting during the past one thousand years, focusing on the cultural factors that made landscape a fundamental value in the Chinese tradition and the methods whereby painters created pictorial equivalents. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

159D. Writing in China. *

Examines material and conceptual phenomena of writing in Chinese visual culture. Focuses on the intersections of places and practices of writing through

various inscribed sites, ranging from oracle bones, seals, and mountain facades to hand scrolls, architecture, and contemporary art. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

160. Storytelling in Asian Art. *

Combination of theoretical perspectives on narrative from literary criticism, rhetoric, folklore, and film theory with art historical focus on images (cave temples, stone reliefs on stupas, scrolls, dance-drama, etc.) from India, Pakistan, China, Japan, Cambodia, and Indonesia. Enrollment limited to 35. (General Education Code(s): A, E.) *K. Thangavelu*

161. Japanese Arts and Crafts. *

Examines premodern and modern developments in the production, dissemination, and use of Japanese arts and crafts. Includes a unit focusing on the tea ceremony as a key site for shaping craft aesthetics. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A, E.) *The Staff*

163. Early Medieval Visual Culture.**163A. Early Medieval Visual Culture: The Mediterranean. ***

Visual culture from the late Roman Empire to the early Byzantine Empire. Imperial triumphal monuments, Roman, early Christian, and Jewish catacombs, frescoes, manuscripts, and mosaics. Enrollment restricted to sophomores, juniors, and seniors; other students should contact instructor. One quarter of a 10-series course or a course in ancient or medieval culture is recommended as preparation. Enrollment limited to 35. (General Education Code(s): A.) *M. Evangelatou*

163B. Arts and Politics in Theravada Traditions. W

Consideration of the arts and architecture in Theravada Buddhist traditions in Sri Lanka and Southeast Asia. Topics and themes include ritual, relics, visual narrative, mural painting, contemporary art, mass-meditation movement, and political protest. Enrollment limited to 35. (General Education Code(s): A.) *B. Ly*

168. High Renaissance. *

An investigation of the High Renaissance as a period and stylistic concept, using the major artists and monuments of the period 1480–1525 to discuss issues of theory, history, and art. Artists considered include Leonardo da Vinci, Michelangelo, and Raphael. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A.) *C. Sousloff*

169. Studies in 17th-Century Italian Art. *

Italian painting and sculpture of the 17th century in cultural and historical contexts, with special attention to figures such as Caravaggio, Carracci, Bernini, and Algardi, and places such as Bologna, Florence, Rome, Genoa, and Naples. Problems considered include the rise of the academies and connoisseurship, art theory, patronage, and definitions of style. Enrollment limited to 35. May be repeated for credit. (General Education Code(s): A.) *C. Sousloff*

172. Jewish Identity and Visual Representation. *

An exploration of the theoretical and practical or experiential applications of Jewish identity in European visual representation. Brief background on pre-emancipation textual and cultural issues followed by study of the Jewish subject and Jewish subjectivities in modernity. Enrollment restricted to juniors and seniors. Enrollment limited to 35. (General Education Code(s): A, E.) *C. Sousloff*

174C. Constructing Memory and Place in Postwar Architecture. F

How have architects engaged memory and place in architectural projects and built landscapes since World War II? Examines memorializing, memory, and erasure of place in reconstruction of cities, creation of memorials, and design of buildings. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

175. Feminism and Aesthetics. *

Addresses the feminist critique of art history and visual culture; queries the viability of a feminist sensibility or politics in visual representation and reception. Approaches these topics through the problem of the representation of the "woman artist" and the feminine/feminist voice in cultural institutions and discourse. Enrollment limited to 35. (General Education Code(s): A.) *C. Sousloff*

177. French Painting, 1780–1855. *

The art of David, Gros, Ingres, Gericault, Delacroix, the Barbizon School, and Courbet studied in relation to the changing status of the art and the political events from 1789 to 1848. Second in a series of three courses on French art and its historical context. See courses 176 and 137. Enrollment limited to 35. (General Education Code(s): A.) *D. Hunter*

178A. Victorian America. *

Examines how American writers and artists negotiated complexities of U.S. society during the 19th century. Emphasis on issues ranging from women's rights to laissez-faire capitalism, and from Reconstruction to manifest destiny. Considers how the era's cultural products provided artists, patrons, and audiences with metaphorical coping strategies to counteract what Victorians perceived to be the period's overwhelming social and political changes. Enrollment limited to 35. (General Education Code(s): A.) *M. Berger*

179. The Megastructure. *

Explores the political, social, and cultural discourse surrounding the megastructure from its origins in visionary projects of the early 1960s to reactionary projects of the late 1970s. Students read architectural theory, film criticism, political commentary, and sociological critique. Previous courses in architecture recommended. Enrollment limited to 35. (General Education Code(s): A.) *J. Lieber*

180. The Camera and the Body. *

Through the study of historical and contemporary visual texts (from ethnography and portraiture to advertising and erotica), this course explores how photographic images of the body, while masquerading as "natural," "self-evident," or "scientific," participate in highly coded sign systems that influence who looks at whom, how, when, and why. Enrollment limited to 35. (General Education Code(s): A.) *J. González*

181. Environments, Installations, and Sites. *

A study of conceptual and formal issues that have informed the production of temporary, site-specific art works since 1960. Works that seek to transform the role of the audience, to escape or remake museum and gallery spaces, to introduce environmental concerns, or to situate art in "the land" or in "the street" serve as a focus. Enrollment limited to 35. (General Education Code(s): A.) *J. González*

182. Chicano/Chicana Art: 1970–Present. *

Taking the terms "Chicano" and "Chicana" as a critical framework, addresses cultural and conceptual themes in visual art production since 1970. Questions concerning

aesthetics, identity, gender, and activism in painting, photography, murals, and installation art explored. (General Education Code(s): A, E.) *J. González*

183. Mahayana Buddhist Visual Culture: Problems and Perspectives. *

Introduces the historical, social, and religious foundations of Mahayana Buddhism in Asia as well surveying the art and architecture it inspired. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

185. Topics in African Art.

185A. Royal Arts of Africa. *

Examination of the visual culture of selected African kingdoms, historical and contemporary. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A, E.) *E. Cameron*

185B. Gender. *

In Africa, relationships exist between gender and visual culture. Course examines where categories come from, differences in men's and women's visual cultures, and how visual cultures teach, reinforce, and negotiate gender definitions. When are male/female boundaries crossed, and why? Enrollment limited to 35. (General Education Code(s): A, E.) *E. Cameron*

185C. African Architecture. *

Study of the built environment in Africa. Focusing in depth on 10 major architectural forms or sites, this course explores the diversity of architectural types and how gender, politics, religion, and culture shape and are shaped by architectural spaces. Enrollment limited to 35. (General Education Code(s): A, E.) *E. Cameron*

186B. Baroque Art and Architecture. **W**

Examines central figures in Italian, French, and Spanish art and architecture of the 18th and 19th centuries, from Caravaggio to Piranesi. Topics include: the legacy of the Renaissance; transformations of classical mythology and the erotic idea; the role of the female hero and martyr; changes in the nature of religious experience and the role of the spectator in the encounter with art; the image of absolutism; and the Grand Tour. Enrollment limited to 35. (General Education Code(s): A.) *J. Lieber*

187A. Textile Traditions of Oceania. **S**

Investigates how textiles contribute to cultural fabric of Oceania. Explores women's roles in socioeconomic exchanges and cultural production; gender issues regarding production and function of Oceanic textiles; and history of processes, functions, and aesthetics. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements. Prior coursework related to Oceania recommended. Enrollment restricted to juniors and seniors or by permission of instructor. Enrollment limited to 25. (General Education Code(s): W, A, E.) *S. Kamehiro*

189. Special Topics in Art History.

189D. Modernity and Nationalism in the Arts in India. **S**

Deals with artistic responses to the forces of modernity, colonialism, industrialization and globalization in India during the 19th and 20th centuries. Addresses the complex and often painful climb toward re-establishing a truly Indian artistic identity. Enrollment limited to 35. (General Education Code(s): A, E.) *K. Thangavelu*

189N. Impressionism. *

Focusing on work of artists Monet, Degas, Morisot, Cassatt, Caillebotte, and others, course themes

include development of a Parisian avant-garde, representing modernity, new art exhibition strategies, issues of gender in/and representation, and rise of landscape painting. Prerequisite(s): course 137 recommended. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

189V. Art of the Venetian Renaissance. **W**

Considers Venetian art in the 15th and 16th centuries. Topics include major artists (the Bellini, Carpaccio, Titian, Tintoretto, Veronese, Palladio) and the relationship of the city to outside forces (Byzantine Empire, Turkish Empires) and other Italian cities. Enrollment limited to 35. (General Education Code(s): A.) *The Staff*

189Y. Art of the Contemporary African Diaspora. *

Considers contemporary art by African artists operating in metropolitan centers, as well as Afro-British, Afro-Caribbean, and African-American production. Topics are organized thematically and address constructing and deconstructing the idea of Africa; cultural authenticity; diaspora; Creolité and creolization; hybridity; cosmopolitanism; post-black; and globalism in the arts. Recommended: background in art history. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): A.) *S. Murray*

189Z. Time-Based Media and the Body, 1980-Present. **F**

Addresses relations between the body and video, film, and digital-based media, examining performance and embodiment as formative elements of these works. Works are primarily from the 1980s to the present, looking back as necessary to understand contemporary practice. It is strongly suggested that students should have taken one or more art history courses. Enrollment limited to 35. (General Education Code(s): A.) *S. Murray*

190. Seminars in Visual Culture.

190A. Theories in Architecture. **W**

How do we construct architecture in words? Which discourses do we use, and what do they tell us about how we understand architecture? How are technology and the techniques of architectural representation understood? Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

190B. The Virgin of Guadalupe: Images and Symbolism in Spain, Mexico, and the U.S. *

Focus on the histories of miraculous images of La Virgen de Guadalupe de Extremadura (Spain) and La Virgen de Guadalupe de Tepeyac (Mexico). The foundations and growth of the cult of the Mexican Guadalupe during the colonial period is examined along with the multivalent symbolism of her image. Considers contemporary "appearances" of the Virgin of Guadalupe, from the miraculous images on a tree in central California and the compositions of Chicano artists, to mass-produced kitsch. This course can be taken for senior exit credit only by permission of the instructor. This course can be taken for senior exit credit only by permission of the instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *C. Dean*

190C. Subalternatives: Representing Others. *

Explores how visual representation (in fine art, popular art, film, and television) encodes difference in selected cultural and historical contexts. Considers (post)colonial image-making both as a strategy of

domination as well as resistance. This course can be taken for senior exit credit only by permission of the instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *C. Dean*

190D. The World of the Lotus Sutra .

Close study of the principal text of East Asian Buddhism as a self-enclosed vision of reality, with careful consideration of the forms and functions of the world of visual and aural representation that it has inspired. Prerequisite(s): course 114 or permission of instructor. Enrollment limited to 18. (General Education Code(s): A.) *R. Birnbaum*

190F. Mountains and Religion in China. *

Topical approach to the visual culture of mountains in Chinese history—encompassing both imaginative constructions and physical realities—especially in relation to religious practices. Considers examples and contexts in relation to such topics as pilgrimage, local and state religion, and individual or group retreat and reclusion. Interview only: a previous course on Chinese history or culture (in such departments as history of art and visual culture, history, literature, or anthropology) or permission of instructor; instructor determines if prerequisite is met. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A.) *R. Birnbaum*

190G. Word and Image in Chinese Culture. *

The Chinese tradition, from the earliest material evidence to the most recent, has persistently emphasized a close relationship between written language and pictorial image. This concern has appeared equally in artifactual and theoretical form. Its best known representation is in the association of calligraphy with painting. Course examines the evolution and meaning of that association. A knowledge of the Chinese language is not necessary. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

190H. Representing Cultural Narratives: Japanese Handscrolls. *

Narrative handscrolls were one of the most characteristic and vivid productions of Japanese visual culture for over a thousand years. They were used to represent and re-represent almost every aspect of institutional and social history. Examines their cultural categories and historical development. This course can be taken for senior exit credit only by permission of the instructor. This course can be taken for senior exit credit only by permission of the instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

190I. Huayan Visions. *

Explores the distinctive conceptual world of the Buddhist Huayanjing (Avatamsaka-sutra) and its expression in visual forms. This long text, composed in Sanskrit and later translated into Chinese, is a principal scripture of the international Mahayana Buddhist traditions of Asia. Prerequisite(s): course 114, an upper-division course in Buddhist studies is recommended, or permission of the instructor. Enrollment limited to 18. (General Education Code(s): A.) *R. Birnbaum*

190M. History and Visual Culture. *

The literature on art and visual culture in the European tradition and the critiques that have emerged in postmodern theory, particularly as these pertain to the

term and concept "history." Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A.) *C. Sousloff*

190Q. Art and Culture Contact in Oceania. * Examines impact of culture contact on Oceanic and Euro-American visual cultures in context of "discovery," colonialism, and "postcolonialism." Topics include 18th-century visual culture, colonial identities, primitivism, syncretism, impact of Christianity, contemporary art/market, media, tourism, transnationalism, and globalization. Prerequisite(s): prior course work related to Oceania recommended. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *S. Kamehiro*

190P. Death and Patriotism: The Case of the French Revolution.

What are the relations between the mortal body and politics in times of crisis? What purposes can death, or the threat of death, serve? Examines representations of executions, assassinations, and funerals during the French Revolution, with an emphasis on the Terror. Enrollment limited to 18. (General Education Code(s): A.) *D. Hunter*

190Q. Portraiture: Europe and America, 1400–1990. *

Western portraiture and self-portraiture at certain key moments (early modern Italy, 16th-century Germany, 17th-century Holland, France from the reign of Louis XIV to the Revolution, contemporary U.S.) are explored by reading 20th-century interpretations and some primary sources. This course can be taken for senior exit credit only by permission of the instructor. Enrollment limited to 18. (General Education Code(s): A.) *D. Hunter*

190R. Word and Image in Illuminated Byzantine Manuscripts. *

Religious, scientific, and secular manuscripts of Byzantium: how words and images interact to express and promote concepts of Byzantine culture; serve liturgical needs of private devotion; reflect imperial ideals; diffuse moral values and knowledge; and proclaim social status and cultural affiliations. Prerequisite(s): course 104A or permission of instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A.) *M. Evangelatou*

190S. Semiotics and Visual Culture. *

How can visual culture be understood as the production, circulation, and recirculation of signs? This course offers a history of semiotics and its methodological application in the analysis of images in popular culture and within the discipline of art history. This course can be taken for senior exit credit only by permission of the instructor. Enrollment restricted to junior and senior students. Enrollment limited to 18. (General Education Code(s): A.) *J. González*

190T. Feminist Theory and Art Production. *

A close reading of works of art and theoretical texts by feminists working from 1970 to the present. The course encourages debate around the past, present, and future relevance of feminist theories to visual cultural studies, paying particular attention to issues of cultural and ethnic difference. Enrollment limited to 18. (General Education Code(s): A.) *J. González*

190U. Representations of Women in Indian Art. S

Deals with representations of the female divinity in Indian religious imagery, and of women in secular and courtly paintings. Also examines roles women play in the production of art in the Indian subcontinent.

Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *K. Thangavelu*

190W. Pilgrimage in South Asian Religion. * Examines the role of pilgrimage in Hindu and Buddhist religious practice from the ancient to the modern periods, emphasizing art historical material from a representative survey of sites located throughout South Asia. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

190Y. Image and Gender. *

Examines what visual representations (feminine and masculine) reveal of gender in 19th- and 20th-century European and American culture; how images reflect norms of gender; and how we are conditioned to read images in gendered terms. Explores how femininity and masculinity were conceived during historical periods and how gender ideals changed in response to social, political, and economic pressures. Students encouraged to consider the fluid nature of 21st-century notions of ideal femininity and masculinity and possible alternatives. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 18. (General Education Code(s): A.) *M. Berger*

191. Seminars in Art History.

191B. The Life/Sculpture of Gianlorenzo Bernini, Master of the Roman Baroque. *

Sculptures, performances, and art theory of Roman Baroque artist Gianlorenzo Bernini. Early modern sources on Bernini's life and recent art history used to assess issues in cultural theory: embodiment, performance/performativity, visual and textual genres, space/time in sculpture. Enrollment restricted to junior and senior majors in history of art and visual culture, art, literature, history, philosophy, politics, theater arts, and sociology. Enrollment limited to 18. (General Education Code(s): A.) *C. Sousloff*

191C. Iconoclasm. *

What happens when, to control an object, it is destroyed? Examines destruction of art as a way of ending the object's life cycle, as a device of social tension/change, and as a colonial and post-colonial mechanism of religious/political control. Prerequisite(s): course 10E or permission of instructor. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *E. Cameron*

191D. Spectacle, Ceremony, and Display in Medieval Pilgrimage and Contemporary Tourism. *

Medieval pilgrimage and contemporary tourism studied as social, cultural and economic phenomena with analogous structures. Examines some of the most significant medieval pilgrimage sites (Rome, Jerusalem, Santiago de Compostela) through contemporary literature on tourism. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

191F. Play and Ritual in African Visual Cultures. W

Compares how play and ritual construct worlds and regulate visual cultures—from dolls to "ritual" objects and performances. Attention given to areas where play and ritual overlap and the visual cultures that result. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *E. Cameron*

191H. Chan Texts and Images. *

Examines selected issues in history of Chan (Zen) Buddhist traditions in China from medieval times to the present day. Concepts, methods, and visual expression of Chan practice situated through study of texts and visual materials. Prerequisite(s): course 114 or permission of instructor. Enrollment limited to 18. (General Education Code(s): A.) *R. Birnbaum*

191P. Art and Identity in the Pacific: Creating and Challenging Ethnic and National Identities. F

Theoretical discussions and Pacific Basin case studies on 1) definitions of cultural, ethnic, and national identities; 2) relationship between art, museums, and construction of historical and cultural narratives; 3) ways "tradition" defined in art practices and used by groups to assert an identity in their present. Participants first develop a theoretical framework and vocabulary for analyzing artistic production in a variety of cultures. Through specific case studies, will explore how art, architecture, and museums actively contribute to define and challenge ethnic and national identities. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 18. (General Education Code(s): A, E.) *S. Kamehiro*

191S. Gender and Sexuality in Italian Renaissance Art. *

Addresses how Renaissance art both constructed and reflected cultural notions of gender and sexuality. In particular, course focuses on ideals of women with relation to marriage and politics; notions of masculinity and the effeminate male; homosexuality; and pornography. Recommended: background in Renaissance art and/or culture. Enrollment restricted to juniors and seniors. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

191X. Cult of Mary in Byzantine Art. F

Why did the cult of the Virgin Mary become so important in Byzantine culture? Examines historical, cultural, theological, political, and social reasons for this development, seen through the interaction of Byzantine visual culture and literature. Prerequisite(s): course 104A, or juniors and seniors may enroll with permission of instructor. Enrollment limited to 18. (General Education Code(s): A.) *M. Evangelatou*

195. Senior Thesis. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Independent field study away from the campus. Students submit petition to sponsoring agency. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Independent field study away from the campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual study in areas approved by sponsoring instructors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Independent study or research for graduate students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

History of Consciousness

415 Humanities 1
(831) 459-2757
<http://histcon.usc.edu/>

Faculty and Professional Interests

GOPAL BALAKRISHNAN, Associate Professor of History of Consciousness

Classics of political thought from Plato to Rousseau, early modern and modern European intellectual history, historical sociology, the history and future of capitalism, nationalism

JAMES T. CLIFFORD, Professor of History of Consciousness

History of anthropology, travel, and exoticism; transnational cultural studies, museum studies, indigenous studies

ANGELA Y. DAVIS, Professor of History of Consciousness and Feminist Studies

Feminism, African American studies, critical theory, popular music culture and social consciousness, philosophy of punishment (women's jails and prisons)

TERESA DE LAURETIS, Professor of History of Consciousness, Literature, and Film and Digital Media

Semiotics, psychoanalysis, feminism, film theory, literary theory, queer studies

BARBARA L. EPSTEIN, Professor of History of Consciousness

Social movements and theories of social movements, 20th-century U.S. politics and culture, Marxism and related theories of social change

DONNA J. HARAWAY, Professor of History of Consciousness and Feminist Studies

Feminist theory, cultural and historical studies of science and technology, relation of life and human sciences, human-animal relations, and animal studies

DAVID S. MARRIOTT, Professor of History of Consciousness

Literary theory, psychoanalysis, black cultural theory and philosophies of race, literary and visual cultures of modernism

VICTOR BURGIN, Professor Emeritus of History of Consciousness

HAYDEN WHITE, Professor Emeritus of History of Consciousness

Extended Department Faculty

JOHN BROWN CHILDS, Professor of Sociology
Ethnic conflict and transcommunal cooperation; sociology of knowledge; African American, Native American, Latino interactions

MICHAEL H. COWAN, Professor of American Studies

American cultural theory and history, history of American studies, symbolic expression in American life, urban cultural studies, American literary studies, studies in the institutional culture of higher education

GINA DENT, Associate Professor of Feminist Studies, History of Consciousness, and Legal Studies

Africana literary and cultural studies, legal theory, popular culture

SHELLY ERRINGTON, Professor of Anthropology

Globalization of folk art, visual and social semiotics, photography, film, the Internet and digital media, Southeast Asia, and Latin America

CARLA FRECCERO, Distinguished Professor of French Literature and Feminist Studies

Renaissance studies, French and Italian language and literature, early modern studies, postcolonial theories and literature, contemporary feminist theories and politics, queer theory, U.S. popular culture

HERMAN S. GRAY, Professor of Sociology

Cultural studies, media and television studies, black cultural politics, social theory

SUSAN HARDING, Professor of Anthropology

Culture, politics, narrative, gender, local/global studies, ethnographic writing, fundamentalism, Christianity, state-making, aging, America, and Spain

DAVID C. HOY, Professor of Philosophy

Kant, Hegel, Nietzsche, Heidegger, Derrida, Foucault, phenomenology, poststructuralism, and contemporary European philosophy

ROBERT L. MEISTER, Professor of Politics

Political and moral philosophy, law and social theory, Marxian theory, institutional analysis, antidiscrimination law

HELENE MOGLEN, Professor of Literature and Feminist Studies; UC Presidential Chair

The English novel; feminist, critical, cultural, and psychoanalytic theory; gender and genre in social and psychological contexts

TRILOKI NATH PANDEY, Professor of Anthropology

Native peoples of North America, cultures of India, political anthropology, anthropological theories and comparisons

ANDREW SZASZ, Associate Professor of Sociology
Environmental sociology (environmental movements, policy, environmental justice); theory

RICHARD TERDIMAN, Professor of Literature

Nineteenth- and 20th-century French and European literature and culture, literary and cultural theory, contemporary critical theory, cultural globalization

ANNA TSING, Professor of Anthropology

Culture and politics, feminist theory and gender in the U.S., social landscapes and tropical forest ethnoecologies, ethnicity, local power and relations to the state in Indonesia, Southeast Asia, and the U.S.

JUDY YUNG, Professor Emerita of American Studies

PATRICIA ZAVELLA, Professor of Latin American and Latino Studies

Relationship between women's work and domestic labor, poverty, family, sexuality and social networks, feminist studies, ethnographic research methods, and transnational migration of Mexican/ale workers and U.S. capital

Program Description

History of consciousness is an interdisciplinary graduate program centered in the humanities, with links to the social sciences, physical and biological sciences, and arts. It is concerned with forms of human expression and social action as they are manifested in specific historical, cultural, and political contexts. The program stresses flexibility and originality. Interest is focused on

problems rather than disciplines. Although students are prepared to teach in particular fields, the emphasis is on questions that span a number of different approaches.

Over more than 30 years of existence, the history of consciousness program has become widely recognized as a leader of interdisciplinary scholarship. Program graduates are influential scholars at prominent universities, and dissertations have been published by major publishing houses and academic presses. Graduates currently find academic employment in a wide range of disciplines, including literature, feminist studies, science studies, anthropology, sociology, American studies, cultural studies, ethnic studies, communications, the study of religion, and philosophy. In addition, history of consciousness graduates work as filmmakers, museum researchers, free-lance writers, postdoctoral researchers, and academic administrators.

Since the curriculum concentrates on theoretical and methodological issues and is concerned with the integration of disciplines, candidates for admission are expected to have a relatively clear idea of the project they wish to pursue. Experience of advanced work in one or more fields is preferred, but not required.

History of consciousness emphasizes a variety of topics in its seminars and research pursuits. These areas of research include studies at the intersection of race, sexuality, and gender; global capitalism and cultural processes; psychoanalytic and semiotic theories of the image; science and technology studies; theories and histories of religion; social movements; and literary studies and poetics. Seminars are regularly offered in these and other areas of ongoing faculty research.

History of consciousness has strong cooperative relations with associated faculty from other campus programs, scholars who offer seminars and participate in advising, qualifying exams, and thesis committees. Within the limits of seminar size and faculty time, cross-disciplinary work in graduate courses offered by other departments is encouraged. The formal list of associated faculty is a non-exhaustive indication of advising possibilities beyond the program's core faculty. Campus research organizations, such as the UCSC Center for Cultural Studies, the Institute for Humanities Research, the Institute of Advanced Feminist Research, and the Chicano/Latino Research Center, also provide venues for collaborative work.

Requirements

Students are required to enroll in a minimum of two courses per quarter until advancement to candidacy (normally achieved no later than the fourth year).

Incoming students are required to take a minimum of five history of consciousness graduate seminars during the first two years. In the first year, students are required to take the introductory seminar, course 203A, *Approaches to History of Consciousness*. In the course of the first year, students must also take a writing intensive "B" seminar, either 203B, *Approaches*, or a "B" seminar following another seminar the student has taken. By the end of the first year, students are expected to complete a full seminar paper. Unless an exception is approved by the director of Graduate Studies, "B" courses do not count toward the five seminars selected to fulfill the basic department requirement. The remainder of the courses taken to fulfill university enrollment requirements may include not only history of consciousness seminars but also independent study with specific faculty or graduate seminars offered in other departments.

Additional requirements for the Ph.D. vary with individual disciplinary and interdisciplinary needs and are determined in consultation with relevant faculty and the chair of the program.

Advancement to candidacy depends on the general quality of a student's work; demonstration of proficiency in a foreign language relevant to the student's area of work, either by passing a written exam administered by the department or successfully completing a language course approved by the department; success in the qualifying exam; and proposal of an acceptable thesis topic. The qualifying exam is centered on a qualifying essay that demonstrates the candidate's ability to do extended, dissertation-level research and analysis relevant to the proposed thesis topic and dissertation plan. The exam focuses on the student's research project and on the fields of scholarship it presupposes.

After advancement to candidacy, required by the end of the fourth year, students concentrate on the writing of the dissertation. The current normative time to degree limit of seven years means that a student usually has at least three years after advancement to candidacy for completion of the dissertation.

Students also have the option of doing advanced work in a traditional discipline and receiving a parenthetical degree notation of this specialization. In such cases, students must satisfy the appropriate department's criteria. Currently such degree notations may be negotiated with American studies, anthropology, literature, philosophy, sociology, and feminist studies. Students are expected to complete at least one year of supervised teaching as part of the degree requirements.

Applications

The deadline for applications to the History of Consciousness program is December 1 of each year. Admissions information and application materials are available online at graddiv.usc.edu.

Applications are invited from students with backgrounds and interests in the humanities and social sciences and are especially encouraged from individuals with a clear idea of the project they wish to undertake. Strong preference is given to applicants working in areas for which the faculty resources in history of consciousness are appropriate and available. Graduate Record Examination (GRE) scores are required as is a writing sample of no more than 10 pages.

Admission is for the fall quarter only.

It is important to note that in light of California's elimination of affirmative action as an admissions criterion, the history of consciousness department reaffirms its commitment to the principles of affirmative action. These principles mean a commitment to diversity, equal opportunity, and outreach to underrepresented communities. Further, this commitment underlines our understanding that the very fabric and quality of our scholarship depends on the representation and interplay of diverse experience and perspectives. So defined, affirmative action is reflected in every aspect of the history of consciousness program, including scholarship, teaching, admissions, hiring, and the process of departmental governance.

Lower-Division Courses

80A. Culture and Ideology in the 20th Century. * A survey of the principle ideological issues of the 20th century—attitudes toward sex, race, class, work, violence, and knowledge—viewed from the perspective of structuralist and semiological theories of culture. (General Education Code(s): T4-Humanities and Arts.) *A. Davis*

80B. Constructions of the Exotic.

W
Analyzes ethnographic and auto-ethnographic representations of non-Western peoples. Films, video, ethnographies, novels, and journalism are considered, paying attention to specific histories of colonial and postcolonial contact which influence images of "culture" and "identity." (General Education Code(s): T4-Humanities and Arts.) *J. Clifford*

80E. Myth and Religion.

F
A study of the nature of religion and myth as well as their interrelationship; the beginnings and functions of myth, its major themes in various cultures, its relationship to sacrifice and ritual, and its role in selected religions and cultures throughout the world. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts.) *G. Lease, The Staff*

80I. Philosophy, Race, and Gender.

W
What is the concept of the human? How is the concept of the human related to race and gender? How has it changed from the 18th century to the 20th century? Focuses on the founding texts of the German Enlightenment. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

80J. Social Movements in the U.S.

Traces the history of social movements in the late 19th- and 20th-century U.S., including populism, labor, socialism, Communism, the New Left, civil rights, feminism. Looks at the relationship between cultures of protest and mainstream popular and political cultures. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *B. Epstein*

80L. Will the Real Jesus Please Stand Up?.

W
Christianity claims but one Jesus at its foundation; the sources, however, reveal many Jesuses. Is there a "real" Jesus among the memories of the earliest Jesusites, or among the Jesus-types of Late Antiquity? Or only contradictory choices? (General Education Code(s): T4-Humanities and Arts.) *G. Lease*

80M. Imagining Popular Culture.

Focuses on representations of race, class, and gender in contemporary popular culture images, particularly film and television. Attendance is required at both lectures and screenings. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

80N. Politics of Emotion/Emotion of Politics.

F
Engages histories of affect, the complex realms of the senses, feelings, emotions, and the body. Asks questions about the role of emotions in the making and unmaking of the contemporary political order and marginal cultures of feeling. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *T. Spira*

80O. Hitler, National Socialism, and Religion.

S
A critical evaluation of Hitler as a religious leader and his National Socialism as both a religious movement and an example of 20th-century political theology: a study of the relationship between religion and politics. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *G. Lease*

80Q. Science as Culture and Practice.

W
Using tools from the analysis of social history, visual and material culture, narrative, and laboratory and field practices, introduces students to modern science, technology, and medicine studies. Examples come especially from 20th- and 21st-century life and human and information

sciences. May be repeated for credit. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *D. Haraway*

80T. Art and Life: Introduction to Interventionist Art and Visual Studies.

W
Emphasizes how interventionist practices and activist art might inform students' political development and actions. Explores modes of expression and political identities that are useful after college. Leads to the production of alternatives to mainstream media. (General Education Code(s): T4-Humanities and Arts.) *L. Kelley*

80U. Modernity and Its Discontents.

Offers an introduction to the idea of modernity from Kant to Freud, Nietzsche to Fanon. (General Education Code(s): T4-Humanities and Arts.) *D. Marriott*

Upper-Division Courses

102. Philosophy and Poetics.

Introduction to the relationship between philosophy and poetics in some major 19th- and 20th-century poets and thinkers. Enrollment restricted to juniors and seniors. Enrollment limited to 30. *D. Marriott*

111. States, War, Capitalism.

S
Survey of seminal work on ancient origins of the state, diverse geo-political systems of war and diplomacy, and consequences of the formation of the world market on the evolution of geo-political systems up to and beyond the wars of today. Enrollment restricted to juniors and seniors. Enrollment limited to 35. *G. Balakrishnan*

113. Participatory Dissent.

S
Brings together debates in feminism, contemporary art, and radical pedagogy, investigating the impact of the feminist revolution in the arts and humanities on debates in radical pedagogy and art as social practice. *N. Loveless*

118. Jewish Social Movements.

S
Jewish social movements of the late 19th and 20th centuries, in Europe (Eastern and Western) and the U.S.: the confrontation between Hasidism and Haskalah, tensions between socialism and Zionism, between religiosity and secularism, the mutual influences among these tendencies. (Also offered as History 185D. Students cannot receive credit for both courses.) Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): E.) *B. Epstein*

126. Film Fantasies.

A focused study of cinema as a social technology for the production of public and private fantasies: how films contribute to shaping the image a culture has of itself and how film viewing may influence individual fantasies, values, and identities. Enrollment restricted to juniors and seniors. Enrollment limited to 80. *T. De Lauretis*

145E. Topics in Medical Humanities.

Medical humanities is an interdisciplinary field of humanities (literature, philosophy, ethics, history, and religion) concerned with its application to medical education and practice. The humanities provide insight into the human condition, suffering, personhood, and our responsibility to each other; and offer an historical perspective on medical science. Course helps prepare students for the reading comprehension and writing parts of the MCAT. Satisfies the Modern Literature concentration. Students cannot receive credit for this course and Literature 80K. (Also offered as Modern Literary Studies 145E. Students cannot receive credit for both courses.) *W. Godzich*

199. Tutorial. F,W,S

A program of individual study arranged between an undergraduate student and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses**203A. Approaches to History of Consciousness. F**

An introduction to history of consciousness required of all incoming students. The seminar concentrates on theory, methods, and research techniques. Major interpretive approaches drawn from cultural and political analysis are discussed in their application to specific problems in the history of consciousness. Prerequisite(s): first-year standing in the program. See the department office for more information. (Formerly course 203.) *The Staff*

203B. Approaches to History of Consciousness. W

Writing-intensive course based on readings in course 203A. Prerequisite(s): course 203A. Enrollment restricted to graduate students. Enrollment limited to 9. *G. Balakrishnan*

204A. Introduction to Cultural Studies. *

Classic texts from the British cultural studies tradition. Traces later developments in North America, Latin America, Australia, and elsewhere. Asks how class analysis has been complicated by work on race, ethnicity, gender, sexuality, and postcoloniality. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *J. Clifford*

204B. Introduction to Cultural Studies. *

Writing intensive course based on readings in course 204A. Prerequisite(s): course 204A. Enrollment restricted to graduate students. Enrollment limited to 20. *J. Clifford*

205A. Theories of Slavery. *

Explores philosophical, legal, and socio-historical analyses of slavery. Focus on Atlantic slavery and the production of race and gender formations, complemented by discussion on contemporary forms of slavery. Impact of historical slavery on prevailing discourses and institutions. (Also offered as Feminist Studies 225A. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

205B. Theories of Slavery. *

Writing-intensive course based on readings in History of Consciousness 205A and Feminist Studies 225A. (Also offered as Feminist Studies 225B. Students cannot receive credit for both courses.) Prerequisite(s): course 205A or Feminist Studies 225A. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

207. Theory of the Text. *

An introduction to contemporary theories of textual interpretation: anthropological, linguistic, historical, literary, semiotic, and philosophical. Consideration of different kinds of texts and ways of reading them: from dream reports, folktales, and myths, through musical scores, monuments, rituals, games, and codes, to poems, novels, and political tracts. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *T. De Lauretis*

208A. Radical Critiques of Penalty. *

Examines recent theories of imprisonment, focusing on the philosophical and criminological literature associated with scholarly and activist movements arguing for prison abolition. In considering the disarticulation of crime and

punishment, race, class, and gender serve as principal analytical categories. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

208B. Radical Critiques of Penalty. *

Writing intensive course based on readings in course 208A. Prerequisite(s): course 208A. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

209A. Women of Color: Feminist Theories and Practices. *

Examination of feminist consciousness in the indigenous and diasporic cultural histories of women of color. Analysis of "feminist moments" in these histories and their epistemological implications for the construction of feminist theories that take into account intersections of gender, ethnicity, class, and sexual orientation. Discussion of possible paradigmatic shifts in feminist theory. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Davis*

209B. Women of Color: Feminist Theories and Practices. *

Writing intensive course based on readings in course 209A. Prerequisite(s): course 209A. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

210A. Cultural and Historical Studies of Race and Ethnicity. *

Explores the historical construction of racial and ethnic categories in the Americas, especially the U.S., in interaction with gender, sexuality, class, and nationality. Intended to introduce current work by UCSC faculty and Bay Area scholars and to stimulate graduate student research projects, the course is organized by intensive reading around key questions, followed by presentations by invited scholars. Emphasizes research resources and methodologies. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

210B. Cultural and Historical Studies of Race and Ethnicity. *

Writing intensive course based on readings in course 210A. Prerequisite(s): course 210A. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

211A. French Hegel. *

Introduces the "return to Hegel" in the work of some major 20th-century French thinkers. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

212. Feminist Theory and the Law. *

Interrogation of the relationship between law and its instantiating gendered categories, supported by feminist, queer, Marxist, critical race, and postcolonial theories. Topics include hypostasization of legal categories, the contest between domestic and international human rights frameworks, overlapping civil and communal codes, cultural explanations in the law, the law as text and archive, testimony and legal subjectivity. (Also offered as Feminist Studies 212. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *G. Dent*

213A. Representation. *

An introduction to contemporary theories including semiotics, psychoanalysis, poststructuralism, and the feminist critique of representation. Emphasis on questions of difference and the construction of the subject in culture. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *T. De Lauretis*

213B. Representation. *

Writing intensive course based on readings in course 213A. Prerequisite(s): course 213A. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *T. De Lauretis*

214A. Studies in History, Religion, and Myth. *

Selected events, figures, and ideas from histories of religions: their sources, production, and functions. Emphasis on 19th- and 20th-century theories of religion, the problems of origin and institution, and the relationship between particular histories and their mythologies. Enrollment restricted to graduate standing. Enrollment limited to 15. May be repeated for credit. *G. Lease*

214B. Studies in History, Religion, and Myth. *

Writing intensive course based on readings in course 214A. Prerequisite(s): course 214A. Enrollment restricted to graduate standing. Enrollment limited to 15. May be repeated for credit. *G. Lease*

215A. Critical Theory in the Marxist Tradition. *

An introduction to classic texts of the Frankfurt School, focusing on works by Adorno, Horkheimer, Benjamin, and Marcuse. Explores their uses and critiques of Marxism, emphasizing questions of the relation between philosophy and history, theory and praxis, aesthetics and politics, and identifying issues relevant to contemporary debates around race, class, and gender. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *A. Davis*

215B. Critical Theory in the Marxist Tradition. *

Writing intensive course based on readings in course 215A. Prerequisite(s): course 215A. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *A. Davis*

217A. Seminar: Topics in Feminist Theory. F

Studies in the theory and history of feminist consciousness; analysis of the main areas of a specifically feminist interest; determination of the theoretical bases for a distinctively feminist perspective on the principal problems of the life and human sciences; examination of relations of class, race, and gender in feminist theory and practice. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *The Staff*

217B. Seminar: Topics in Feminist Theory. *

Writing intensive course based on readings in course 217A. Prerequisite(s): course 217A. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *The Staff*

218A. Postcolonial Theory. *

Study of selected topics in postcolonial theory, including decolonizing critiques of Western knowledges and epistemologies, nationalism, gender and sexuality, cultural representations of neo-colonialism and imperialism, subalternity, history and historical transformation, and global relations of dominations. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

218B. Postcolonial Theory. *

Writing intensive course based on readings in course 218A. Prerequisite(s): course 218A. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

219A. Psychoanalysis and Cultural Criticism. W

Readings in Freudian psychoanalytic theory from Freud and his contemporaries to the present, with emphasis on concepts (such as the unconscious, sexuality, fantasy, narcissism) that have informed recent cultural criticism

around questions of social identity, subjectivity, marginality, and power. Enrollment restricted to graduate students. Enrollment limited to 15. *T. De Lauretis*

219B. Psychoanalysis and Cultural Criticism. S
Writing intensive course based on readings in course 219A. Prerequisite(s): course 219A. Enrollment restricted to graduate students. Enrollment limited to 15. *T. De Lauretis*

220A. Globalization and Cultural Process. F
Discusses theories of globalization and its cultural effects. How are cultural forms destroyed, imposed, appropriated, hybridized, translated, invented, and reinvented at local, national, regional, and transnational levels? Historical and ethnographic focus on tourist encounters, museums, nativisms, film/media performances, etc. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *J. Clifford*

220B. Globalization and Cultural Process. W
Writing intensive course based on readings in course 220A. Prerequisite(s): course 220A. Enrollment limited to 20. May be repeated for credit. *J. Clifford*

222A. Theories of Late Capitalism, Nationalism, and the Politics of Identity. *
Looks at the theoretical literature on what is variously called late capitalism/postindustrialism/postfordism, and in that context considers the rise of nationalism and identity politics in the latter part of the 20th century. The primary focus is on the U.S. and Western Europe, but questions of the globalization of capital and the transformation of relations between "the West" and "the Third World" are also considered. Written work for the course consists of weekly short papers. Enrollment restricted to graduate students. Enrollment limited to 15. *B. Epstein*

222B. Theories of Late Capitalism, Nationalism, and the Politics of Identity. *
Writing intensive course based on readings in course 222A. Prerequisite(s): course 222A. Enrollment restricted to graduate students. Enrollment limited to 15. *B. Epstein*

223. Recent European Philosophy. W
Seminar on recent developments in European philosophy, with particular attention to German theorists such as Nietzsche, Heidegger, Gadamer, Horkheimer, Adorno, or Habermas. Theorists such as Sartre, Merleau-Ponty, Derrida, Foucault, Bourdieu, Levinas, Laclau, or Vattimo may be read as well. (Also offered as Philosophy 223. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *D. Hoy*

224. History of Consciousness. F
Examination of contemporary theories of consciousness in both analytic and continental traditions. Among those who deflate modern philosophy's preoccupation with consciousness are not only Dennett, Davidson, and Rorty, but also Heidegger, Foucault, and Derrida. Among those who argue for irreducibility of subjectivity are not only Searle, Nagel, and Chalmers, but also Sartre, Merleau-Ponty, and Levinas. Discussion of parallel readings from both philosophical perspectives. (Also offered as Philosophy 256. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 25. *D. Hoy*

225. The Politics of Affect. *
Point of departure is the question of the political, posed with respect to psychoanalysis. The underlying question is what the political does to psychoanalysis, but also

what the unconscious does to the political. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

228. Fundamental Problems of Metapolitics. S
Focuses on seminal works of political thought: the first half devoted to ancient and modern classics; the second considering several major contemporary reflections. Aims to reconstruct and assess the claims regarding epistemic conditions and criteria of metapolitical judgment. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Balakrishnan*

229A. Aesthetics and Politics. *
Studies the connections between questions of aesthetics and politics, including questions of beauty, genre, pleasure, narrative form, structures of feeling and style, in literature, film and music, as these relate to the politics of class, race, gender, sexuality, and decolonization. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

230A. Poetry, Language, Thought. F
Introduces the relation between philosophy and poetics in some major 20th-century poets and thinkers. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

230B. Poetry, Language, Thought. W
Writing-intensive course based on readings in course 230A. Prerequisite(s): course 230A, or permission of instructor. Enrollment limited to 15. *D. Marriott*

232A. Third World Feminisms and Globalization. *
Studies third world feminist theories and struggles and their relations to globalization; topics include nationalism, development, transnational practices, identity politics, human rights, especially the ways in which Third World feminisms respond and contribute to political, economic, social, and cultural transformations. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

233A. Theories of Modernity and Postmodernity. *
Study of social and cultural theories of modernity and postmodernity; analysis of various conceptualizations of the modern and the postmodern and their relation to production, history, aesthetics, cultural identity, social struggle; texts from a variety of disciplines (literature, sociology, philosophy). Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

233B. Theories of Modernity and Postmodernity. *
Writing intensive course based on readings in course 233A. Prerequisite(s): course 233A. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

234A. Social Movements in the 20th-Century U.S. F
The history of major social movements in the 20th-century U.S., including populism, labor, socialism and communism, civil rights, the women's movement, the anti-nuclear movement. Various theoretical perspectives on the rise and fall of social movements. Enrollment restricted to graduate students. Enrollment limited to 15. Offered in alternate academic years. May be repeated for credit. *B. Epstein*

234B. Social Movements in the 20th-Century U.S. W
Writing intensive course based on readings in course 234A. Prerequisite(s): course 234A. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *B. Epstein*

235A. Theory of Religion. S
The difficulty of defining religion (universal essence vs. local/individual experience), of specifying its categorical boundaries, and of generating a theory based on more traditional disciplines (anthropomorphism, societal, psychic, transcendent, cognitive/ritual, historical/cultural/political). Enrollment restricted to graduate students. Enrollment limited to 15. *G. Lease*

235B. Theory of Religion. *
Writing intensive course based on readings in course 235A. Prerequisite(s): course 235A. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Lease*

237A. Historical Materialism. *
Students read landmark works of classical and contemporary Marxism. Writings from Marx, Lenin, Trotsky, Lukacs, Gramsci, Adorno, Benjamin, Sartre, Althusser, Anderson, Jameson, and Zizek are addressed. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Balakrishnan*

239A. The Dialectical Legacy. *
From Adorno to Zizek rediscoveries of Hegel have provided the impetus for some of the most innovative currents of 20th-century Marxism. Examines the philosophical and historical problems that Marx inherited from Hegel through close readings of their major works. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Balakrishnan*

239B. The Dialectical Legacy. *
From Adorno to Zizek rediscoveries of Hegel have provided the impetus for some of the most innovative currents of 20th-century Marxism. Examines the philosophical and historical problems that Marx inherited from Hegel through close readings of their major works. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Balakrishnan*

240. Basic Principles of University-Level Pedagogy (1 credit). F
Provides training for graduate students in university-level pedagogy in general. Under the supervision of the department chair, coordinated by a graduate student with substantial experience as a teaching assistant. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

242A. Violence and Phenomenology: Fanon/Hegel/Sartre. *
Study of the work and influence of Frantz Fanon from a range of viewpoints: existential, phenomenological, psychoanalytic, and political; a variety of genres: film, literature, case history, and critique; and a set of institutional histories: clinical, cultural, and intellectual. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

242B. Violence and Phenomenology: Fanon/Hegel/Sartre. *
Writing intensive course based on readings in course 242A. Prerequisite: course 242A. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

243A. Nationalism, Anti-Semitism, and Jewish Resistance in World War II.

Jewish resistance to Nazism during World War II, in Eastern Europe, and its historical context. Includes the pre-war rise in nationalism and anti-Semitism in Poland and Lithuania, Jewish integration in the Soviet Union, and the consequences for wartime resistance. (Also offered as History 256. Students cannot receive credit for both courses.) Enrollment restricted to seniors and graduate students. Enrollment limited to 15. *B. Epstein*

247. Performance/Performativities. W

Performance acts and theories of performativity in visual culture from modernity to present. Major theoretical positions subtending the emergence of performances/performativities: subjectivity, identity, temporality, media, ritual, the event, the body and embodiment, collaboration, and politics. (Also offered as Digital Arts and New Media 247. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Qualified seniors accepted with permission of instructor. Enrollment limited to 15. *C. Sousloff*

250A. Foundations in Science Studies. F

Critical inquiry into topics in the history, sociology, anthropology, and philosophy of science and technology. Organized around the position that science is its practice, the seminar explores practices of representation, science studies and cultural studies, local/global tensions and networks, and the science question in feminism and antiracism. Enrollment restricted to graduate students. Enrollment limited to 15. *K. Barad*

250B. Foundations in Science Studies. *

Writing intensive course based on readings in course 250A. Prerequisite(s): course 250A. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Haraway*

251A. Readings in Science Studies. *

Focus is on recent literature in social, cultural, and historical studies of science, medicine, and technology. This seminar familiarizes students with current scholarly debates, research networks, national traditions, international exchanges, conference proceedings, interdisciplinary projects, and publication sites. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *D. Haraway*

251B. Readings in Science Studies. *

Second quarter of two-quarter course. Writing-intensive course based on the readings studied in course 251A. Prerequisite: course 251A. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Haraway*

252. Poststructuralism. *

French poststructuralism, with particular attention to the main philosophical texts of Jacques Derrida and Michel Foucault. Other representative theorists as well as critics of poststructuralism are studied as time permits. (Also offered as Philosophy 252. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *D. Hoy*

253A. Topics in Cultural Analysis. S

Advanced graduate seminar in which students do research on focused topics. Each quarter centered on single thematic area. Students read works of culture-theory and exemplary studies illustrating methodologies, problems, and current controversies. Prerequisite(s): minimum of second-year status in the history of consciousness pro-

gram; instructor evaluates student's ability to participate. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Clifford*

255A. Carl Schmitt: Political and Legal Order in Modern Thought. *

Students study the main translated texts of Carl Schmitt's work, as well as certain secondary commentary on his body of thought. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Balakrishnan*

256A. Theories of the Visual. *

Study of psychoanalytic theories of the visual including the emergence of psychoanalysis and cinema as parallel discourses and the mobilization of key psychoanalytic concepts—scopophilia, voyeurism, fetishism—in Freudian and Lacanian understandings of the gaze so central to film and photographic theory. Enrollment restricted to graduate students. *D. Marriott*

256B. Theories of the Visual. *

Writing intensive course based on readings in course 256A. Prerequisite: course 256A. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

259A. Kant, Lacan, and the Ethics of Psychoanalysis. *

Offers an introduction to Jacques Lacan's "Return to Kant" and the response it provokes as a reading of sadism, politics, and ethics. Specific point of entry adopted for course is Lacan's seminar on "The Ethics of Psychoanalysis." Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

259B. Kant, Lacan, and the Ethics of Psychoanalysis. *

Writing-intensive course based on readings in course 259A. Prerequisite(s): course 259A. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Marriott*

260A. Film and the Visible. *

Study of selected topics in film theory, including the construction of vision and spectatorship; the relations of look, image, and narrative; the formative effects of classic, experimental, and independent cinema in contemporary visual culture; the feminist critique of representation; the role of cinema in the production of public and private fantasies, cultural memory, and identity. Enrollment restricted to graduate students. Enrollment limited to 15. *T. De Lauretis*

260B. Film and the Visible. *

Study of selected topics in film theory, including the construction of vision and spectatorship; the relations of look, image, and narrative; the formative effects of classic, experimental, and independent cinema in contemporary visual culture; the feminist critique of representation; the role of cinema in the production of public and private fantasies, cultural memory, and identity. Prerequisite(s): course 260A. Enrollment restricted to graduate students. Enrollment limited to 15. *T. De Lauretis*

260C. Film and the Visible. *

Writing intensive course based on readings in courses 260A and 260B. Prerequisite(s): course 260A or 260B. Enrollment restricted to graduate students. Enrollment limited to 15. *T. De Lauretis*

261. Modern Intellectual History. *

Survey of 19th- and 20th-century intellectual history that focuses on a cross-section of major works from Hegel to Levi-Strauss. Enrollment restricted to graduate students. Enrollment limited to 15. *G. Balakrishnan*

264. The Idea of Africa. W

Examines the position of Africa in cultural studies and the simultaneous processes of over- and under-representation of the continent that mark enunciations of the global and the local. Themes include defining diaspora, the West as philosophy, and Africa in the global economy. (Also offered as Feminist Studies 264. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *G. Dent*

291. Advising (2 credits). F,W,S

Independent study formalizing the advisee-adviser relationship. Regular meetings to plan, assess and monitor academic progress, and to evaluate course work as necessary. May be used to develop general bibliography of background reading and trajectory of study in preparation for the qualifying examination. May be repeated for credit. *The Staff*

292. Practicum in Composition.

A practicum in the genres of scholarly writing, for graduate students working on the composition of their qualifying essay or doctoral dissertation. Enrollment restricted to graduate students. Enrollment limited to 15. *D. Haraway, T. De Lauretis, J. Clifford*

293. Field Study. F,W,S

Research carried out in field settings, based on a project approved by the responsible faculty. The student must file a prospectus with the department office before undertaking the research and a final report of activities upon return. May be repeated for credit. *The Staff*

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. *The Staff*

295. Directed Reading. F,W,S

Systematic working through a prearranged bibliography which is filed as a final report at the end of the quarter with the signature of the instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

A seminar study group for graduate students focusing each quarter on various problems in the history of consciousness. A statement and evaluation of the work done in the course will be provided each quarter by the students who have participated in the course for that quarter, and reviewed by the responsible faculty. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Independent study and research under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

298. Doctoral Colloquium. *

Under the supervision of a History of Consciousness faculty member, students finishing their dissertation meet weekly or bi-weekly to read and discuss selected draft chapters, design difficulties and composition problems. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Prerequisite(s): advancement to candidacy. May be repeated for credit. *The Staff*

Humanities

503 Humanities I
(831) 459-2696
<http://humwww.ucsc.edu>

Faculty and Professional Interests

Professor

JEROME NEU
*Philosophy of mind; emotions, culture, and insults;
philosophy of law; Freud and psychoanalytic theory*

Program Description

UCSC offers several discipline-based and interdisciplinary majors and minors within the humanities, and many majors in the social sciences and the arts integrate humanistic methods into the curriculum. Many majors in the humanities offer concentrations or pathways that allow students to pursue an individualized course of study. Finally, students have the option of pursuing an individual major within the rubric of humanities.

Programs of studies of the humanities leading to undergraduate majors or minors include: American studies, classical studies, East Asian Studies, German studies, history, Italian studies, Jewish studies, language studies, linguistics, literature, philosophy, Southeast Asian studies, and feminist studies. There are five graduate programs in the humanities: history, history of consciousness, linguistics, literature, and philosophy. Curricular offerings in several languages and instruction in writing complement and support both the graduate and undergraduate programs of study.

Information Systems Management

See Engineering, page 255.

Italian

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Professor

MARGARET BROSE (Literature)
Italian literature, 19th- and 20th-century poetry and poetics, the novel, Romanticism, medieval literature, gender studies, autobiography

Associate Professor

DEANNA SHEMEK (Literature)
Italian literature and cultural history, Renaissance studies, early modern popular culture, narrative (early modern to contemporary), women's studies, literary theory

Lecturer

GIULIA CENTINEO
Italian culture and civilization; history of Italian language; Italian linguistics, syntax, and semantics; language pedagogy

MARIA (TONIA) PRENCIPE
Business Italian, translation, Italian culture and civilization

Program Description

Students interested in acquiring proficiency in Italian can enroll in language courses from beginning to advanced levels. In addition, students may select from among the following programs: a major or minor in language studies, a major in literature with an emphasis in Italian literature, a major in global economics, or a major in Italian studies.

The sequence of lower-division courses 1-6 is aimed at enabling students to gain proficiency in aural comprehension, speaking, reading, and writing. Courses 1A and 1B offer lower-division intensive Italian language instruction equivalent to levels 1, 2, 3. The 1, 2, 3 sequence starts once a year in the fall quarter, while the 1A-1B sequence starts once a year in the winter quarter. Classes are taught in Italian from the beginning level.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Study Abroad

The Office of International Education sponsors programs of study in Italy. For a list of current programs and requirements, visit their web site, <http://ioie.ucsc.edu>.

Lower-Division Courses

1. Instruction in the Italian Language. F

Aural comprehension, speaking, reading, writing, and laboratory. Check the quarterly *Schedule of Classes* for exact quarter(s) of offering. Elementary sequence (1-2-3) begins in fall quarter. *The Staff*

1A. Intensive Elementary Italian. W

Intensive instruction in elementary Italian language emphasizing oral fluency. Taken in conjunction with Italian 1B, the two courses are equivalent to levels 1-2-3. Accelerated pace allows a rapid mastery of grammar and syntax, giving the student a basic knowledge of Italian in only two quarters. *The Staff*

1B. Intensive Elementary Italian. S

Sequential to course 1A, completes the equivalent instruction offered through Italian 1-2-3. May not be taken by students who have completed Italian 1 or Italian 3. Open to students who have successfully completed either 1A or Italian 2; for students completing course 2, course 3 is preferable. *The Staff*

2. Instruction in the Italian Language. W

Aural comprehension, speaking, reading, writing, and laboratory. Check the quarterly *Schedule of Classes* for exact quarter(s) of offering. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 1; or placement by examination. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. *The Staff*

3. Instruction in the Italian Language. S

Aural comprehension, speaking, reading, writing, and laboratory. Check the quarterly *Schedule of Classes* for exact quarter(s) of offering. Students interested in this course who have not taken the prerequisite should

meet with the instructor prior to the first class meeting. Prerequisite(s): course 2; or placement by examination. *The Staff*

4. Intermediate Italian. F

Short stories, articles, films, and newsclips are used as the basis for studying intermediate-level conversation and composition. Laboratory assignments involve use of the World Wide Web, conversations with native speakers, films and video clips. Students interested in this course who have not taken the prerequisite at UCSC should meet with the instructor, preferably prior to the first class meeting, and take the placement examination. Prerequisite(s): course 1B or 3, or placement by examination. Enrollment limited to 25. (General Education Code(s): IH.) *The Staff*

5. Intermediate Italian. W

Reading of Italian short stories and a play are used as basis for further study and refinement of oral and written skills at the intermediate level. Particular emphasis is placed on oral/written discussion of abstract ideas and topics, and on the study of different language registers/contexts. Laboratory work is regularly assigned. Students interested in this course who have not taken the prerequisite at UCSC should meet with the instructor, preferably prior to the first class meeting and take the placement exam. Prerequisite(s): course 4 or placement by examination. Enrollment limited to 25. (General Education Code(s): IH.) *The Staff*

6. Intermediate-Advanced Italian. S

Reading of first novel in the language and weekly viewing of Italian films serve as basis for oral reports and discussions on various aspects of Italian culture and civilization. Weekly assignments, three essays, and a paper on topics derived from or related to the text. Students interested in this course who have not taken the prerequisite at UCSC should meet with the instructor, preferably prior to the first class meeting, and take the placement examination. Prerequisite(s): course 5 or placement by examination. Enrollment limited to 25. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

106. Italian Culture Through Film. W

Film is used as a medium through which images of Italians and their culture are disseminated, perpetuated, and crystallized. Whether these representations offer historical perspectives or stereotypes, they are important documents for the study of Italian culture, society, history, and politics. While analyzing films by and about Italians, we develop an informed opinion on relevant issues in Italian studies. The course is taught in English with an enhancement section in Italian. The enhancement section meets once a week and is designed to give students who are already familiar with the language the opportunity to discuss the films in Italian and to read/view additional

material in the language. Students cannot receive credit for this course and Languages 80D. Prerequisite(s): course 6. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Italian Studies

Department of Literature
303 Humanities 1
(831) 459-4778
<http://literature.usc.edu/>

Faculty and Professional Interests

Core Program Faculty

MARGARET R. BROSE, Professor of Literature (Cowell)

GIULIA CENTINEO, Lecturer in Italian (Cowell)

CYNTHIA POLECRITTI, Associate Professor of History (Stevenson)

MARIA (TONIA) PRENCIPE, Lecturer in Italian (Cowell)

DEANNA SHEMEK, Professor of Literature (Cowell)

CATHERINE M. SOUSSLOFF, Professor of History of Art and Visual Culture (Porter and Cowell)

Affiliated Faculty

MURRAY BAUMGARTEN, Professor English and Comparative Literature (Humanities I)

JANINA DARLING, Lecturer in History of Art and Visual Culture

MARIA EVANGELATOU, Assistant Professor History of Art and Visual Culture (Porter)

CARLA FRECCERO, Professor of Literature and Feminist Studies (Humanities I)

MARY-KAY GAMEL, Professor of Literature (Cowell)

VIRGINIA JANSEN, Emerita, History of Art and Visual Culture

CHARLES W. HEDRICK JR., Professor of History (Cowell)

MARGO HENDRICKS, Associate Professor of Literature (Cowell)

ALLAN LANGDALE, Visiting Assistant Professor of History of Art and Visual Culture (Porter)

GARY B. MILES, Emeritus

TYRUS MILLER, Professor of Literature (Cowell)

ELEONORA PASOTTI, Assistant Professor of Politics (Merrill)

NINA TREADWELL, Associate Professor of Music (Music Center)

JAMES WILSON, Lecturer in Writing (Cowell)

Program Description

Students interested in an interdisciplinary approach to Italian culture through the combined study of literature, history, politics, art history, music, and film may pursue a major or minor in Italian studies. The guidelines for the completion of the major may be obtained from Professor Deanna Shemek or Professor Margaret Brose. There are numerous opportunities for study in Italy through the UC Education Abroad Program (EAP), either for a year (Bologna, Milan, Padua) or for an intensive semester (Milan, Padua, Rome, Siena). The Italian studies program is administered by the Literature Department.

Major Requirements

Each student must complete the lower-division language sequence (Italian 1–6, or equivalent). In addition, students are required to take 10 courses (one course may be lower division), including a core unit of five courses to be taken at UCSC: three Italian literature courses, one course in Italian history, and one course in Italian art history. A course on Dante is required. A minimum of five courses must be taught principally in Italian or through Italian language texts read in the original. Five courses may be approved elective courses. One course may focus on Italy in a European or global context. One Italian literature course may be replaced by an Italian culture course. Up to five elective courses may be approved from UC EAP's yearlong study abroad in Italy. All students must complete a senior seminar course focused on Italian literature, history, or art history.

Minor Requirements

Each student must complete the lower-division language sequence (Italian 1–6, or equivalent). Students must also complete five upper-division courses in Italian studies: three Italian literature courses, one course in Italian history, and one course in Italian art history. A course on Dante is required. One Italian literature course may be replaced by an Italian culture course. Three of the five upper-division courses must be completed at UCSC; three must be taught principally in Italian. A maximum of two courses may be transferred from EAP.

2008–09 Italian Studies Curriculum

Fall 2008

History of Art and Visual Culture

10G *Introduction to Visual Culture: Europe*
C. Soussloff

191X *Byzantine Art and the Virgin Mary*
M. Evangelatou

History

65A *Medieval Europe: 200–1000*
C. Polecristi

Italian

1 *Instruction in the Italian Language*
G. Gentino, M. Prencipe

4 *Intermediate Italian*
G. Centineo

Italian Literature

102 *Introduction to Italian Literature*
M. Brose

Pre- and Early Modern Literature

131 *Love and Madness in Medieval Literature*
The Staff

Winter 2009

History of Art and Visual Culture

115 *Italian Renaissance: Representation and Institutions*
A. Langdale

153 *History of the Book: 600–1000*
E. Remak

189V *Venetian Renaissance Art and Architecture*
A. Langdale

History

102C *The Mediterranean in the Modern Era, 1730–1930*
E. Burke

164A *Late Medieval Italy, c. 1200–1400*
C. Polecristi

Italian

1A *Intensive Elementary Italian*
T. Mohammed

2 *Instruction in the Italian Language*
M. Prencipe

5 *Intermediate Italian*
G. Centineo

106 *Italian Culture Through Film*
G. Centineo
(also taught as under the Language Program as 80D)

Italian Literature

130B *Boccaccio*
D. Shemek

Modern Literary Studies

144H *Jewish Writers and the European City: Venice*
M. Baumgarten

Spring 2009

History of Art and Visual Culture

10G *Introduction to Visual Culture: Europe*
A. Langdale

History

164B *Renaissance Italy, c. 1400–1600*
C. Polecristi

196Y *Saints and Holiness in Medieval Europe*
C. Polecristi

Italian

1B *Intensive Elementary Italian*
G. Gentino

3 *Instruction in the Italian Language*
M. Prencipe

6 *Intermediate-Advanced Italian*
G. Centineo

Italian Literature

130D *Dante's Divine Comedy*
M. Brose

Pre- and Early Modern Literature

150 *Italian Renaissance*
D. Shemek

Japanese

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Professor

SHIGEKO OKAMOTO
Sociolinguistics, discourse analysis, pragmatics, language and gender, foreign language pedagogy, Japanese linguistics

Associate Professor

ALAN S. CHRISTY
Early modern and modern Japan; history of social sciences, colonialism, nationalism

Assistant Professor

NORIKO ASO
Japanese social and cultural history, women's history, race and ethnicity, colonialism, nationalism, Korean history

Lecturer

SAKAE FUJITA
Foreign language methodology, drama/theater/improvisation use in language learning, language and identity, foreign language literacy

Program Description

Students interested in acquiring proficiency in Japanese can enroll in language courses from beginning to advanced levels. In addition, students may select from among the following programs: a major or minor in language studies, an East Asian studies minor, or a major in global economics.

The sequence of lower-division courses 1–6 is aimed at enabling students to gain proficiency in aural comprehension, speaking, reading, and writing. Instruction takes place mostly in Japanese from the second half of the first quarter.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Study Abroad

The UC Education Abroad Program (EAP) has information on study in Japan. There are EAP centers in Yokohama, Tsuru, Kyoto, Tokyo, Sendai, Tsukuba, and Tohoku. Courses taken abroad can, with approval of an adviser, be applied to major requirements. For more information on the program, see UC Education Abroad Program, page 40. For information on credit applied to a major, contact the appropriate department.

Lower-Division Courses

1. Instruction in the Japanese Language. F

Goal is to understand and apply basic rules of grammar and the sociolinguistic rules of the language needed to carry out various, simple tasks; to learn to read and write hiragana, katakana, and 40 kanji. *The Staff*

2. Instruction in the Japanese Language. W

Goal is to understand and apply additional rules of grammar and the sociolinguistic rules of the language needed

to carry out various tasks; to develop skills in reading and writing; learn to read and write 70 additional kanji. Prerequisite(s): course 1; or placement by examination. *The Staff*

3. Instruction in the Japanese Language. S

Goal is to understand and apply additional rules of grammar and the sociolinguistic rules of the language needed to carry out various tasks; to further develop skills in reading and writing; to learn to read and write 70 additional kanji. Prerequisite(s): course 2; or placement by examination. *The Staff*

4. Intermediate Japanese. F

Goal is to understand and apply additional rules of grammar and the sociolinguistic rules of the language needed to carry out various tasks; to further develop skills in reading and writing; to learn to read and write 70 additional kanji. Prerequisite(s): course 3; or placement by examination. (General Education Code(s): IH.) *The Staff*

5. Intermediate Japanese. W

Goal is to develop grammatical, cultural and analytical skills, and vocabulary, necessary for reading Japanese texts in several genres. Prerequisite(s): course 4; or placement by examination. (General Education Code(s): IH.) *The Staff*

6. Intermediate Japanese. S

Goal is to develop grammatical, cultural and analytical skills, and vocabulary, necessary for reading Japanese texts in several genres. Prerequisite(s): course 5; or placement by examination. (General Education Code(s): IH.) *The Staff*

50. Preadvanced Japanese. F

Intensive work in Japanese grammar to strengthen grammatical correctness and excellence of expression. A comprehensive textbook and drill book cover a wide range of styles and topics. Course is prerequisite to upper-division Japanese language courses. Prerequisite(s): course 6. Students interested in this course who have not taken the prerequisite should meet with the instructor, preferably prior to the first class meeting. Enrollment limited to 20. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

103. Advanced Japanese. S

Readings in contemporary Japanese. Assignments include short stories, writing essays, classroom presentation and translation of a short story. May be repeated for credit with consent of instructor. Prerequisite(s): course 50. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. *The Staff*

104. Advanced Japanese. W

Readings on cultural/historical issues in contemporary Japanese short stories, essays, and poems. Focus on developing skills to write coherent essays and discuss them in a

group situation. May be repeated for credit with consent of instructor. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 50. *The Staff*

105. Advanced Japanese. *

Readings in contemporary Japanese prose (fiction and nonfiction) with an emphasis on contextual understanding and stylistic appreciation. May be repeated for credit with consent of instructor. Prerequisite(s): course 50. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. *The Staff*

110. Japanese Language, Culture, and Society. W

Examines the social and cultural aspects of the Japanese language. Topics include language planning; writing-system reform; standard Japanese; regional variation; honorifics; gender norms and practices; age variation; communication styles; loanwords and English; and minority languages and their speakers. Prerequisite(s): course 6, or consent of instructor. Enrollment limited to 25. *S. Okamoto*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Jewish Studies

Department of History
201 Humanities 1
(831) 459-2982
<http://history.ucsc.edu>

Program Faculty

BETTINA APTHEKER, Professor of Feminist Studies

MURRAY BAUMGARTEN, Professor of English and Comparative Literature

RAOUL BIRNBAUM, Professor of History of Art and Visual Culture

MARGARET BROSE, Professor of Literature

BARBARA EPSTEIN, Professor of History of Consciousness

STANLEY FLATTÉ, Emeritus

LAUREL FOX, Professor of Biology

ROBERT GOFF, Emeritus

GILDAS HAMEL, Lecturer in History

PETER KENEZ, Professor of History

MARC MANGEL, Professor of Engineering (Applied Mathematics and Statistics)

LOISA NYGAARD, Associate Professor of Literature

TAMMI ROSSMAN-BENJAMIN, Lecturer in Hebrew

DANIEL SELDEN, Professor of Literature

CATHERINE SOUSSLOFF, Professor of History of Art and Visual Culture

MICHAEL THALER, Lecturer in History

BRUCE THOMPSON, Lecturer in History

Program Description

The minor in Jewish studies introduces students to the study of modern Jewish cultures and to the range of disciplines that bear upon the field while supporting students' work in their own majors. This introduction to Jewish studies is helpful for students who plan to do graduate work in Jewish studies, whether through regular disciplines or in Jewish studies programs and also for students who plan to attend rabbinical schools or to find work with Jewish communities. For others with an interest in Jewish topics but without such plans, a minor in Jewish studies offers intellectual enrichment and a focus within the student's chosen field.

The Jewish studies minor is designed to complement existing majors in the arts, humanities, physical and biological sciences, and social sciences. It is conceived as an interdisciplinary program, and students are urged to plan their program with a faculty adviser. There are significant library resources, including the Baumann Endowment for Classic Jewish Texts, the Neufeld-Levin Holocaust Materials, the Morris Brose Fund for Visual Arts and Jewish Culture, and the Silverman collection of Sephardic materials.

This minor offers students the opportunity to gain knowledge and skills in diverse contexts and in various aspects of Jewish culture—from its origins in the ancient world to the modern era. The minor will help students to prepare to move successfully into graduate programs in a variety of disciplines—especially in the humanities, social sciences, and pre-professional programs; and it will provide students with a grounding in materials fundamental to Western culture and liberal education, of value to majors in all divisions. With its emphasis on the transnational and diasporic aspects of Jewish culture, this minor connects with a range of disciplines and programs on the UCSC campus that explore the multiplicity of the world's cultures and complex relationships among them; at the same time, this minor will help students to develop analytical tools, cultural literacy, and critical versatility.

The Jewish studies minor is administered by the History Department. For additional information on curriculum and advising, go to <http://history.ucsc.edu>.

Requirements for the Minor

- eight courses are required for the minor.
- three lower-division courses, two of which may be satisfied through the study of Hebrew language.
- two courses from the upper-division Jewish Studies core courses sequence.
- three additional upper-division courses from the Jewish Studies curriculum.

Jewish Studies Core Courses

Modern Literary Studies

- 144A *Jewish Diaspora, Ethnicity, and Urban Life*
- 144B *Modernity as Jewish Challenge and Catastrophe*
- 144C *Literature and the Holocaust*
- 144D *Jewish Writers and the American City*
- 144E *Hebrew Poetry*

Students, especially those who plan to continue their studies in graduate school, may wish to gain pro-

ficiency in Hebrew, Yiddish, German, Russian, Polish, Hungarian, French, Italian, or Spanish, depending on their area of interest. Students who participate in a UC Education Abroad Program (EAP) may petition to apply up to three courses from EAP toward the minor. Petition forms are available in the History Department office.

Journalism

Writing Program
166 Kresge College
(831) 459-2431
<http://writing.ucsc.edu>

Program Description

Admission to the minor in journalism is suspended at present. The following conditions will apply if it is reinstated.

The Writing Program accepts students each quarter into the minor in journalism. The minor consists of a series of courses and internships that emphasize not just craft but critical analysis. The program immerses the student in studies of the rhetoric of nonfiction writing and of the significance of public discourse. It is designed to coordinate with a student's major in any field of study in which the practice of writing for newspaper and magazine publication might complement normal course work.

A full description of the minor, an explanation of application procedures, and a petition for admission into the program may be obtained at the Writing Program office (Kresge 166). Petitions are reviewed during the second week of each quarter; selection is based on course work and writing samples. Interested students are encouraged to get more details about the minor from the writing program office (166 Kresge College).

Course Requirements

- Writing 64, *Newswriting Workshop*. All students must take this course (or its equivalent) before they are approved for the minor.
- five upper-division courses in writing. At least three must be from the following: Writing 165, 166 (one or more courses in the series), and 167. The remaining two courses may include any upper-division creative writing course (see Literature, page 337), American Studies 105, Community Studies 144, Environmental Studies 156 (for environmental studies majors), Film and Digital Media 150, and Writing 101 (if not used as media criticism), 102, 103, 104, 107, 108, 109, 110A, 120, 161, 163, 169, and 195.
- one course in media criticism (ordinarily Writing 167, but Sociology 116, Community Studies 80L, Writing 70, and 128 are accepted)
- one quarter of internship
- a senior thesis or portfolio

Kresge College

College Office
(831) 459-2071
<http://www2.ucsc.edu/kresge>

For college description and list of faculty, see page 88.

Lower-Division Courses

10. Academic Success (2 credits). *

Helps students develop study skills, writing skills, critical reading and thinking skills, test-taking strategies, strategies for stress reduction, and time-management skills. Students evaluated on attendance at class, attendance at individual meetings with instructor, and preparation of weekly assignments. Enrollment restricted to college members and by permission of college advisor. Enrollment limited to 18. *The Staff*

12A. Service Learning (3 credits). F,W,S

Students find a volunteer position with the instructor's assistance and perform community service in non-profit organizations, schools, unions, or local government agencies. Students meet weekly, keep a journal, and write a "social action witnessing" report of their experience. Enrollment restricted to college members. Enrollment limited to 15. May be repeated for credit. *The Staff*

12B. Service Learning (2 credits). S

Students find a volunteer position with the instructor's assistance and perform community service in non-profit organizations, schools, unions, or local government agencies. Students meet weekly, keep a journal, and write a "social action witnessing" report of their experience. Enrollment restricted to college members. Enrollment limited to 15. May be repeated for credit. *The Staff*

30C. The Writing Life (3 credits). *

Studies challenges and rewards of writing careers students might pursue professionally (from technology to travel, screenwriting to grant writing, journalism to literary careers—depending on quarter taught). Course centers around series of visiting UC Santa Cruz alumni who talk about their writing lives. Enrollment restricted to college members. Enrollment limited to 18. May be repeated for credit. *F. Fatemi*

42. Student-Directed Seminar (no credit). F,W,S

Seminar taught by upper-division Kresge students under Kresge faculty supervision. (See course 192.) Students submit petition to sponsoring agency. *The Staff*

60C. Prison Narratives (3 credits). S

Seeks to ask hard questions about the role of the prison, its increasing use in our nation, and the use of torture by the U.S. government in Guantanamo, Abu ghraib, and other prisons. Readings include J. James's *Imprisoned Intellectuals*, Alexander Berkman's *Prison Memoirs of an Anarchist*, and other writings by American prisoners. Eve Ensler's *What I Want My Words to Do to You* is shown. Course is primarily reading and discussion; students are asked to keep a reading journal and to write a critical/creative essay at the end of the quarter. (Formerly *Language of the Prison House*.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to college members. Enrollment limited to 20. *W. Cooper*

60F. Writer's Read (2 credits). S

Students attend weekly creative writing readings by fiction writers and poets, read excerpts from the writers'

works, participate in question and answer sessions, and write short, creative and/or analytical responses to the readings and writings. Enrollment restricted to Kresge and Porter college members. Enrollment limited to 25. May be repeated for credit. *The Staff*

60G. Arts Journalism and Criticism: Writing About Contemporary Art and Popular Culture (3 credits). *

Focuses on issues in contemporary art and popular culture. Students write about music, film/video, and visual art. Class meets weekly to look at artists' work and to discuss readings. Weekly writing assignments and class discussions. Enrollment restricted to college members during priority enrollment. Enrollment limited to 22. *The Staff*

60K. The Art of Comedy: Literature and Performance (3 credits). W

Students analyze comedic writing and practice writing comedy. Students develop pieces to be delivered in a performance at the end of the quarter. Enrollment limited to 22. *The Staff*

60L. Anti-Museum I: Poetic Imagination Tool Kit (3 credits). *

Reinvents the museum as we know it by using the perceptual tools of poetic imagination to create fundamental alternatives to the known forms of museum. Weekly readings, presentations, and projects culminate in a collective exhibition of student-created anti-museums. Enrollment limited to 22. *The Staff*

60M. Community Mural (3 credits). *

Through lecture, demonstrations, and hands-on projects, students develop the skills to successfully complete a mural. Generating the idea, completing the design, submitting a proposal, and painting a mural are covered. Enrollment restricted to college members. Enrollment limited to 15. *The Staff*

61. Kresge College Student Leadership (2 credits). *

Holistic approach examining leadership as it relates to personal and institutional ethics, personal accountability, group dynamics, and the effects of culture on leadership. Enrollment restricted to college members. *The Staff*

62. Transformative Action. W

Addresses the most effective methods of social change. Examines principles and strategies of transformative action and case studies of leaders solving world problems. Empowers students to be innovators in real-life community projects. Integrates nonviolence, psychology, sustainability, and social justice. *The Staff*

62A. Transformative Action (2 credits). W

Addresses the most effective methods of social change. Examines principles and strategies of transformative action and case studies of leaders solving world problems. Empowers students to be innovators in real-life community projects. Integrates nonviolence, psychology, sustainability, and social justice. *The Staff*

63. Kresge Garden Cooperative (2 credits). S

Offers hands-on gardening skills within a student-run space. Focuses on developing a strong cooperative garden on campus, with special attention to the documentation of this process. Enrollment limited to college members. Enrollment limited to 10. *The Staff*

65. Power and Representation Lab.

65A. Power and Representations: Food Systems (2 credits). F

Explores the relationship between our individual choices as "eaters" and "food citizens," and how those choices affect the collective "food system" on many scales—locally, statewide, nationally, and internationally. Concurrent enrollment in course 80A or 80B is required. Enrollment limited to 20. *D. Shaw*

65B. Power and Representation: Photography (2 credits). F

Focuses on creating a final project individually, or in collaboration with others, that engages issues of power and representation through the medium of photography. Concurrent enrollment in course 80A or 80B is required. Enrollment limited to 20. *S. Graham*

65C. Power and Representation: Creative Writing (2 credits). F

For students who wish to supplement their core experience with creative writing. Students do in-class and out-of-class writing assignments; read and discuss texts; and work to develop their final project. Concurrent enrollment in course 80A or 80B is required. Enrollment limited to 20. *K. Schatz*

65D. Power and Representation: Art and Visual Performance (2 credits). F

Students investigate the themes presented in the core course to arrive at a final creative project in pairs, groups, or individually. Concurrent enrollment in course 80A or 80B is required. Enrollment limited to 20. *S. Kushner*

70. Do-It-Yourself Filmmaking: From Writing to Releasing. S

Practical and hands-on approach leads students through the laborious and labyrinthine process of making and distributing an independent narrative feature film. Enrollment restricted to college members during priority enrollment. Enrollment limited to 35. *The Staff*

80A. Introduction to University Discourse: Power and Representation. F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Explores relationships between individuals and their communities—communities as small as families and friends, colleges and cities; communities as large as nations and the world. Examines ways we constitute ourselves as individuals in relation to communities, focusing on representations of class, ethnicity, sexual orientation, gender, and race in several genres—critical theory, film, art, fiction, non-fiction, and theater. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C1.) *The Staff*

80B. Rhetoric and Inquiry: Power and Representation. F

Explores the intersections of investigations, interpretation, and persuasion, and hones strategies for writing and research. Explores relationships between individuals and their communities—communities as small as families and friends, colleges and cities; communities as large as nations and the world. Examines ways we constitute ourselves as individuals in relation to communities, focusing on representations of class, ethnicity, sexual

orientation, gender, and race in several genres—critical theory, film, art, fiction, non-fiction, and theater. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2.) *The Staff*

80T. Power and Representation (Kresge Core Course for Transfer Students). F

Explores the intersections of investigations, interpretation, and persuasion, and hones strategies for writing and research. Explores relationships between individuals and their communities—communities as small as families and friends, colleges and cities; communities as large as nations and the world. Examines ways we constitute ourselves as individuals in relation to communities, focusing on representations of class, ethnicity, sexual orientation, gender, and race in several genres—critical theory, film, art, fiction, non-fiction, and theater. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to sophomore, junior, and senior college members. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, W.) *The Staff*

99. Tutorial. F,W,S

A program of directed study arranged between a freshman or sophomore student and a Kresge faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Independent Study (2 credits). F,W,S

A program of directed study arranged between a student and a Kresge faculty member. Class time is less proportional to credit given. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99G. Independent Study (3 credits). S

A program of directed study arranged between a student and a Kresge faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under Kresge faculty supervision. (See course 42.) Prerequisite(s): upper-division standing in Kresge, a proposal supported by a Kresge faculty member willing to supervise, and college approval. *The Staff*

193. Field Study. F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a Kresge faculty supervisor. To be used primarily by upper-division students doing part-time, off-campus study. Prerequisite(s): approval of student's adviser and the college. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a Kresge faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195. Senior Thesis. F,W,S

Senior thesis or project for student doing individual major program. May be repeated twice for credit. Prerequisite(s): permission of sponsoring committee and college approval. *The Staff*

198. Independent Field Study. F,W,S

Provides for college-sponsored individual study programs off campus, for which Kresge faculty supervision is not in person (e.g., supervision is by correspondence.) Prerequisite(s): approval of the student's faculty sponsor and college approval. *The Staff*

199. Tutorial. F,W,S

A program of individual study arranged between an upper-division student and a Kresge faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Language Program

239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Chinese

DAVID KEENAN
Chinese language, fiction, and history

French

ANGELA ELSEY
Francophonie, 19th-century French history and civilization, French and Francophone cinema

CHRISTIANE GAUTIER
International and multicultural education; second-language acquisition; language pedagogy and teacher training; educational technology; linguistics; sociolinguistics; French phonetics; 20th-century French culture and civilizations

GRETA HUTCHISON
Foreign language pedagogy, second language acquisition, medieval French literature, and 19th-century literature and art

NORA MÉGHARBI
Second and foreign language acquisition, applied linguistics, pedagogical grammar, technology and multimedia, sociolinguistics, TA training, course supervision, business French, scientific French, francophone literature, translation

German

WALTER CAMPBELL
Language teaching, 18th- and 19th-century German literature, history of German

JUDITH HARRIS-FRISK
German language and cultural studies; German literature and intellectual history, 1750–present; turn-of-the-century Vienna and Weimar German; German issues of national identity and multiculturalism

Greek

KAREN BASSI (Literature)
Greek and Latin literatures, Greek drama, Hellenistic poetics, feminist interpretation, literary and cultural theory, pre- and early modern studies, historiography

MARY-KAY GAMEL (Literature)
Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

GILDAS HAMEL (History)
History of Judaism and Christianity; Hebrew and Greek Bible; classical languages

CHARLES W. HEDRICK JR. (History)
Greek and Roman history, epigraphy, historiography, political theory

JOHN P. LYNCH (Literature), Emeritus

DANIEL SELDEN (Literature)
Afroasiatic languages and literatures, Greek and Latin, Hellenistic culture, the classical tradition, history of criticism, literary theory

Hebrew

TAMMI ROSSMAN-BENJAMIN
Hebrew language and culture, biblical Hebrew syntax and semantics, the Hebrew Bible, Jewish thought, psycholinguistics, second-language acquisition and bilingualism

Hindi

JOHN MOCK
Language pedagogy, Hindi and Urdu fiction, Urdu poetry, languages and cultures of Northern Pakistan and Afghanistan, orality and literacy, discourse analysis, areal linguistics

Italian

GIULIA CENTINEO
Italian culture and civilization; history of Italian language; Italian linguistics, syntax, and semantics; language pedagogy

MARIA (TONIA) PRENCIPE
Business Italian, translation, Italian culture and civilization

Japanese

SAKAE FUJITA
Foreign language methodology, drama/theater/improvisation use in language learning, language and identity, foreign language literacy

SHIGEKO OKAMOTO
Sociolinguistics, discourse analysis, pragmatics, language and gender; foreign language pedagogy, Japanese linguistics

Latin

KAREN BASSI (Literature)
Greek and Latin literatures, Greek drama, Hellenistic poetics, feminist interpretation, literary and cultural theory, pre- and early modern studies, historiography

MARY-KAY GAMEL (Literature)
Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

GILDAS HAMEL (History)
History of Judaism and Christianity; Hebrew and Greek Bible; classical languages

CHARLES W. HEDRICK JR. (History)
Greek and Roman history, epigraphy, historiography, political theory

JOHN P. LYNCH (Literature), Emeritus

DANIEL SELDEN (Literature)
Afroasiatic languages and literatures, Greek and Latin, Hellenistic culture, the classical tradition, history of criticism, literary theory

Portuguese

ANA MARIA SEARA
Portuguese language; literature, film, and music of Brazil and the Portuguese-speaking world; acquisition and teaching of foreign, second, and heritage languages

Russian

WILLIAM NICKELL
Leo Tolstoy, Russian cultural history, 1920s–1930s Soviet Russia, Russian Soviet film, Russian language and pedagogy

Spanish and Spanish for Spanish Speakers

BRENDA BARCELÓ
Medical Spanish, Latin American culture, Latin dance expressions, Spanish/English and English/Spanish translation and interpretation, Hispanic linguistics, Romance languages

CARLOS CALIERNO
Latin American culture, history, literature, cinema, music, art, economics, and politics

VERÓNICA FELIU
Latin American literature of the 20th century; Chilean feminisms, politics, and culture; Latin American cultural studies; Spanish learning for both non-native and heritage speakers

MARÍA VICTORIA GONZÁLEZ-PAGANI
Language teaching methodology; Spanish syntax; computer-assisted foreign language learning; Latin American cultural studies, especially women's contributions

MARÍA MORRIS
Language learning styles and strategies, culture and technology in language training

MARTA NAVARRO
Latin American literature, Mexican/Chicano culture, Latina/Chicana issues

ARIEL A. PÉREZ
Language acquisition and teaching methodology, computer-assisted language learning, teaching language for proficiency, oral proficiency assessment; Latin American current affairs

FRANK A. (PACO) RAMÍREZ
Second-language acquisition, bilingual education, Siglo de Oro Theater, Peninsular medieval literature, Spanish-language film and theater for linguistic and cultural acquisition

ALVARO ROMERO-MARCO
Spanish literature of the 19th- and 20th-centuries; film, cultural studies

Program Description

Understanding how language works is a crucial part of comprehending human consciousness and communication. Language is an intellectual tool basic to all disciplines. In today's communities, multicultural and global, learning a second language is not a refinement but a necessity—the key to understanding and communicating with others near and far. The goal of the Language Program at UCSC is to allow students to achieve a substantial level of proficiency in languages other than English. Since such proficiency always includes cultural as well as linguistic comprehension, the program requires investigating the complex relationship between language and culture.

The Language Program offers rigorous language training by professional language instructors. Most courses are taught in the target language from the very beginning. In 2008–10, languages offered are Chinese, French, German, Greek, Hebrew, Hindi, Italian, Japanese, Latin, Portuguese, Russian, Spanish, Spanish for Spanish speakers, and Urdu.

Students with previous language preparation who wish to continue in that language take a placement examination to determine the course level appropriate for them. Each language's placement examination

format is described in the quarterly *Schedule of Classes*, along with the time, date, and location of the examination.

Language learning at UCSC is supported by a variety of technologies. There is a campus language laboratory in the Media and Electronic Resource Center (MERC) at McHenry Library; the library also houses an abundance of print and audiovisual material in the languages taught at UCSC, including music recordings and videos. Television programs are received from countries around the world. Faculty in the Language Program are incorporating new technologies into their teaching on an ongoing basis, including computer software and web-based resources.

In addition to language courses, the program offers upper-division courses exploring history, sociology, literature, art, film, and other manifestations of culture. All courses are taught in the target language.

Students of language interested in theater have the opportunity to participate in the annual International Playhouse, which every spring presents highly successful programs. To date, pieces have been performed in Chinese, French, German, Italian, Japanese, Latin, Portuguese, Russian, and Spanish.

Students are also encouraged to participate in foreign film series (e.g., Chinese, French, Italian, Portuguese, Russian, Spanish), international music festivals, and conferences on intercultural or international topics.

Students who wish to concentrate on language study can choose various majors. Students can major in language studies, which combines courses in language proficiency and culture with general and applied linguistics. The Literature Department offers courses in French, German, Spanish, Latin American, and Italian literature. The Literature Department encourages all students to study a second language and requires two upper-division courses in a non-English literature for the intensive literature major. The History Department encourages students of Asian, Latin American, European, and classical history to study a second language and provides a variety of opportunities to make use of language skills in their studies. Latin American and Latino Studies focuses on the Hispanic culture of the Americas and requires all majors to read, speak, and write Spanish or Portuguese. Other area studies majors involving language study include classical studies, German studies, Italian studies, East Asian studies (Chinese emphasis), global economics, and health sciences.

Study abroad is an important component of language study at UCSC. Language students have various opportunities for studying abroad, including one-quarter programs in Siena, Italy, Japan (global economics taught in English), and Costa Rica (tropical biology taught in English); semester programs in Austria, Chile, Costa Rica, France, Germany, India, Italy, or Mexico; and the yearlong UC Education Abroad Program, with centers in Brazil, Chile, China, Costa Rica, France, Germany, Italy, Japan, Mexico, Russia, Spain, and Taiwan.

Lower-Division Courses

80D. Italian Culture Through Cinema. W

Film is used as a medium through which images of Italians and their culture are disseminated, perpetuated, and crystallized. Whether these representations offer historical perspectives or stereotypes, they are important documents for the study of Italian culture, society, history, and politics. While analyzing films by and about Italians, we develop an informed opinion on relevant issues in Italian culture and society. The course, to be taught in English, is organized thematically. Students cannot receive credit

for this course and Italian 106. May be repeated for credit. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

80F. Israel's Struggle for Identity as Seen Through Israeli Cinema. S

Examines, through the medium of film, Israel's struggle for identity since its founding as a modern state. Topics include: Israel's relationship to the Jewish diaspora; the nature of Israel as a Jewish state; and the relationship between Israel and its Arab neighbors. Students may not receive credit for this course and Hebrew 106. May be repeated for credit. (General Education Code(s): T4-Humanities and Arts, E.) *The Staff*

Language Studies

Linguistics Department
241 Stevenson College
(831) 459-4988
<http://ling.ucsc.edu>

Program Description

Language Studies is an interdisciplinary major offered by the Linguistics Department. It is designed to equip students with competence in one or more foreign languages and, at the same time, provide them with an understanding of the general nature of human language—its structure and use. It is a demanding program that requires (1) acquisition of demonstrable competence in a language other than English, (2) grounding in linguistics, and (3) completion of a series of cultural context courses related to the language. Currently, majors may choose a concentration in Chinese, French, German, Modern Hebrew, Italian, Japanese, Russian, or Spanish. Interested students should contact the Linguistics Department office early in their college career to obtain essential information about requirements. Students are also encouraged to download a current copy of the Handbook of Undergraduate Programs in Linguistics and Language Studies from our web site at <http://ling.ucsc.edu>, which contains detailed information about the major.

A junior year abroad through the UC Education Abroad Program (EAP) in a country appropriate to the major language is recommended. A senior year abroad is approved only when all of the language proficiency requirements have been satisfied and when it is clear that any remaining courses can be satisfactorily completed abroad. Courses taken abroad may be used to satisfy major requirements only if approved by the undergraduate director or a designated adviser.

Requirements for the Language Studies Major

Early Declaration

It is important that prospective students declare the major as early as possible so that they can complete the advanced language, linguistics, and context requirements within the allowed period of enrollment.

Students who wish to include an EAP experience in their course of study will have to coordinate their choice of year abroad with the scheduling of UCSC courses. Transfer students who have not made significant progress with the language requirements before entering UCSC may find it difficult to include an EAP year before completion of graduation requirements.

Course Requirements

Language studies majors must satisfy course requirements in languages, linguistics, and cultural context.

Language component: Language studies majors (in French, German, Italian, Modern Hebrew, Russian, and Spanish) must achieve a level equivalent to six quarters in the language of concentration. One advanced language course after level 6 is also required. Note that Language courses 4, 5, or 6 fulfill one of the Introduction to Humanities (IH) general education requirements. Majors in Chinese and Japanese must achieve a level equivalent to nine quarters of language study.

Six foundation courses in linguistics:

- Linguistics 50, *Introduction to Linguistics: Sounds and Words*
- Linguistics 52, *Syntax I*; or Linguistics 55, *Syntactic Structures*
- Linguistics 53, *Semantics I*
- Linguistics 10, *Phonology I*
- two advanced linguistics courses

Five elective courses in linguistics or cultural context:

- *Linguistics courses:* any upper-division course in linguistics
- *Cultural context courses in the major language:* to be selected from a variety of disciplines including literature, history, politics, and art

Senior exit requirement: In their senior year, language studies majors must satisfy the senior exit requirement in one of two ways:

- Option 1. Successful completion of a capstone course. Students may designate an appropriate upper-division course as their capstone course.
 - In addition to fulfilling the normal requirements for the designated course, such students concurrently enroll in the Linguistics 190, *Senior Research Series* (two credits, enrollment limited to 12) with the same instructor, and produce a research paper or other significant project, normally related to their language of focus.
 - Prior to enrolling in 190, language studies majors must have senior standing, achieved level 5 language competence, and must have completed Linguistics 52/55, *Syntax I* or *Syntactic Structures*, and 101, *Phonology I*.

Option 2. Senior thesis or project supervised by a faculty member.

- The proposal for a senior thesis or project must be submitted for departmental approval at least three quarters prior to the quarter of graduation.
- Students enroll in Linguistics 195, *Senior Thesis* or Linguistics 194, *Senior Project* with the approval of the faculty adviser. The senior thesis is an original investigation of the major language in some relevant way, such as the linguistic structure or history of the language or its historical, literary, cultural, sociological, ethnographic, or political context.

Requirements for the Minor

The minor requires completion of two years (six quarters) of language study (or demonstration of an equivalent level of ability) and eight additional linguistics and cultural context courses as follows:

- Linguistics 50, *Introduction to Linguistics: Sounds and Words*

- Linguistics 52, *Syntax I*; or Linguistics 55, *Syntactic Structures*
- Linguistics 101, *Phonology I*
- two advanced linguistics courses
- three elective/context courses (see handbook for details)

There is no senior exit requirement for the minor.

Disqualification Policy

The Linguistics Department has adopted a major disqualification policy for linguistics and language studies majors that is intended to encourage students to take seriously their performance in the introductory courses and to make a strong effort to pass those courses.

Students who receive more than one No Pass, D, W, and/or F in the following introductory courses will not be permitted to major in linguistics or language studies:

- Linguistics 50, *Introduction to Linguistics Sounds and Words*
- Linguistics 52, *Syntax I*
- Linguistics 53, *Semantics I*
- Linguistics 55, *Syntactic Structures*
- Linguistics 101, *Phonology I*

Students who fail one of these courses will be sent a letter reminding them of this policy and warning them that they are at risk of disqualification should they fail to pass a subsequent introductory course.

Students may appeal their disqualification by writing a formal letter to the department chair. This letter should explain any extenuating circumstances that influenced their poor performance in the introductory courses. For example, if some event led to poor performance in multiple courses in a single quarter, a student has a potential case for appeal. In contrast, academic dishonesty or poor performance spanning multiple quarters will be considered evidence that a student is ill-suited for the majors.

The letter of appeal must be submitted to the Linguistics Department office (241 Stevenson College) no later than 15 days from the date the disqualification notice is mailed, or the 10th day of classes in the quarter of their disqualification, whichever is later. The department will subsequently notify the student and the student's college of the appeal decision no later than 15 days after the submission of the appeal.

Latin

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Professor

KAREN BASSI (Literature)
Greek and Latin literatures, Greek drama, Hellenistic poetics, feminist interpretation, literary and cultural theory, pre- and early modern studies, historiography

MARY-KAY GAMEL, Professor (Classics and Comparative Literature)
Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

CHARLES W. HEDRICK JR. (History)
Greek and Roman history, epigraphy, historiography, political theory

JOHN P. LYNCH, (Literature) Emeritus

Associate Professor

DANIEL SELDEN (Literature)
Afroasiatic languages and literatures, Greek and Latin, Hellenistic culture, the classical tradition, history of criticism, literary theory

Lecturer

GILDAS HAMEL (History)
History of Judaism and Christianity; Hebrew and Greek Bible; classical languages

Program Description

The Language Program offers instruction in elementary Latin. It consists of a two-course sequence that begins in the fall quarter only. Students interested in Latin literature should see the course listings under Literature. Those interested in classical studies should see the program description for classical studies.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Lower-Division Courses

1. Elementary Latin. F

Instruction in Latin grammar, using a modern Latin method, designed to prepare for the study of classical literature. The sequence begins in the fall quarter only. *The Staff*

2. Elementary Latin. W

Instruction in Latin grammar, using a modern Latin method, designed to prepare for the study of classical literature. Prerequisite(s): course 1. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Latin American and Latino Studies

32 Merrill College
(831) 459-4284
<http://lals.ucsc.edu>

Faculty and Professional Interests

Core Faculty

GABRIELA ARREDONDO, Associate Professor of Latin American and Latino Studies
Latino/a studies; U.S. immigration history; U.S. social and cultural history; Chicano/a history; critical race and ethnicity theories; Chicana and Mexicana feminisms; "borderlands" studies; history of modern Mexico

JOHN G. BORREGO, Professor of Latin American and Latino Studies

Global political economy, national development, urban and regional planning, community organizing, social change, ethnic minorities, Mexico and the Southwest

GUILLERMO DELGADO-P, Lecturer of Latin American and Latino Studies

Latin American cultures; comparative indigeneity; indigenous property rights; cultures of the sacred; ecologies and peasantries; Quechua/Andean linguistics, mining, labor history; alternative/electronic journalism; anthropology in the developing world; interethnicity; urbanization; social movements; culture theory

JONATHAN FOX, Professor of Latin American and Latino Studies

Latin American and Latino politics, including issues of democratization, accountability, social movements, transnational civil society, social and environmental policy, and immigration

ROSA-LINDA FREGOSO, Professor of Latin American and Latino Studies

Cultural studies, feminist studies, film and visual culture, human-rights studies, and gender-based violence

SHANNON GLEESON, Assistant Professor, Latin American and Latino Studies

Migrant populations, the effects of documentation status, labor rights, civic engagement, inequality and stratification, political sociology, law and society, mixed methods and comparative approaches

WALTER L. GOLDFRANK, Professor of Latin American and Latino Studies and Sociology

Social change, historical sociology, world systems, modern Mexico, Chile, social movements and revolution, development theories, policies and outcomes

SUSANNE JONAS, Lecturer of Latin American and Latino Studies

Latin American immigration and Latino communities in the U.S., comparative Latin American politics, contemporary Central America, Central American binational organizing, U.S.-Latin American cross-border issues, U.S. foreign policy in Latin America, the Left in Latin America, comparative peace processes in Central America and worldwide

FLORA LU, Assistant Professor of Latin American and Latino Studies

Ecological anthropology, human behavioral ecology, Amazon rainforest, indigenous peoples, conservation, Ecuador, culture change, market integration, indigenous resource management, political ecology, environmental justice

MANUEL PASTOR JR., Professor of Latin American and Latino Studies

Urban poverty and regional development, Latinos in the urban U.S., environmental justice, macroeconomic stabilization in Latin America; distribution and growth in the developing world; Cuban economic reform; Mexican economic reform

HECTOR PERLA, JR., Assistant Professor of Latin American and Latino Studies

International relations; Latin American studies; Latino politics; political psychology; Central America; U.S. foreign policy; social and revolutionary movements; asymmetric conflicts

CECILIA M. RIVAS, Assistant Professor of Latin American and Latino Studies

Salvadoran transnationalism; media (Internet, newspapers); migration; globalization; race, ethnicity, and gender; bilingualism; consumption; El Salvador; Central America

PATRICIA ZAVELLA, Professor of Latin American and Latino Studies

Chicana/o-Latina/o studies, women's work and domestic labor, poverty, family, sexuality and social networks, feminist studies, ethnographic research methods, and transnational migration of Mexican/o workers and U.S. capital

Participating Faculty

MARK D. ANDERSON, Assistant Professor of Anthropology

Racial formation, diaspora, nationalism, transnationalism, indigeneity, consumption, Central America, Honduras, Latin America, African diaspora

JULIANNE BURTON-CARVAJAL, Professor of Literature

Twentieth- and 21st-century Latin(o) American visual media, particularly film; melodrama as a transnational form; gender and authorship; history, cultures, and representations of California, particularly the Central Coast

JEFFREY T. BURY, Assistant Professor of Environmental Studies

Political ecology; sustainable development; Latin American studies; international relations; institutional dimensions of natural resource conservation in the global south

PEDRO G. CASTILLO, Associate Professor of History

Chicano/a history and culture; American social and urban history; race, class, and gender in California history; immigration history, Latin/os in the U.S.

CAROLYN DEAN, Professor of History of Art and Visual Culture

Cultural histories of the native Americas and colonial Latin America

MARIA ELENA DIAZ, Associate Professor of History

Colonial Caribbean and Latin America; social and cultural history; ethnohistory; slavery, race, and gender

KENT H. EATON, Associate Professor of Politics

Comparative politics, international relations, political economy, public policy, territorial conflict, federalism, decentralization, party and electoral systems, Latin America, the Philippines

LISBETH HAAS, Associate Professor of History

U.S.-Mexico borderlands, Chicano and Native American history; visual culture in the colonial Americas; the U.S. West and California; historical memory, theory, and historical methodology

NORMA KLAHN, Professor of Literature

Latin American literary and cultural studies (specialization: Mexico), Chicano/Latino literature and culture from a cross-border perspective, modernity/postmodernity, poetics and politics, genre theory (novel, poetry, autobiography), contemporary critical theories (i.e., border, ethnic, feminist, transnational/global)

ALMA R. MARTINEZ, Associate Professor of Theater Arts

Acting, directing, dramatic criticism, Chicano/a theater with a focus on El Teatro Campesino and Luis Valdez, contemporary Mexican and Latin American, popular/political theater, Latin/o images in films

LOURDES MARTÍNEZ-ECHAZÁBAL, Associate Professor of Latin American Literature

Latin American and Caribbean literatures; Afro-Latin American literatures, cultures, and societies; found[n]ational narratives; Brazilian literature; literatures of Cuba and the Cuban diaspora; critical race theory

OLGA NÁJERA-RAMÍREZ, Professor of Anthropology

Folklore theory, ritual, festival, dance, greater Mexican culture, history and folklore, transnationalism, identity; expressive culture, ethnomusicology, bilingual communication, gender, history, and culture of Latin America, the U.S., and Mexico

MARCIA OCHOA, Assistant Professor of Community Studies

Gender and sexuality, race and ethnicity, Latina/o studies, media and cultural studies, ethnography of media, feminism, queer theory, multimedia production, Latin American studies—Colombia and Venezuela, political philosophy, geography

MATTHEW D. O'HARA, Assistant Professor of History

Modern Latin America and Mexico; late colonial Latin America; religion, spirituality, and ritual; urban history; race, ethnicity, and identity; political culture

PAUL ORTIZ, Associate Professor of Community Studies

African American history, U.S. social and political history, social documentary, oral history, subaltern studies and theories of resistance, U.S. South, Latino studies, social movements, working-class history; history of farm labor, African diaspora

JUAN POBLETE, Associate Professor of Literature

Latin(o) American literatures; transnational/global cultures (literature, radio, film); Latin(o) American cultural studies; 19th-century studies; the history of reading practices

CATHERINE RAMIREZ, Assistant Professor of American Studies

Chicana and U.S. Latino literature and history; gender studies and feminist theory; visual culture and style politics; cultural studies; popular and urban youth cultures; speculative fiction, comparative American studies

B. RUBY RICH, Professor of Community Studies

Documentary film and video, post-9/11 culture, new queer cinema, feminist film history, Latin American and Latin/a cinema, U.S. independent film and video, the essay film, the politics of film festival proliferation and the marketing of foreign films in the U.S.

GABRIELA SANDOVAL, Assistant Professor of Sociology

Latino/a sociology, voting and representational politics, urban sociology, political sociology

FELICITY SCHAEFFER-GRABIEL, Assistant Professor of Feminist Studies

Transnational feminism, migration, Latin American/Latino studies, Chicano/a studies, Internet, technology and the body, sexuality, gender and globalization

HELEN SHAPIRO, Associate Professor of Sociology

Political economy, Latin American economic history and development (with an emphasis on Brazil), industrial policy, the auto industry, the state and transnational corporations

GUSTAVO O. VAZQUEZ, Assistant Professor of Film and Digital Media

Film and video production, directing drama, documentary and experimental cross-cultural experiences in film, film curator

Affiliated Faculty

JUDITH AISSÉN, Professor of Linguistics

Syntax, morphology, Optimality Theory, Mayan languages

JORGE ALADRO FONT, Professor of Spanish Literature

Spanish mysticism, theory and historical developments of imagery in the Middle Ages to the baroque period, Renaissance and baroque Hispanic literature, Italian ideas in the Spanish Renaissance, Cervantes

ROBERT W. FAIRLIE, Associate Professor of Economics

Labor economics, public policy, entrepreneurship, applied econometrics

DANA FRANK, Professor of History

U.S. social and economic history; women, labor, and working-class history; contemporary political economy; modern Central America

GREGORY S. GILBERT, Professor of Environmental Studies

Tropical ecology and conservation, disease ecology

STEPHEN R. GLIESSMAN, Alfred E. Heller Professor of Agroecology (Environmental Studies)

Agroecology, sustainable agriculture, tropical land use and development, alternative trade networks, sustainable livelihoods and conservation, community and agroecology

MARÍA VICTORIA GONZÁLEZ-PAGANI, Lecturer in Spanish Language

Language teaching methodology; Spanish syntax; computer-assisted foreign language learning; Latin American cultural studies, especially women's contributions

DAVID E. GOODMAN, Professor Emeritus of Environmental Studies

Kirsten Silva Gruesz, Professor of Literature
Chicano/Latino literatures and cultures, Comparative Americas studies, language ideologies and bilingualism in literature

DANIEL GUEVARA, Associate Professor of Philosophy

Kant, moral philosophy, moral psychology, environmental ethics, history of modern philosophy

CRAIG HANEY, Professor of Psychology

Applications of social psychological principles to legal settings, assessment of the psychological effects of living and working in institutional environments, social contextual origins of violence, development of alternative legal and institutional forms

KAREN D. HOLL, Pepper-Giberson Professor, Environmental Studies

Restoration ecology, conservation biology, landscape ecology

AIDA HURTADO, Professor of Psychology

Social identity, feminist theory, social psychology of education, survey methodology

KENNETH KLETZER, Professor of Economics

International economics, macroeconomics, economic development

DEBORAH LETOURNEAU, Professor of Environmental Studies

Agroecology, tropical biology, insect-plant interactions, biological control as an alternative to chemical pesticides

DANIEL T. LINGER, Professor of Anthropology

Self and identity, politics, cultural theory, cities, violence, transnational experience, Brazil, Japan

PAUL M. LUBECK, Professor of Sociology

Political sociology; political economy of development, globalization, labor and work; logics of methodology; religion and social movements; Islamic society and identities; information and networks

JUDIT MOSCHKOVICH, Associate Professor of Mathematics Education

Mathematics cognition and learning, student conceptions of linear functions, discourse in mathematics classrooms, Latino mathematics learners, bilingual mathematics learners, mathematics instruction for English learners

EDUARDO MOSQUEDA, Associate Professor of Education

Mathematics education of English learners; large-scale dataset quantitative analysis; urban education issues

LUCINDA PEASE-ALVAREZ, Associate Professor of Education

Language and literacy development, language-minority education, bilingualism, informal learning

JENNIFER POOLE, Assistant Professor of Economics
International trade, Latin American economics, applied microeconomics

MICHAEL ROTKIN, Lecturer in Community Studies

Marxist theory, capitalist system, community organizing, electoral politics, media, government programs, community power structure, institutional analysis, and affirmative action

JOHN M. SCHECHTER, Professor of Music
Cultural musicology; Ibero-American musics of South America; Quechua music culture; American Indian music and thought; music theory; music and ritual; music and discourse; transculturative music-making; Stravinsky; Founder, UCSC Latin American Ensembles (dir. 1986-2000)

ANA MARIA SEARA, Lecturer, Portuguese Language
Portuguese language; literature, film, and music of Brazil and the Portuguese-speaking world; acquisition and teaching of foreign, second, and heritage languages

DAVID G. SWEET, Professor Emeritus of History

DANA TAKAGI, Professor of Sociology
Social inequality and identity, research methods, race relations, nationalism and social movements

KIP TELLÉZ, ASSOCIATE Professor of Education
Preparation of teachers for linguistic and cultural diversity, second language learning, studies of the school curriculum, educational assessment

LARRY TRUJILLO, Lecturer in Community Studies
Chicano/a studies, ethnic studies, grassroots community organizations, prison-industrial complex, student development, Chicano music

RASMUS WINTHER, Assistant Professor of Philosophy
Philosophy of science, epistemology, metaphysics, philosophy of biology, American pragmatism, Latin American philosophy, evolutionary theory

KAREN TEI YAMASHITA, Associate Professor of Literature (Creative Writing)
History and anthropology of Japanese immigration to Brazil, Asian American literature, modern fiction, playwriting

Program Description

The Latin American and Latino Studies (LALS) Department prepares students for bilingual, and multicultural participation in a rapidly changing world. Both Latin America and U.S. Latino and Latina communities are being transformed by globalization; at the same time, deep historical legacies continue to be very present. The Latin American and Latino Studies Department integrates the study of Chicano/a and Latino/a communities in the U.S. with analysis of

the histories, politics, cultures, and societies of Latin America and the Caribbean.

LALS courses deal with changing political, social, economic, and cultural realities, including immigration and transnational communities; gender, racial, sexual, and ethnic identities; social movements; diverse forms of cultural expression; ongoing political and economic restructuring in Latin America; and the challenges of political and economic empowerment for Latino/a communities in the U.S. To understand these processes, we draw from interdisciplinary perspectives that include the social sciences, the humanities, and the arts.

In addition to academic knowledge, LALS also provides opportunities for students to acquire practical, real-world skills. Through program-related internship and field-study experiences, students can acquire useful, pre-professional skills in any of the following key areas: community development/advocacy, public policy, education, journalism, media, performance, and research/writing, among others.

Latin American and Latino studies courses span a number of disciplines and are augmented by courses taught by participating faculty in various departments. A sample list appears at the end of the course descriptions. The Latin American and Latino Studies Department compiles a quarterly list of these courses offered by other departments that are pre-approved and count toward the major; this list appears on the department's web site under "courses" and is frequently updated.

Graduates of the LALS major have made careers in a wide variety of fields, including teaching, community organizing, community and government service, journalism and the media, environmental science, global economics, health care, legal services, library science, music, publishing, and research. Many have gone on to pursue advanced degrees in the U.S. or abroad in anthropology, bilingual education, communications, cultural studies, ecology, economics, geography, history, law, literature, media, public health, and sociology—to name a few.

Major Requirements

- Although not required for the major, we recommend that students begin the major by taking LALS 1, *Introduction to Latin American and Latino Studies*, in their first year. Three lower-division courses are required for the major: Latin American and Latino Studies 10, *Bridging Latin American and Latino/a Studies* (recommended to transfer students who have already taken a Latin American studies or Latino studies course elsewhere). Ideally students (fresh and transfer) should take LALS 1 and LALS 10 (in this order) but LALS 10 is **required** to declare the major.
- An additional two lower-division electives (select from courses listed below):

Latin American and Latino Studies

- | | |
|-----|--|
| 1 | <i>Introduction to Latin American and Latino Studies</i> |
| 80A | <i>Peoples and Cultures of the Americas</i> |
| 80B | <i>Social Movements in Latin America</i> |
| 80C | <i>Power and Resistance in the Americas</i> |
| 80D | <i>Political Change in Mexico</i> |
| 80F | <i>Latinos in the U.S.A.: Comparative Perspectives</i> |
| 80H | <i>Comparative Latino Histories</i> |
| 80I | <i>Gender Global Cinema</i> |
| 80N | <i>Drug Wars in the Americas</i> |
| 80Q | <i>Música Latina</i> |

80S *Sexualities and Genders in Latin American and Latino/a Studies*

80T *Topics in Latin American and Latino/a Studies Cinema*

80X *Central American Culture and Society*

American Studies

80E *Introduction to U.S. Racial and Ethnic Histories and Formations: Chicano/Latino American*

Anthropology

80G *Barrio Popular Culture*

80I *Culture and Power in Latin America*

80G *Barrio Popular Culture*

Community Studies

80A *Chicanos and Social Change*

Environmental Studies

80A *The Future of Rain Forests*

History

11A *Latin America: Colonial Period*

11B *Latin America: National Period*

80N *Women at Work*

History of Art and Visual Culture

80M *Indigenous American Visual Culture*

Spanish /Latin American/Latino Literature

60 *Introduction to Literary Genres*

80N *Latino expressions in the U.S.*

Music

4A and *Latin American Ensembles* (three quarters fulfill 4B one lower-division elective)

11D *Introduction to World Music*

80F *Music in Latin American Culture: Regional Traditions*

Sociology

15 *World Society*

Theater

80M *Chicano Teatro*

Other courses numbered 1–80 on Latin American and/or Latino/a subjects may be substituted with approval in advance from the Latin American and Latino Studies Department.

Courses with similar content taken at other institutions may be substituted with approval from the Latin American and Latino Studies Department upon declaration of major.

Latin American and Latino Studies 10 must be taken at UCSC.

In addition, all majors must complete nine upper-division courses, including two required core courses, (no substitutions):

Latin American and Latino Studies

100A *Politics and Society: Concepts and Methods*

100B *Culture and Society: Culture in a Global Context*

The remaining seven electives must meet the following criteria:

- A cluster of three courses must be taken in one of the following areas of concentrations: African diasporas in the Americas; Chicano/a studies; cinema; gender studies; history; indigeneity; migration/immigration; politics/political economy/policy; popular culture and cultural studies; race and ethnicity; literature; and social movements. Courses may be taken in any department, as long as they fit into the cluster and appear on the LALS list of course offerings.

- At least one must concentrate on pre-twentieth-century topics
- At least one must center on Chicano/a-Latino/a issues
- At least two must be taught in Spanish or Portuguese

Language Requirements

All Latin American and Latino studies majors are expected to learn to speak, read, and write Spanish or Portuguese and to make use of these skills on a regular basis in their upper-division academic work. Majors must take at least two upper-division courses taught in Spanish or Portuguese. Before taking upper-division course work taught in the language, students must demonstrate proficiency in Spanish equivalent to the completion of Spanish 6 or 56, or Spanish for Spanish Speakers 63. Students who wish to pursue Portuguese may take the Portuguese 1A/1B or 60A/60B series. Students who have achieved fluency in Spanish or Portuguese through life experience may be exempt from this recommended preparatory course work after demonstration of their proficiency. In addition to Latin American and Latino studies and affiliated department course offerings, the required two upper-division courses taught in Spanish or Portuguese*** may be fulfilled through study abroad with prior approval by Latin American and Latino Studies. Students may also pursue internship or field study opportunities to satisfy one of the two required upper-division courses taught in Spanish or Portuguese; however, at least one of the two courses must be fulfilled in a classroom setting. ***Upper-division courses in Portuguese are currently not taught at UCSC and must be taken elsewhere.

Field-Study and Internship Opportunities

All majors are strongly encouraged to undertake either a field study in Latin America, the Caribbean, a Latino/a community in the U.S., or formal academic study abroad through the Education Abroad Program (EAP). These paths are the best ways to improve language skills, explore the nature and direction of specific academic and career interests in relation to Latin American and Latino studies, and deepen cross-cultural understanding and relationships based upon personal experience.

Field studies are independent, community-based study projects for academic credit, done under faculty sponsorship and arranged on an individual basis. Local opportunities for internships and field study in Latino/a communities on California's Central Coast are numerous. Credit for up to three upper-division courses may be applied toward the major from field study; however, course credit from field study and study abroad combined may not exceed three upper-division courses. Students should check the Latin American and Latino Studies Department web site for further information regarding the field-study process and course credit. A listing of local field-study programs and petition forms are available at the Latin American and Latino Studies Department office, 32 Merrill.

Study Abroad

Students may apply to study at foreign universities through EAP. EAP offers opportunities for students to study at universities in México City and Monterrey, México; San José, Costa Rica; Santiago and Concepción, Chile; Rio de Janeiro, Brazil; and Madrid, Córdoba, Alcalá, Granada, and Barcelona

in Spain. Sophomores, juniors, and seniors with two years of university-level Spanish may apply. In addition, during fall and spring quarters, the EAP Field Research Program (FRP) in México is an experiential program geared toward juniors and seniors who want to explore the "real" México outside the classroom and at the same time receive research training. EAP has research sites in states such as Jalisco, Yucatán, Oaxaca, or Michoacán (final site choice depends on the research topic). Application deadlines are generally several months to a year in advance of the program, so students should come to the office early to plan their study abroad programs. The department will approve courses taken abroad which cover topics appropriate to the LALS curriculum for upper-division credit toward the major. All credit for EAP classes transfers back to students' UCSC transcripts. Financial aid applies to all but summer programs and includes airfare and living costs. Before departure, students should present a proposed study plan for courses abroad to the department adviser for review. Credit for up to three EAP courses can be applied toward the major. (A maximum of three courses of Field Study and EAP combined can be applied toward the major requirements.)

Senior Comprehensive Requirement

Every major must complete a senior exit requirement in order to graduate. The preparation and completion of this requirement is structured into the senior year. There are five options to choose from:

- Enrollment in a Latin American and Latino Studies senior seminar (194 series), with good to excellent performance, including the submission of the required final research paper;
- An extended research paper, 20–30 pages in length. This paper often builds on related course work and requires approval from the relevant faculty adviser before the end of the winter quarter of the senior year. Students must be enrolled in an independent-study tutorial to complete this paper;
- A senior thesis, generally between 40–60 pages, based on one or two quarters of sustained independent research under the supervision of the faculty adviser while enrolled in an independent study (done by petition to LALS, and with the approval of the faculty adviser);
- A senior project, which can be either a creative project or a community-action project. Creative projects include web site design, video, performance, slide show, photo exhibit, or other media work. A short written analysis of the student's experience in conducting the project is required. Community-action projects often involve sustained research and/or activity conducted in a community organization or public interest group, usually stemming from an internship. A short written analysis of the connection between the student's activity and research and the project itself is required while enrolled in an independent study;
- The student-directed seminar option is available to unusually qualified students only. It requires three quarters of preparation directed by a faculty adviser and approval by the Academic Senate Committee on Educational Policy. This option can be taken only by petition to LALS, and with the approval of the faculty adviser. Petition forms are available at the LALS office. More information about the course proposal and approval process and deadlines is available at <http://lals.ucsc.edu>.

Latin American and Latino Studies Major Planners

The following are two recommended academic plans for undertaking basic preparation for the Latin American and Latino studies major. Plan One is a guideline for students who commit to the major early in their academic career. Plan Two is for transfer students.

Plan One Frosh			
YEAR	FALL	WINTER	SPRING
1st (frsh)	Span 1 LALS 1	Span 2 LALS 10	Span 3 LALS 80-series
2nd (soph)	Span 4 or SpSS 61 LALS 80-series	Span 5 or SpSS 62 LALS 100A	Span 6 or 56 or SpSS 63 LALS 100B
3rd (jr)	LALS upper- division course	LALS upper- division course	LALS upper- division course
4th (sr)	LALS upper- division course LALS upper- division course	LALS upper- division course LALS upper- division course	LALS 194 (Senior Exit Requirement)

Plan Two Junior Transfers			
YEAR	FALL	WINTER	SPRING
3rd (jr)	Span 4 or SpSS 61 LALS 10 LALS 80-series	Span 5 or SpSS 62 LALS 100A LALS 80-series	Span 6 or 56 or SpSS 63 LALS 100B LALS upper- division course
4th (sr)	LALS upper- division course LALS upper- division course	LALS upper- division course LALS upper- division course	LALS upper- division course LALS 194 (Senior Exit Requirement)

Combined Majors

The combined major options, requiring fewer courses than a double major, are established with the global economics, literature, politics, and sociology programs.

Latin American and Latino Studies/Global Economics

Students are required to take a total of 18 courses and to satisfy a senior comprehensive requirement. For the combined major in Latin American and Latino studies/global economics, students complete a total of eight lower-division course requirements for both the Latin American and Latino studies and global economics majors. Students are assigned a faculty adviser from each discipline. Upper-division course requirements include Economics 100A, 100B, and 113; LALS 100A and 100B; and five additional elective courses, two from economics and three from Latin American and Latino studies. Two of the upper-division courses must be taught in Spanish (or Portuguese***) and two to four (at least one quarter) must be courses of academic study abroad, internship, or field study in a Spanish- or Portuguese-speaking country. The comprehensive requirement is met by the completion of a senior thesis on a topic suitable to both global economics and Latin American and Latino studies, supervised by a faculty member from either department and read and approved by the student's advisers from both departments.

***Upper-division courses in Portuguese are currently not taught at UCSC and must be taken elsewhere.

Latin American and Latino Studies/Literature

Students are required to take a total of 13 courses and to satisfy a senior comprehensive requirement. Students

complete a total of three lower-division course requirements. One of the lower-division LALS classes must be LALS 10 (no substitutions); one of the lower-division classes must be Spanish Literature 60; and one is an elective from the LALS 80 series or a Literature 80 series course in a relevant area of study. For transfer students, a petition can be made to replace the other lower-division elective course with an appropriate course from another institution.

Upper-division requirements include four core courses, LALS 100A, 100B, Spanish Literature 102A, and Spanish Literature 102B; and six additional elective courses, three from Spanish Literature and three from LALS. At least four of the upper-division courses must be taught in Spanish or Portuguese (with at least one taught by LALS core or participating faculty), and at least one of the Literature courses must address theoretical concerns. Up to three relevant courses taken through study abroad programs from which credits are transferable to UCSC may be credited toward the major when the content is deemed appropriate by both departments. To complete the comprehensive requirement, students can write a senior thesis (by petition), enroll in an appropriate LALS Seminar (194 series), or enroll in an appropriate Literature Senior Seminar in the area of concentration. If the thesis option is selected, it should be planned in consultation with an adviser from each department, completed under the supervision of a faculty member from either department, and read and approved by both advisers; one adviser is sufficient if this faculty member belongs to both departments. Both departments must approve a study plan before the major can be declared.

Latin American and Latino Studies/ Politics

Students are required to take a total of 13 courses and to satisfy a senior comprehensive requirement. For the combined major in Latin American and Latino studies/politics, students complete three lower-division course requirements. One of the lower-division courses must be LALS 10 (no substitutions). For transfer students, a petition may be made to substitute the other lower-division courses (one Latin American and Latino studies elective, one course from Politics 1–79) with appropriate course work from another institution. The 10 upper-division courses include three core course requirements (LALS 100A and 100B, and Politics 100 and 140C), three courses from any Politics Department sequences (comparative, American, international, and theory), and four upper-division electives. At least one of the Latin American and Latino studies upper-division courses must be taught in Spanish or Portuguese***, and at least one course in the politics/Latin American and Latino studies combined major must be on Chicano/a-Latino/a issues. To complete the senior comprehensive requirement, students may take either a Politics (190) or LALS (194) senior seminar. ***Upper-division courses in Portuguese are currently not taught at UCSC and must be taken elsewhere.

Latin American and Latino Studies/ Sociology

Students are required to take a total of 14 courses and to satisfy a senior comprehensive requirement. There are four lower-division course requirements, two each from the sociology and Latin American and Latino studies majors. One of the lower-division LALS courses must be LALS 10 (no substitutions); transfer students may petition to replace the other lower-division course with an appropriate course from another institution. Upper-division requirements include six core courses: LALS

100A, 100B; Sociology 103A, 103B, 105A, and 105B; and four additional elective courses, two from sociology and two from Latin American and Latino studies. At least one of the Latin American and Latino studies upper-division courses must be taught in Spanish or Portuguese, and at least one course in the sociology/Latin American and Latino studies combined major must be on Chicano/a-Latino/a issues. Up to three relevant courses taken through study abroad programs from which credits are transferable to UCSC may be credited toward the major when the content is deemed appropriate by the faculty advisers of both sociology and Latin American and Latino studies. Students can satisfy the comprehensive requirement in one of three ways: (1) writing a senior thesis, (2) passing an appropriate LALS Senior Seminar (194 series), or (3) completing the sociology course option of two additional sociology upper-division, cluster III courses. If the thesis option is selected, it should be planned in consultation with an adviser from each department, completed under the supervision of a faculty member from either department, and read and approved by both advisers; one adviser is sufficient if this faculty member belongs to both departments.

Minor Requirements

The minor in Latin American and Latino studies consists of seven courses, including two lower-division courses (LALS 1 or LALS 10 and one other lower-division course) and five upper-division courses (including either LALS 100A or 100B and any other four upper-division courses that count towards the major). Knowledge of Spanish and/or Portuguese is highly recommended, but not required for the minor.

Graduate Studies

The Department of Latin American and Latino Studies offers a parenthetical notation in Latin American and Latino studies for Ph.D. students in anthropology, education, environmental studies, history, history of consciousness, literature, psychology, politics, and sociology. This concentration in Latin American and Latino studies provides graduate students with opportunities for interdisciplinary study with faculty from across the campus. Completion of the program will be listed on the graduate degree as a parenthetical notation. The request must originate in the degree-granting department. Students in other departments wishing to pursue a parenthetical notation in Latin American and Latino studies should consult with the chairs of their respective Ph.D. programs and of Latin American and Latino studies. A list, updated annually, of regularly offered approved graduate courses is available in the Latin American and Latino Studies Department office and web site at <http://lals.ucsc.edu>. Graduate students are encouraged to complete the application to the parenthetical notation, available at the Latin American and Latino Studies Department, no later than their third year.

Requirements for the Notation

Committee Composition. The student must have a designated graduate adviser from among the Latin American and Latino studies core, participating, or affiliated faculty. This adviser will be in addition to the graduate adviser from the student's home department. The Latin American and Latino studies adviser must serve on the student's qualifying examination committee and/or on the student's dissertation committee.

Writing. The student must prepare a significant piece of writing in the area of Latin American and Latino

studies. This writing may take the form of a substantial seminar paper, master's essay, or doctoral dissertation chapter.

Course requirements. The student must take five graduate courses in Latin American and Latino studies, including the required LALS 200 and LALS 297. The remainder can be selected from appropriate graduate offerings of any UCSC department, as long as they are taught by core, participating, or affiliated Latin American and Latino studies faculty.

Teaching. The student must serve as a teaching assistant in at least one Latin American and Latino studies course or teach a Latin American and Latino studies course independently in the regular curriculum or in Summer Session.

Courses. Graduate course work in Latin American and Latino studies is available both in the Latin American and Latino Studies Department and in other UCSC departments. Graduate courses to date in the Latin American and Latino Studies Department include

200	<i>Bridging Latin American and Latino Studies</i>
210	<i>Latina Feminisms: Theory and Practice</i>
212	<i>Latino/a Ethnographic Practice</i>
215	<i>Latina Cultural Studies; Transborder Feminist Imaginaries</i>
220	<i>Transnational Civil Society: Limits and Possibilities</i>
240	<i>The Culture and Politics of Human Rights</i>
242	<i>Globalization, Transnationalism, and Gender in the Americas</i>
270	<i>Race and Nation in the Americas</i>
297	<i>Independent Studies</i>
299	<i>Thesis Research</i>

Additional Upper-Division Courses of Interest

Anthropology

138B	<i>Brazil</i>
130F	<i>African Diasporas in the Americas</i>
130L	<i>Latin American Ethnography</i>
130M	<i>Inside Mexico</i>
130Q	<i>Mejicanos in Anthropological Discourse</i>

Community Studies

126	<i>African American and Latino Communities: Histories</i>
152	<i>Gender and Sexuality in Latin America</i>

Economics

148	<i>Latin American Economies</i>
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Education

128	<i>Immigrants and Education</i>
141	<i>Bilingualism and Schooling</i>
181	<i>Race, Class, and Culture in Education</i>

Environmental Studies

143	<i>Sustainable Development: Economy, Policy, and the Environment</i>
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Feminist Studies

115	<i>Gender, Sexuality, and Transnational Migration Across the Americas</i>
120	<i>Transnational Feminisms</i>
194F	<i>Chicana/Latina Cultural Productions</i>

History

125	<i>California History</i>
126	<i>History of the Southwest: Colonial Period to 1920</i>
128	<i>Chicano/a History</i>
130	<i>History of Modern Cuba</i>

- 131 *Women in Colonial Latin American History*
 132 *History of the Caribbean: Colonial Period*
 133 *Inter-American Relations*
 134B *History of Mexico, 1850 to Present*
 190 *Seminar in Race and Nation in Latin America*
 190A *Slavery and Race in Latin America*
 190C *American Race, Class, and Gender History*
 190T *Latin America in the Cold War*
 194 *California History*

History of Art and Visual Culture

- 110A *Topics in Pre-Hispanic Visual Culture: Mexico*
 110B *Topics in Pre-Hispanic Visual Culture: The Andes*
 151A *The Native in Colonial Spanish America*
 182 *Chicano/Chicana Art: 1970-Present*
 190B *The Virgin of Guadalupe: Images and Symbolism in Spain, Mexico, and the U.S.*

English-Language Literatures

- 150B *Chicano Literature*

Modern Literary Studies

- 125D *Cinema and Social Change*
 125L *Films on the Border*

Spanish/Latin American/Latino Literature

- 102A *From the Conquest to Sor Juana*
 117 *The Spanish Speaking Caribbean*
 130D *Latin American Testimonio*
 130E *Latin American Poetry*
 131A *National Literatures of Latin America: Zapata to Zapatisa: Literature, History, and Politics in Mexico*
 131H *National Literatures of Latin America: Cuba*
 134C *Fiction and Marginality*
 134G *Popular Culture in Latin American Narrative*
 134J *Mexico Through the Movies*
 134L *A Historia de la lectura y los lectores: Recepción y consume cultural en el mundo Latino Americano*
 134M *Afro-Latin American Literatures*
 135A *Mexico Through the Movies: El otro cine y el cine del otro*
 135F *Cine y Literatura*

Politics

- 140C *Latin American Politics*
 190V *Problems in Latin American Politics*

Psychology

- 157A *Chicana Feminism* (Also offered as Feminist Studies 151A)
 157B *Advanced Topics in Chicana Feminism* (Also offered as Feminist Studies 151B)

Sociology

- 122C *Chicanos/as and the Law*
 156 *Latina/o Identity*
 177A *Latinos/as and the American Global City*

Spanish

- 156A *Topics in Hispanic Language and Culture: Hispanic Culture Through Film*
 156F *Topics in Hispanic Language and Culture: El Humor en Español*

Spanish for Spanish Speakers

- 125 *Mexico and the Southwest*

The above is a partial list of upper-division courses taught by Latin American and Latino Studies participating and affiliated faculty based in other departments. A complete list of interdisciplinary course offerings approved for the Latin American and Latino Studies major and minor is published prior to each academic quarter on the department web site: <http://lals.ucsc.edu>.

Lower-Division Courses

1. Introduction to Latin American and Latino Studies. F,S

Interdisciplinary introduction presenting the elements for studying Latin American culture, society, economics, and politics, as well as the dynamics of Latino communities in the U.S. Special attention paid to issues of race, gender, and class, to emerging political and economic shifts in the Americas, and to new local and transnational efforts for social change on the part of Latin America's peoples and Latinos in the U.S. (General Education Code(s): IS, E.) *The Staff*

10. Bridging Latin American and Latina/o Studies. F,W

Interdisciplinary exploration of transnational migrations; social inequalities; collective action and social movements; and cultural productions, products, or imaginaries. Examines how transnational migration and hemispheric integration are transforming Latin American studies and Chicana/o-Latina/o studies. Explores the influence of neoliberalism and globalization, especially the intersection of critical analysis and social-justice praxis. Completion of course 1 highly recommended. (General Education Code(s): E.) *P. Zavella*

42. Student-Directed Seminar.

Seminar taught by upper-division student under faculty supervision. Requires prior approval by Latin American and Latino Studies Department and two quarters (fall, winter) of supervised preparation prior to teaching in spring quarter. (See course 192). *The Staff*

80A. Peoples and Cultures of the Americas: Trends and Issues. *

Anthropological in approach, concentrates on how Latin America's image is constructed and studied today. Topics include geographies, nationalities, social classes, ethnicities, gender, ecologies, regions, cultural areas, folklore, revolutions, and rural and urban societies. (General Education Code(s): T3-Social Sciences, E.) *G. Delgado-P*

80B. Social Movements in Latin America. W

Examines contemporary social movements in Latin America, especially those that arose from popular response to different forms of social exclusion and to authoritarian political systems. Explores a variety of popular movements, their successes and setbacks, including rural and urban uprisings, native nations and their descendants, women, African descendants, labor, environmental and grassroots movements. Enrollment limited to 25. (General Education Code(s): T3-Social Sciences, E.) *The Staff*

80C. Power and Resistance in the Americas: Cross-Border Social Movements. S

Focuses on politics of power and resistance regarding major cross-border issues facing Latin Americans and Latinos in the 21st century. Emphasizes migration and migrant organizing; neoliberal "free trade" and implications for labor; organizing by women's, indigenous, and ecological movements; and for democracy and human rights. Many specific cases drawn from binational Central American experiences. (General Education Code(s): T3-Social Sciences, E.) *G. Delgado-P*

80D. Political Change in Mexico. W

Reviews broad trends in contemporary Mexican politics against the backdrop of long-term historical, social, and economic change throughout the 20th century, analyzing how power is both wielded from above and created from below. The course covers national politics, grassroots movements for social change and democratization, envi-

ronmental challenges, indigenous movements, the media, and the politics of immigration and North American integration. (General Education Code(s): T3-Social Sciences, E.) *J. Fox*

80E. Latin American Philosophy. S

Is there a general school of philosophy endemic to Latin America? Would it have to appeal to quintessential Western philosophical questions regarding knowledge, values, and reality? If not, why not, and would it then still count as philosophy? What difference do ethnic and national diversity, as well as strong political and social inequality, make to the development of philosophical questions and frameworks? Course explores a variety of historically situated Latin American thinkers who investigate ethnic identity, gender, and socio-political inequality and liberation, and historical memory, and who have also made important contributions to mainstream analytical and continental philosophy. (Also offered as Philosophy 80E. Students cannot receive credit for both courses.) (General Education Code(s): T4-Humanities and Arts, E.) *R. Winthor*

80F. Latinos in the U.S.: A Comparative Perspective. F

Analyzes the Latino experience in the U.S. with a special focus on strategies for economic and social empowerment. Stresses the multiplicity of the U.S. Latino community, drawing comparative lessons from Cuban-American, Puerto Rican, Chicano/Mexicano, and Central American patterns of economic participation and political mobilization. (General Education Code(s): T3-Social Sciences, E.) *The Staff, L. Trujillo*

80G. Race, Class, and Gender. S

Examines the economic, social, political, and cultural experience of communities of color (Latinas/os, African Americans, Asian Americans, and Native Americans) and women in the U.S., through a sociological perspective. Using quantitative and qualitative methods, the relationship among individual actions, social institutions, societal forces, and social change are analyzed. Enrollment limited to 60. (General Education Code(s): E.) *S. Gleason*

80H. Comparative Latina/o Histories. *

Designed to survey recent works in the field of Latina and Latino histories, with particular emphasis on historiographical approaches and topics in the field. Readings are chosen to expose a selection of the varied histories and cultures of Latina/os in the U.S., and focus primarily on Mexicans, Puerto Ricans, and Cubans. (General Education Code(s): T3-Social Sciences, E.) *G. Arredondo*

80I. Gender and Global Cinema. *

Examines the relationship between globalization, gender, and cultural representation in cinema. Academic topics include aesthetics of world cinema, gender and work, exploitation, gender in family systems/relationships, gender and violence, gender and colonization, and gender and migration. Students cannot receive credit for this course and Film and Digital Media 132C. Enrollment limited to 60. (General Education Code(s): T3-Social Sciences, E.) *D. Campos, R. Fregoso*

80Q. Música Latina. F

Surveys various musical forms and styles that have developed in Latin America and Latino communities in the U.S. Discusses concept of hybridity and grapples with this as a central issue in the evolution of Latin American/Latino music. Addresses migration of music, which not only contributes to its distribution but also to the evolution of musical practices of forms, styles and genres across borders. (General Education Code(s): T3-Social Sciences, E.) *The Staff*

80S. Sexualities and Genders in Latin American and Latina/o Studies. *

Introduction to issues and themes surrounding sexualities and genders within Latin American and Latina/o studies. Provides background in the basic theoretical and historical frameworks of gender and its relationship to sexuality. In addition to cross-border perspectives, course also examines how gender and sexuality are structured and experienced through other social categories. Enrollment limited to 70. (General Education Code(s): T3-Social Sciences, E.) *The Staff*

80T. Topics in LALS Cinema. S

Lower-division offering on a topic of particular cultural, historical or contemporary interest in the field of Latin American and Latino/a cinema. Enrollment limited to 60. (General Education Code(s): T3-Social Sciences, E.) *The Staff, A. Seara*

80X. Central American Peoples and Cultures. F

Examines contemporary societies and peoples of Central America considering how, in recent decades, media, history, war, cultural production, and migration have shaped Guatemala, Honduras, El Salvador, Nicaragua, and Costa Rica both as individual nations and as a region. Enrollment limited to 60. (General Education Code(s): T5-Humanities and Arts or Social Sciences, E.) *C. Rivas*

81A. Mexican Folklórico Dance (2 credits). F

Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. Students taught choreographed dances from various regions of Mexico and also learn dance techniques (técnica) and stage make-up application. Additional workshops and lectures offered to supplement class. Open to all students; no previous experience required. (Also offered as Anthropology 81A. Students cannot receive credit for both courses.) May be repeated for credit. (General Education Code(s): A.) *O. Najera Ramirez*

81B. Mexican Folklórico Dance (2 credits). W

Second course in series. Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. (Also offered as Anthropology 81B. Students cannot receive credit for both courses.) May be repeated for credit. (General Education Code(s): A.) *O. Najera Ramirez*

81C. Mexican Folklórico Dance (2 credits). S

Third course in series. Provides instruction in the aesthetic, cultural, and historical dimensions of Mexican folklórico dance. (Also offered as Anthropology 81C. Students cannot receive credit for both courses.) Prerequisite(s): course 81A or 81B. May be repeated for credit. (General Education Code(s): A.) *O. Najera Ramirez*

*Upper-Division Courses***100A. Politics and Society: Concepts and Methods. W**

Focuses on social science issues through the interdisciplinary analysis of power relations. Compares diverse analytical strategies, assesses contending explanations, and builds practical research skills in the field of Latin American and Latino Studies. Topics change yearly, but can include environmental justice, access to education, political participation, gender, and migration. Prerequisite(s): course 1 or 10. Enrollment restricted to sophomore, junior, and senior Latin American and Latino studies majors. (General Education Code(s): E.) *J. Fox*

100B. Culture and Society: Culture in a Global Context. S

Focuses on transnational, regional, and local features of Latina/o and Latin American cultural production and artistic expression: how culture is shaped by historical, social, and political forces; how cultural and artistic practices shape the social world; and how culture is produced in an interconnected, postindustrial, and globalized economy. Prerequisite(s): courses 1, 10 or History 11B. Enrollment restricted to sophomore, junior, and senior Latin American and Latino studies majors, minors, and combined majors with global economics, sociology, literature, and politics. (General Education Code(s): E.) *R. Fregoso, G. Delgado-P, C. Rivas*

101. Using Media. *

Hands-on survey of print, broadcast, audiovisual, and electronic media. Students complete and present a dozen different media production assignments as part of permanent portfolio. Assignments have Latino/Latin American focus. Peer critique of media projects. Prerequisite(s): concurrent enrollment in course 101L. (General Education Code(s): E.) *The Staff, J. Burton-Carvajal*

101L. Using Media: Video Laboratory (2 credits). *

Trains students in the fundamentals of video preparation, production and post-production through Social Sciences Media Laboratory. Prerequisite(s): concurrent enrollment in course 101. *J. Burton-Carvajal*

110B. El Area Andina Hoy. F

Taught in Spanish. Offers contemporary debates on Andean societies through a prism of recent interdisciplinary contributions (anthropological, sociological, political scientific, historical). Aims at understanding neo-regionalism, cultural history, and impact of globalization on specific localities. Andean societies are adjacent to the Amazon, a complementary aspect offered in this course. Prerequisite(s): course 1 or Anthropology 1, and Spanish 6 or Spanish for Spanish Speakers 63 or equivalent. Enrollment limited to 30. (General Education Code(s): E.) *G. Delgado-P*

111. The U.S.-Mexican Border Region. *

Global and national forces have transformed the 2,000-mile United States/Mexico border region into a site for world market factories. Analyzes how this transformation has affected workers and communities and systematically reviews subjective responses. (General Education Code(s): E.) *J. Borrego*

120. Cultures of the Sacred. *

Comprehensive seminar on notions of the sacred, dealing with the complexities of magic and religious themes in the Americas as seen from an anthropological perspective. Topics include both popular religion as well as non-Christian religious practices. Based on recent anthropological literature, as well as new developments concerning rituals related to the sacred (spiritualism, voodoo, santería, magical curing, spirit possession, glossolalia, earth feeding, rituals of reciprocity). (General Education Code(s): E.) *G. Delgado-P*

121. Early California Cultures. *

Examines the cultural practices and expressions of four early California populations—indigenous, Spanish, Mexican/Californio, and immigrant Anglo-Americans—from 1770–1850—and how this led to formation of current cultural practices. *J. Burton-Carvajal*

123A. Cinema and Social Change: Feature Films. *

Intensive weekly sessions contextualize, view and analyze a dozen classical fictional films from Latin America (1960s–1990s). (General Education Code(s): E.) *J. Burton-Carvajal*

123B. Cinema and Social Change: Documentary Transformations. *

Surveys the range of documentary practices designed as catalysts for and interventions in processes of social change from the 1950s to the present, with particular emphasis on sociological and political filmmaking. (General Education Code(s): E.) *J. Burton-Carvajal*

126A. Global Capitalism and Community Restructuring. W

Examines how Watsonville (U.S.) and Irapuato (Mexico) are being restructured by national development, North American economic integration (NAFTA), and global capitalism. Explores the relentless penetration of market imperatives, their impact on the communities, and community response; costs/benefits of being abandoned by or being attractive to global capital; and how people are surviving—scrambling to find jobs, keeping families together, and engaging in binational strategies for survival. Prerequisite(s): permission of instructor; concurrent enrollment in laboratory course 126B. Enrollment restricted to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS, E.) *J. Borrego*

126B. Voices from the Watsonville Community. W

Weekly Wednesday evening seminar in Watsonville allows students to interact with local workers, organizers, immigration and citizenship NGO's, affordable housing non-profits, entrepreneurs, large commercial developers, county planners, city managers, PVUSD educators, health activists, politicians, commercial and organic farmers, food processing owners/plant managers, and environmentalists, in order to develop a deeper understanding of the past, present, and future of the community and the region. Class will present findings and interact with panel of community members on a Saturday morning during first weekend of spring quarter. Prerequisite(s): concurrent enrollment in course 126A. Enrollment restricted to sophomores and juniors. Enrollment limited to 25. (General Education Code(s): IS, E.) *J. Borrego*

127. Mexico and the Movies. *

Surveys a century of film production in Mexico, concentrating on major works by leading directors and emphasizing the two most popular forms—comedy and melodrama—in the context of constructions of national identity from 1931, the beginning of the sound era, to the present. Knowledge of Spanish highly recommended. (General Education Code(s): E.) *J. Burton-Carvajal*

128. Latino Media in the U.S. W

Explores the history and practice of Latino media in the U.S. with an emphasis on work created by, for, with, and about Latino constituencies. Course highlights the role that media plays in struggles for social change, political enfranchisement, creative self-expression, and cultural development. Course content varies with instructor. (Also offered as Writing 128. Students cannot receive credit for both courses.) Enrollment limited to 39. (General Education Code(s): E.) *The Staff*

129. Women Filmmakers: Latin American and Latina. *

Focuses on the work of a dozen major Latin American and Latina filmmakers from Argentina, Brazil, Venezuela, Mexico, and the U.S., including María Luisa Bemberg,

María Navaro, Matilde Landeta, Lourdes Portillo, concentrating on films of the last two decades. (General Education Code(s): E.) *J. Burton-Carvajal, R. Fregoso*

140. Rural Mexico in Crisis. F

Focuses on political, social, economic, and environmental changes in rural Mexico from the 1910 revolution through the Zapatista rebellion. Emphasizes the interaction between the state, markets, and rural civil society, covering agrarian reform, agricultural policy, grassroots development initiatives, democratization, indigenous movements, natural resource management, and migration. Previous completion of course 100A and/or course 80D recommended. Prerequisite(s): Previous completion of course 100A and/or course 80D recommended. Enrollment restricted to juniors and seniors. Sophomores may enroll with permission from instructor. (General Education Code(s): E.) *J. Fox*

141. Latino Communities and Economic Development. *

Examines the economic experiences of Latinas/os in the U.S. and underlying conditions of Latino workers, Hispanic businesses, and Latino community development. By examining their economic status, profiles Latino workers, the self-employed, and communities by region, cultural differences, age, gender, education, and immigrant make-up. Enrollment restricted to juniors and seniors. Enrollment limited to 35. (General Education Code(s): E.) *The Staff*

142A. Central America: Revolution, Intervention, and Social Change. W

Historical and contemporary overview of the region. More detailed focus on conditions generating popular and revolutionary movements in Nicaragua, El Salvador, and Guatemala during the 1980s; U.S. policy responses; and peace negotiation processes. Examines prospects for Central America in the 21st century including migration to the U.S. (General Education Code(s): E.) *S. Jonas*

142B. The Caribbean: Revolution, Intervention, and Social Change. *

Focuses on the political economy and recent/contemporary processes of social transformation in Cuba, Haiti, Dominican Republic, Puerto Rico, and English-speaking Caribbean countries; U.S. role in the region; Caribbean migrant communities in the U.S. (General Education Code(s): E.) *The Staff*

143. Race and Ethnicity. *

Race and ethnicity have been—and continue to be—powerful forces shaping the U.S. experience. This course examines a range of conceptual approaches and monographic studies grounded in the history of the U.S. The readings provide various criteria for studying and understanding these phenomena. The course problematizes "race" by asking what the readings tell us about "race-making" and the reproduction of racial ideologies in specific historical contexts. Similarly, "ethnicity" is treated as a historically specific social construct. (General Education Code(s): E.) *G. Arredondo*

143J. Global Political Economy. F

Analyzes the global, social, economic, and political forces that shape transnational, national, and regional societal formations and consequently the entire environment for social change. Examines the evolution of revolutionary struggle and its origins within and impact upon the evolving capitalist system. *J. Borrego*

144. Chicanas/Mexicanas in the U.S. *

Explores current historical and theoretical writings on the lived experiences of Chicanas and Mexicana women in

U.S. history. Themes include domination/resistance politics, (re)presentations, contestation, social reproduction, identity and difference. (General Education Code(s): E.) *G. Arredondo*

145. Grassroots Social Change in Latin America. *

Focuses on the analysis of collective action by under-represented groups in Latin America. Concepts and issues include political participation and impact, gender, ethnicity and race, class, the environment, religion, non-governmental organizations, and social capital. Prerequisite(s): any two Latin American and Latino studies courses or permission of instructor; open to graduate students. Enrollment limited to 25. (General Education Code(s): E.) *The Staff*

146. Urban Crisis in the Americas. *

Multidisciplinary course on the cities of Latin America and Latino barrios in the U.S. Examines how cities have been constituted spatially, economically, and culturally from the Pre-Columbian era to the present. (General Education Code(s): E.) *G. Delgado-P*

147. Land and Peasants in the Americas. *

Explores current trends of rural societies in Latin America. Places emphasis on the human experience of the peasantry in the context of globalization and 21st-century free trade. Concentrates on specific cases of rural migrations throughout the Americas. Land and environmental issues, peasant women's experiences, rural society changes, the future of the Latin American peasantry, and the role of rural workers in post-industrial society are discussed. Knowledge of Spanish recommended. (General Education Code(s): E.) *G. Delgado-P*

148. Workers in the Americas. W

Current issues related to the experience of the Latin American and Latino working classes. Studies organized labor, resistance-literature, struggles for wages and political power, gender and labor, and labor autonomy. (General Education Code(s): E.) *G. Delgado-P*

152. Media and Commodities Between the Americas. F

Examines the circuits of media, commodities, and migration connecting the Americas in an age of globalization. Issues of states, transnational markets, social relations, and cultural representations addressed. Relationship between consumption, nationalism, and globalization is considered critically. Enrollment limited to 35. (General Education Code(s): E.) *C. Rivas*

160. North American Integration: Post-NAFTA. *

Analyzes the multi-dimensional process of integration in North America via NAFTA. Covers issues of trade and investment flows between Canada, the U.S., and Mexico, including important legislative, scientific, technological, cultural, and political components, as well as social dislocations and political challenges associated with NAFTA. (General Education Code(s): E.) *J. Borrego, J. Fox*

161P. Theater in the "Chicano Power" Movement. *

Covers the rise of Teatro Chicano as a cultural-political force within the 1960's "Chicano Power" Movement starting with founding playwright Luis Valdez and El Teatro Campesino and covering Chicana/o playwrights inspired by the movement, e.g. Cherrie Moraga, Luis Alfaro, and Josefina Lopez. (Also offered as Theater Arts 161P. Students cannot receive credit for both courses.) (General Education Code(s): A, E.) *The Staff*

162. U.S. Policy in the Americas. S

Studies U.S. policies toward Latin America and hemisphere-wide (primarily since WWII), including Cold War policies and interventions, U.S. response to the Cuban Revolution, the Alliance for Progress, counterinsurgency as the response to revolutionary movements, the crisis in U.S. hegemony, NAFTA, and issues of U.S. policies for the post-Cold War era and the 21st century. (General Education Code(s): E.) *M. Mojica, S. Jonas*

163. America in Flux: Population Dynamics in the U.S. W

Examines key theories of demographics change in important policy issues, such as the aging of America, racial categorization, and immigration. Explores political and economic factors that have led to the changing face of the U.S. over the last century and key legislative changes that have changed the experience of immigrants. Students use primary demographic data from the U.S. Census Bureau and learn basic tools for demographic data access and presentation. Prerequisite(s): course 100A. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): E.) *S. Gleeson*

164. Environmental Justice. S

Introduces students to participatory-action research, which both creates positive social-environmental change and contributes to scientific knowledge. Through collaboration with environmental justice organizations, students develop research skills, hone critical reflection abilities, and understand the connections between race, ethnicity, power, poverty, and environmental problems. (Formerly Action-Research for Social Change, Environmental Quality: Lessons Learned from Latin America, U.S.) Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 35. (General Education Code(s): E.) *F. Lu*

166. Latino Families in Transition. *

Explores the complex nature of Latino families in the U.S., which like other American families are undergoing profound changes. Placing families within a historical context of post-1960s social transformations, such as feminism, migration, "reconstructed" or multiple-earner households, examines how family members adapt, resist, and/or construct alternative visions and practices of family life. Prerequisite(s): course 1. Enrollment limited to 40. (General Education Code(s): E.) *P. Zavella*

167. Amazonian Societies and the Environment. S

Overview of Amazonian societies and the environment from both a historical and contemporary perspective. Topics include indigenous resource management, hunting and conservation, and the ecological impacts of culture and economic change. Enrollment limited to 35. (General Education Code(s): E.) *F. Lu*

168. Economic History of Latin America. *

Sheds light on Latin America's contemporary social and economic developments by providing an appreciation of their historical roots. Focusing on the period from independence until WWII, evaluates contesting explanations for Latin America's relatively poor economic performance and divergent policy implications. Prerequisite(s): course 1. (General Education Code(s): E.) *H. Shapiro*

169. Latin American Industrialization in a Global Perspective: Past, Present, and Future. *

Analyzes the economic, political, and social aspects of the industrialization process in Latin America. Evaluates import substitution policies, the changing roles of the state and foreign and domestic capital, and the

impact of recent trade liberalization. Compares Latin America's development with that of the East Asian newly-industrialized countries (NICs) and looks at the implications of globalization. (General Education Code(s): E.) *H. Shapiro*

170. Indigenous Struggles in the Americas. S

Focuses on the way Natives of First Peoples have interacted voluntarily and involuntarily with nonindigenous cultures. Examines their perspectives, thoughts, frustrations, and successes. Touches on land issues and examines the way current indigenous cultures of Latin America face and adapt to social change. Focuses mainly on the Andes, lowland Amazon, Mesoamerica, and other areas. (General Education Code(s): E.) *G. Delgado-P*

171. Talleres de Poesía. *

Taught in Spanish. Develops creative writing skills through reading, discussion, and a progression of hands-on group poetry writing sessions. (General Education Code(s): A.) *The Staff*

173. Latin American Immigration to the U.S. F

Interdisciplinary examination of Latin American immigration to the U.S. Topics include history of U.S. as an immigrant nation, economic and political context for migration, immigration process/experience, U.S. immigration/refugee policies, anti-immigrant backlash today, issues facing Latino immigrant communities to the U.S., bi-national communities. (General Education Code(s): E.) *S. Jonas*

175. Migration, Gender, and Health. F

Through an interdisciplinary, cross-border approach, examines complex nature of Latino health in relation to migration and how women and men experience health problems differently. Examines how health problems are created by economic and social conditions, how migrants experience access to care, and how agencies can design culturally sensitive programs. Prerequisite(s): course 100A. (General Education Code(s): E.) *P. Zavella*

176. Gender, the Nation, and Latina Cinema. *

Applies theories of transnational feminism, decolonization, and globalization to the study of Latina cinematic representation in the Americas. Focusing on Latina image making, course explores representations of race, sexuality, and the nation; citizenship, diaspora, and belonging; gender-based violence and racialized state violence; militarization, human rights, and global justice. (Formerly *Transnational Feminism in Cinema*). (General Education Code(s): E.) *The Staff, R. Fregoso*

178. Gender, Transnationalism, and Globalization. *

Focusing on Latin America, examines ways relationship of gender and feminism to contemporary theories of transnationalism and globalization affect social understandings and formation of ideas about nation, national borders, boundaries, and social identities. Explores links between transnational and globalizing processes and emerging global civil society and transborder feminist solidarity movements in the Americas. Enrollment limited to 25. (General Education Code(s): E.) *The Staff, R. Fregoso*

180. Borders: Real and Imagined. *

Situates "The Border" historically and within the context of U.S. imperialism. Examines the formalization of political "borders," methods of enforcement, and intra-group conflicts. Examines the varied experiences of colonialism and immigration between Mexicans, Puerto Ricans, Native Americans, and Cubans. Explores how the tools of "The Border" and "Borderlands" are being

used to untangle the roles of race prejudice and sexual and gender discrimination. (General Education Code(s): E.) *G. Arredondo*

190. Internship. F,W,S

Internships with campus or community organizations sponsored and evaluated by a Latin American and Latino studies faculty member. Students write an analytical paper or produce another major work agreed upon by student, faculty supervisor, and internship sponsor; sponsor must also provide review of experience. Students submit petition to sponsoring agency. *The Staff*

190F. Internship (2 credits). F,W,S

Internships with campus or community organizations sponsored and evaluated by a faculty member from Latin American and Latino studies. Students write a short (8-page) descriptive paper or produce another work agreed upon by student and faculty supervisor. Students submit petition to sponsoring agency. *The Staff*

191. Latin American Studies Teaching Apprenticeship. F,W,S

Advanced students serve as facilitators for small discussion groups or aid in reading of papers related to Latin American studies courses. Students are expected to read all course assignments and meet with instructors to discuss the teaching process. May not be counted toward major requirements. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching under faculty supervision of a lower-division course in Latin American and Latino studies, normally done by majors in the final quarter of study as the senior project. (See course 42.) Students submit petition to sponsoring agency. *The Staff*

193. Field Study. F,W,S

Supervised off-campus study in local Spanish-speaking community. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194B. Colombia: Sociedad y política. *

Taught in Spanish. Overview of contemporary Colombian politics and society in historical and institutional context, with an interdisciplinary approach to the causes and consequences of political violence. Special focus on agrarian and ethnic conflict. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. *The Staff*

194C. Trabajo y empresa en América Latina. *

Taught in Spanish. An introduction to the conflict between the economic interests of the working class and the differing strategies of the several models of "development." Analyzes the methods of resistance of popular movements in their confrontation with entrepreneurial and transnational capital. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *G. Delgado-P*

194D. Hemispheric Dialogues: Bridging Latin American and Latina/o Studies. *

The rapid acceleration of North-South flows of people, resources, and ideas in the Americas has triggered a rethinking of both Latina/o studies and Latin American studies approaches. By bringing empirical materials and conceptual frameworks from Latin American studies to bear on Latina/o studies and vice versa, this advanced research seminar explores the interlocking social, cultural, economic, and political processes that connect Latin America and U.S. Latina/o communities. Prerequisite(s): course 100A or 100B. Enrollment restricted to junior

and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

194E. Latino International Migration: Case Studies, Policy/Law, Transnational Practices. S

Seminar designed for students who already have basic understanding of migration and who want to pursue topic in greater depth and/or as preparation for a career related to immigration. Gives an understanding of various methodological approaches to study of migration, taken from different disciplinary fields. Prerequisite(s): course 173 or permission of instructor. Enrollment restricted to junior and senior Latin American and Latino studies majors, minors, combined, or double majors. Enrollment limited to 20. (General Education Code(s): E.) *S. Jonas*

194F. Latino Civic Engagement in Comparative Perspective. W

Explores the role of Latinos in civic and political life in the U.S., focusing on specific avenues for participation such as religion, work, and transnational experiences. Examines barriers to participation experienced by Latinos in the U.S. as well as relationships between civic engagement and political incorporation and the ramifications for inequality for Latinos and other ethnic/racial groups in cities across America. Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

194G. Chile: Social and Political Change. S

Analysis of Chilean politics and society from the election of Salvador Allende in 1970 to the present. Particular emphasis is given to understanding the different forces, internal as well as external, that broke the Chilean tradition of democratic rule in 1973, and to the current configuration. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *W. Goldfrank*

194J. Movimientos sociales contemporáneos. W

Taught in Spanish. Provides students with an opportunity to critically analyze various national/international impacts of Latino/Latin American social movements. Reviews pertinent social scientific literature and examines conclusions reached by their authors. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *G. Delgado-P*

194K. Drogas en la historia y la cultura de las Américas. S

Taught in Spanish. Studies the devastating effects drugs have on the Americas and the subcultures they (re)produce. Features critical readings on the impact of drugs in the Americas. Studies the origins of substances (tobacco, coca, marijuana), and looks at how they have been used through time before concentrating on the present. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *G. Delgado-P*

194L. Etnicidad, medio ambiente y desarrollo. *

Taught in Spanish. Interdisciplinary analysis of the interaction between ethnicity, tropical forests, and development policy in Latin America. Historical, anthropological, and sociological perspectives on natural resource rights and use, with a focus on Afro-Latin American and indigenous peoples. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

194M. Twentieth-Century Revolutions. *

Treatment of 20th-century Latin American revolutions from Zapata to the Zapatistas. Focuses on the causes and consequences of revolutions rather than on their narrative histories. Enrollment restricted to junior and senior Latin American and Latino studies majors. Enrollment limited to 20. (General Education Code(s): E.) *W. Goldfrank, G. Arredondo*

194N. Las izquierdas en América Latina: ayer, hoy y mañana. F

Taught in Spanish. Focuses on legacies of Latin America's popular and revolutionary movements since the 1960s, current transformations, and 21st-century prospects. Major emphasis on contemporary leftist or left-leaning parties in power in the early 2000s, as well as new perspectives/re-evaluations/debates about past movements. Also includes cross-border strategies, movements, and alliances for social justice. Enrollment restricted to junior and senior Latin American and Latino Studies majors, minors, combined or double majors. Enrollment limited to 20. (General Education Code(s): E.) *S. Jonas*

194P. Tale of Two Cities. *

A comparative study of the social, economic, cultural, political, and geographical development of Los Angeles and Mexico City in the 20th century. Emphasis on the diverse peoples, changing physical environment and various images/interpretations of these two world cities. (Also offered as History 190D. Students cannot receive credit for both courses.) Prerequisite(s): two upper-division history courses and satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to junior and senior Latin American and Latino studies and history majors. Enrollment limited to 20. (General Education Code(s): W, E.) *P. Castillo*

194R. Violencia Cotidiana en las Americas. S

Senior seminar taught in Spanish. Engages a critical study of violence, social relations, and everyday life in contemporary Latin America. Focuses on the relationship between narratives and acts of violence, and the constitution and social effects of these representations. Requires proficiency in Spanish (written and spoken), and advanced reading knowledge of Spanish. Enrollment restricted to junior and senior Latin American and Latino studies majors, minors, double majors, and combined majors. Enrollment limited to 20. (General Education Code(s): E.) *C. Rivas*

195A. Seminar in Research Methods and Writing. W

Provides training in essential research skills, including, topic definition, components of library/bibliographic and literature reviews, interview techniques, fieldwork; development of writing, revising, and editing skills; collective discussion of projects. Strongly recommended for students working on senior thesis, project, or expanded paper for Latin America and Latino studies senior exit requirement. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to junior and senior LALS majors, minors, combined, or double majors. Enrollment limited to 20. (General Education Code(s): W, E.) *S. Jonas*

195B. Senior Project. F,W,S

Senior thesis writing under direction of major adviser. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195C. Senior Project. F,W,S

Senior thesis writing under direction of major adviser. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

196. Field Study Seminar. S

Emphasizes ethnographic strategies of fieldwork. Primarily oriented to students interested in understanding the daily life of societies and cultures. Prepares students both to conduct fieldwork, and to process their fieldwork experience. Covers complexities related to the experience of "stepping out of" one's own culture. Prerequisite(s): concurrent enrollment in course 196L. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 25. *J. Borrego*

196L. Field Study Seminar Lab (2 credits). S

Media lab trains students in the use of electronic and photographic media for the acquisition of field data. Through lectures, demonstrations, hands-on field exercises and review of students' media exercises, students will learn the fundamentals of photography, video production, and audio recording in the field. Prerequisite(s): concurrent enrollment in course 196. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 25. *J. Borrego*

198. Field Study. F,W,S

Off-campus study in Latin America, the Caribbean, or nonlocal Spanish-speaking community in the U.S. Nature of proposed study/project to be discussed with sponsoring instructor(s) before undertaking field study; credit toward major (maximum of three courses per quarter) conferred upon completion of all stipulated requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Individual studies undertaken off-campus. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Supervised directed reading; weekly or biweekly meetings with instructor. Final paper or examination required. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Supervised research and writing of an expanded paper, completed in conjunction with requisite writing for an upper-division course taken for credit in the major. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses**200. Bridging Latin American and Latina/o Studies. W**

Explores social, cultural, economic, and political changes that connect Latin America and U.S. Latina/o communities. The objective of this interdisciplinary team-taught course is to bridge previously distinct research approaches of Latin American and Latina/o studies to better understand processes that link peoples and ideas across borders as well as help students to conceptually and methodologically identify and design new objects of study and revisit traditional approaches. Core requirement for students pursuing the Parenthetical Notation in Latin American and Latino studies. Enrollment restricted to graduate students. *G. Arredondo*

210. Latina Feminisms: Theory and Practice. *

Through an interdisciplinary approach, explores Latina feminist social theory and scholarly practice—especially in representation and interpretation of Latina experiences. Examining key texts at different historical junctures, charts how Latinas of varied ethnic, class, sexual, or racialized social locations have constructed oppositional

and/or relational theories and alternative epistemologies or political scholarly interventions and, in the process, have problematized borders, identities, cultural expressions, and coalitions. Enrollment restricted to graduate students. *P. Zavella*

212. Latina/o Ethnographic Practice. *

Interrogates the social construction of Latino cultures in their varied regional, national-ethnic, and gendered contexts. Assumes that culture is a dynamic process constructed within a context of hierarchical relations of group power, in which Latino groups have been structurally subordinated and socially oppressed. Focuses more on how power relations create a context for the creation of specific Latino cultural expressions and processes than on unraveling the structures of oppression. Enrollment restricted to graduate students. Enrollment limited to 25. *P. Zavella*

215. Latina Cultural Studies: Transborder Feminist Imaginaries. *

Interdisciplinary analysis of feminist theories that inform the field of Latina cultural studies in the Americas, with an emphasis on transnational and hemispheric dialogues. Designed for students pursuing the Parenthetical Notation in Latin American and Latino studies and those with interest in globality, transnational feminist theory, and critical race and postcolonial theories. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Fregoso*

220. Transnational Civil Society: Limits and Possibilities. *

Analyzes social, civic, and political actors that come together across borders to constitute transnational civil society, drawing from political sociology, political economy, comparative politics, and anthropology to address collective identity formation, collective action, institutional impacts, and political cultures. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Fox*

230. Political Ecology in Latin America. F

Examines the foundations and current literature on political ecology, with emphasis on issues in Latin America. Topics include the appropriation of "Nature," degradation and deforestation; conservation policies and politics; land distribution and property; and indigenous resistance. Enrollment restricted to graduate students. Enrollment limited to 14. *F. Lu*

240. Culture and Politics of Human Rights. *

Examines the role of feminist activism and jurisprudence in the expansion of human rights since the Universal Declaration of Human Rights. Addresses challenges of accommodating women's specificity within international human rights law. Focus on application of international and regional human rights conventions and new human rights standards. (Formerly *Feminism and the Culture and Politics of Human Rights*.) (Also offered as Feminist Studies 240. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. *R. Fregoso*

242. Globalization, Transnationalism, and Gender in the Americas. S

Explores how globalization, transnationalism, and the social construction of gender are interrelated, contingent, and subject to human agency and resistance. Examines particular configurations of globalization, transnationalism, and gender through the Americas and their implications for race, space, work, social movements, migration, and construction of collective memory. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Fregoso, P. Zavella*

297. Independent Study. F,W,S

Students submit a reading course proposal to a department faculty member who supervises independent study in the field. Faculty and student jointly agree upon reading list. Students expected to meet regularly with faculty to discuss readings. This independent study must focus on a subject not covered by current UCSC graduate curriculum. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Enrollment restricted to graduate students and permission of instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Latin Literature

Students wishing to pursue a course of study in Latin literature should consult the concentration in national/transnational literatures under Literature, page 337.

Legal Studies

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(831) 459-2056
legalstudies@ucsc.edu
<http://legalstudies.ucsc.edu>

Faculty and Professional Interests

DANE ARCHER, Professor of Sociology
Violence, war and peace, cross-national and cross-cultural research, verbal and nonverbal communication, crime and law

DONALD BRENNEIS, Professor of Anthropology
Linguistic anthropology, folklore, legal anthropology, ethnomusicology, overseas Indians, South Asia, disputing and dispute management, legal language, bureaucratic institutions

GINA DENT, Associate Professor, Feminist Studies, History of Consciousness, and Legal Studies
Africana literary and cultural studies, legal theory, popular culture

PAUL FRYMER, Associate Professor of Politics, Director of Legal Studies
American politics and institutional development; law, race, and civil rights; parties, elections, and representation; organizations, collective action, and social movements; labor and employment; political history

HIROSHI FUKURAI, Professor of Sociology
Intersection between race and jury, comparative analysis of world's jury systems, theories of checks and balances and questions of accountability through representational models in civilian legal participatory processes, performative construction of racial identity, Japanese judicial reforms in the establishment of the "quasi-jury" (saiban-in) system, advanced quantitative statistical methods (covariance and moment structural modelings)

TRILOKI NATH PANDEY, Professor of Anthropology
Native peoples of North America, cultures of India, political anthropology, anthropological theories and comparisons

DANIEL M. PRESS, Professor of Environmental Studies

U.S. environmental politics and policy, social capital and democratic theory, industrial ecology, land and species conservation, regionalism

CRAIG REINARMAN, Professor of Sociology
Political sociology; law, crime, and social justice; drugs and society

MICHAEL E. URBAN, Professor of Politics
Russian politics, postcommunist transitions, U.S.-Russian relations, political language and ideology, revolution

DANIEL J. WIRLS, Professor of Politics
American politics, including national political institutions (Congress) and the President; public policy (military and foreign policy) and political history

DONALD A. WITTMAN, Professor of Economics
Economic theory, politics, law



JOHN DIZIKES, Emeritus

WALTER L. GOLDFRANK, Professor of Sociology
Social change, historical sociology, world systems, modern Mexico, Chile, social movements and revolution, development theories, policies and outcomes, jury studies

CRAIG W. HANEY, Professor of Psychology
Applications of social psychological principles to legal settings, assessment of the psychological effects of living and working in institutional environments, social contextual origins of violence, development of alternative legal and institutional forms

ROBERT L. MEISTER, Professor of Politics
Political and moral philosophy, law and social theory, Marxian theory, institutional analysis, antidiscrimination law

GARY B. MILES, Emeritus

Program Description

Legal studies is an interdisciplinary major offered under the auspices of the Politics Department. It is designed for students who wish to use the methods and perspectives of various academic disciplines to study legal issues and to use the conceptual framework of the law to illuminate empirical and theoretical concerns in the various disciplines. For example, a student might use approaches from psychology and philosophy to study the legal problem of punishment; or draw on doctrinal categories from public and private law to study the changing historical role of market and nonmarket relations within ongoing institutions; or use approaches from critical race theory and feminist studies to better understand matters of civil rights and privacy.

To complete the major, students are required to take courses in legal institutions, constitutional law, and international law, as well as take courses in each of three broad themes: legal theory and philosophy, the role of law in society, and legal institutions. Each of these themes is intentionally broadly defined. Within legal theory, students may take courses in legal jurisprudence, logic, and theories of crime and punishment; within law and society, courses range from feminism and race to psychology and economics; within public law and institutions, courses range from environmental law to human rights law to an introduction to litigation. Students are also expected to take an introductory course in philosophy. To fulfill the senior exit requirement, students have the option to write a senior thesis or take a senior capstone seminar. The seminar topic changes quarterly.

Legal studies is intended to appeal to students who wish to take a concentration of courses on the law from a variety of disciplinary and methodological perspectives. The major is not intended as a substitute or preparation for any part of a law school curriculum but rather as a full field of study within the liberal arts curriculum. As such, it is a good preparation for a variety of future activities. Students graduating in legal studies are particularly well qualified to pursue graduate work on legal topics in humanities and social science disciplines or to attend professional school in fields such as public policy, business administration, social work, and law. Students are also encouraged to participate in field work and law-related internships in the community, and to develop their own extensive independent research projects.

Declaring the major in legal studies is a three-step process: (1) attend a declaration orientation workshop; (2) meet with your faculty adviser; (3) meet with the legal studies undergraduate adviser. Each student meets with an assigned faculty adviser to discuss an intended program of study, including its breadth and purpose.

The legal studies program offers a minor degree as well as the major degree.

Requirements for the Major

Lower-Division Course Requirements—2 courses

Legal Studies 10 Introduction to Legal Process
Philosophy 9, 22, or 24. All legal studies majors are required to take one of the three listed Philosophy courses. (See the Philosophy section in this catalog, page 377, for course descriptions.)

Although these courses are not prerequisites for most upper-division courses, the faculty strongly recommend that students complete these lower-division requirements early in their program of study.

Upper-Division Course Requirements—2 courses

111A *Constitutional Law or*
111B *Civil Liberties*
173 *International Law*

Core Course Requirements—6 courses

Students are required to take six core courses, two in each of three concentrations: Theory, Public Law and Institutions, and Law and Society.

Theory

103 *Feminist Interventions* (Politics course)
105A *Ancient Political Thought*
105B *Early Modern Political Thought*
105C *Modern Political Thought*
106 *Marxism as a Method*
107 *Political Morality of Survivorship and Recovery*
109 *Legal Theory*
109 *Orientalism* (Politics course)
115 *Law and the Holocaust*
144 *Social and Political Philosophy*
146 *Philosophy of Law*
155 *Topics in American Legal History*
157 *Political Jurisprudence*

Public Law and Institutions

111A *Problems in Constitutional Law*
111B *Civil Liberties*
116 *Comparative Law*
120A *Congress, President, and the Court in American Politics*

- 120C *State and Capitalism in American Political Development*
 125 *History of U.S. Penal Law*
 128 *Poverty and Public Policy*
 131 *Wildlife, Wilderness, and the Law*
 132 *California Water Law and Policy*
 133 *Law of Democracy*
 135 *Native Peoples Law*
 136 *Federal Indian Law and Tribal Sovereignty*
 137 *International Environmental Law and Policy*
 139 *War Crimes*
 149 *Environmental Law and Policy*
 152 *Courts and Litigation*
 155 *Topics in American Legal History*
 156 *Administrative Jurisprudence*
 159 *Property and the Law*
 171 *Law of War*

Law and Society

- 107 *Political Morality of Survivorship and Recovery*
 110 *Law and Social Issues*
 112 *Women and the Law (Politics)*
 113 *Gay Rights and the Law*
 114 *Jews, Anti-Semitism, and the American Legal System*
 118 *Political Anthropology*
 120B *Society and Democracy in American Political Development*
 120C *State and Capitalism in American Political Development*
 126 *Law and Politics in Contemporary Japan and East Asian Societies*
 126I *Race and Criminal Justice*
 127 *Black Politics and Federal Social Policy*
 138 *Law and Literature*
 142 *Anthropology of Law*
 147A *Psychology and Law*
 147B *Psychology and Law*
 150 *Children and the Law*
 154 *The Legal Profession*
 155 *Topics in American Legal History*
 160 *Industrial Organization*
 162 *Legal Environment of Business*
 169 *Economic Analysis of the Law*
 172 *The Sociology of Law*
 173 *Law, Crime, and Social Justice*
 180 *Power, Politics, and Protest*
 183 *Women in the Economy*

Comprehensive Requirement—1 course

Students can satisfy the comprehensive requirement in the legal studies major by successfully completing one of the following:

195A, B, C, *Senior Thesis*. Completion of a senior thesis project of approximately 50 pages with a substantial research content, supervised by a legal studies faculty member with a second reader.

196 *Senior Capstone*. The capstone course is designed to provide an interdisciplinary integration of themes related to the study of law and includes a substantial writing requirement.

Requirements for the Minor

To complete a minor in legal studies, a student must take Legal Studies 10 and any five upper-division legal studies core courses.

Lower-Division Courses

10. Introduction to Legal Process. F

Introduction to U.S. and comparative legal institutions and practices. Examines diverse areas of law from torts to

civil rights to international human rights. Why is America portrayed as having an activist legal culture; why is law used to decide so many questions from presidential elections to auto accidents; can law resolve disputes that, historically, have led to war and violence; is the legal system fair and/or effective, and, if so, for whom and under what conditions? (General Education Code(s): IS.) *P. Frymer*

Upper-Division Courses

105A. Ancient Political Thought. F

Ancient political ideas in context of tension between democracy and empire, emergence of the psyche, and shift from oral to written culture. Emphasis on Athens, with Hebrew, Roman, and Christian departures and interventions. Includes Sophocles, Thucydides, Socrates, Plato, Aristotle, Stoics, the Bible, and Augustine. (Also offered as Politics 105A. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. *D. Mathiowetz*

105B. Early Modern Political Thought. W

Studies republican and liberal traditions of political thought and politics. Authors studied include Hobbes, Locke, and Rousseau. Examination of issues such as authorship, individuality, gender, state, and cultural difference. (Also offered as Politics 105B. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. *V. Seth*

105C. Modern Political Thought. S

Studies in 19th- and early 20th-century theory, centering on the themes of capitalism, labor, alienation, culture, freedom, and morality. Authors studied include J. S. Mill, Marx, Nietzsche, Foucault, Hegel, Fanon, and Weber. (Also offered as Politics 105C. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. *M. Thomas*

105D. Late 20th Century Political Thought. S

The politics of identity and recognition as the basis for institutional legitimacy and social struggles in the late 20th century. Conflicting views of Hegel's master-slave dialectic are used to relate, e.g., Sartre, Fanon, Bataille, Merleau-Ponty, Foucault, Lacan, Levinas, Derrida, Deleuze, Zizek, and Badiou to present-day concerns. (Also offered as Politics 105D. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. *R. Meister*

106. Marxism as a Method. *

Examines Marx's use of his sources in political philosophy and political economy to develop a method for analyzing the variable ways in which social change is experienced as a basis for social action. Provides a similar analysis of contemporary materials. Contrasts and compares Marxian critiques of these materials and readings based on Nietzsche, psychoanalysis, cultural studies, and rational choice materialism. (Also offered as Politics 106. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment only. *R. Meister*

107. After Evil: Political Morality of Survivorship and Recovery. *

What are the continuing relationships between victims, perpetrators, and beneficiaries of a past that is recognized as evil? Focus on contrast between the competing moral logics of struggle and reconciliation, and various rationales for allowing beneficiaries to keep their gains in order to bring closure to the past. Theoretical perspectives drawn from law, philosophy, theology, and psychoanalysis. (Also

offered as Politics 107. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment only. *R. Meister*

109. Legal Theory. W

Offers systematic exploration of alternative conceptions of the nature of law, including positivism, natural law, formalism, realism, pragmatism, and theories of justice. Additional focus on the nature of law; relation of law and morality, rights and other legal concepts; and philosophical debates such as critical legal studies and critical race theory. Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

110. Law and Social Issues. *

Examines current problems in law as it intersects with politics and society. Readings are drawn from legal and political philosophy, social science, and judicial opinions. (Also offered as Politics 110. Students cannot receive credit for both courses.) Enrollment restricted to politics, legal studies, and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

111A. Constitutional Law. S

An introduction to constitutional law, emphasizing equal protection and fundamental rights as defined by common law decisions interpreting the 14th Amendment, and also exploring issues of federalism and separation of powers. Readings are primarily court decisions; special attention given to teaching how to interpret, understand, and write about common law. (Formerly *Problems in Constitutional Law*.) (Also offered as Politics 111A. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

111B. Civil Liberties. S

Explores the status of American civil liberties as provided by the Bill of Rights. Particular attention will be given to issues of concern relating to the aftermath of 9/11, including issues relating to detainees, freedom of information requests, wiretapping authority, watch lists, profiling, and creation of a domestic intelligence agency. Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

111C. Issues in Constitutional Law. W

Examines variety of topics in constitutional law that are not covered in courses 111A and 111B. Focuses primarily on Supreme Court decisions and common-law debates. Enrollment restricted to legal studies majors during priority enrollment. *The Staff*

113. Gay Rights and the Law. *

Examines relevant court cases as well as local, state, and federal laws that define boundaries for legal recognition of sexual orientation and personal sexuality. Explores legal assumptions behind current and historical cases defining personal sexuality and sexual orientation and considers the social and political impetus in each era that drove the courts and legislatures to make such decisions. *The Staff*

114. Jews, Anti-Semitism, and the American Legal System. *

Explores how Jews have influenced and been impacted by the American legal system. Students explore significant cases, debates, and trends in the law as it relates to Jewish identity, religious freedom, and conceptions of justice. Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

115. Law and the Holocaust. *

Examines the Nazi philosophy of law, and how it was used to pervert Germany's legal system in order to discriminate against, ostracize, dehumanize, and ultimately eliminate certain classes of human beings, and the role of international law in rectifying the damage. Enrollment restricted to legal studies majors during priority enrollment only. Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

116. Comparative Law. *

Explores legal systems and legal rules around the world, for a better understanding of the factors that have shaped both legal growth and legal change. Particular attention given to differences between common and civil law systems, changes brought about by the European Union, and expansion of legal norms around the globe. (Also offered as Politics 116. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

118. Law and Literature. *

Explores variety of texts including novels, short stories, and essays as a source for reflection about the nature of law and legal practice. Readings include such writers as Herman Melville, Harper Lee, Richard Wright, Arthur Miller, Nadine Gordimer, and James Alan McPherson, among others. (Formerly course 138.) Enrollment restricted to legal studies majors during priority period. *The Staff*

119. Law and the Workplace. *

Examines both the rights that individuals have in the workplace and the rights they do not have. Most Americans are "at will" employees and have very few workplace protections. Examines the exceptions, focusing particularly on civil rights and labor law. Enrollment restricted to legal studies majors during priority enrollment. *P. Frymer*

120A. Congress, President, and the Court in American Politics. *

Study of political development, behavior, performance, and significance of central governmental institutions of the U.S. Emphasizes the historical development of each branch and their relationship to each other, including changes in relative power and constitutional responsibilities. (Also offered as Politics 120A. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. Satisfies American History and Institutions Requirement. *D. Wirls*

120B. Society and Democracy in American Political Development. F

Examines role of social forces (e.g., race, class, and gender) in development of the American democratic processes and in the changing relationship between citizen and state. Course materials address ideas, social tensions, and economic pressures bearing on social movements, interest groups, and political parties. (Also offered as Politics 120B. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. Satisfies American History and Institutions Requirement. *The Staff*

120C. State and Capitalism in American Political Development. S

Examines the relationship between state and economy in the U.S. from the 1880s to the present, and provides a theoretical and historical introduction to the study of politics and markets. Focus is on moments of crisis and choice in U.S. political economy, with an emphasis on the rise of regulation, the development of the welfare

state, and changes in employment policies. (Also offered as Politics 120C. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority period. Satisfies American History and Institutions Requirement. *E. Bertram*

122. The Sociology of Law. *

Explores the social forces that shape legal outcomes and the ways law, in turn, influences social life. Traces the history and political economy of American law; the relation between law and social change; how this relation is shaped by capitalism and democracy; and how class, race, and gender are expressed in welfare and regulatory law. (Also offered as Sociology 122. Students cannot receive credit for both courses.) *C. Reinerman*

123. Law, Crime, and Social Justice. *

Blends the latest research in criminology with that from social stratification, inequality, and social welfare policy with the objective of exploring the relationship between levels of general social justice and specific patterns of crime and punishment. The focus is primarily on the U.S. although many other industrialized democracies are compared. An introductory course in sociology is recommended as preparation. (Also offered as Sociology 123. Students cannot receive credit for both courses.) *The Staff*

125. History of the U.S. Penal Culture. *

Explores the history and theory of U.S. state punishment from its 17th-century beginnings to the present and notes evolving models of criminal deviance, focusing on how punishment systems legitimate particular models of criminal deviance, crime, and its "correction." Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

126. Law and Politics in Contemporary Japan and East Asian Societies. *

Introduction to contemporary analysis of Japan's race relations, ethnic conflicts, and a government's failure to restore remedial justice for war victims in Japan, Asia, and the U.S. Specific issues include comfort women, national or state narratives on Hiroshima, forced labor during World War II, and Haydon legislation that allows war victims to sue Japanese government and corporations in California. (Also offered as Sociology 128. Students cannot receive credit for both courses.) Enrollment limited to 30. *H. Fukurai*

127. Black Politics and Federal Social Policy. S

Examination of changes in the political and economic status of African Americans in the 20th century; particular focus on the role of national policies since 1933 and the significance of racism in 20th-century U.S. political development. (Also offered as Politics 127. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment. (General Education Code(s): E.) *M. Brown*

128. Poverty and Public Policy. S

Studies the causes, consequences, and governmental response to urban poverty in the U.S. Topics include how public policy, the macroeconomy, race, gender, discrimination, marriage, fertility, child support, and crime affect and are affected by urban poverty. Emphasizes class discussion and research. (Also offered as Economics 128. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; ECON 100A & 113 or consent of instructor. Enrollment restricted to economics, business management economics, global economics,

legal studies, or economics combined major Enrollment limited to 35. (General Education Code(s): W, E.) *R. Fairlie, L. Kletzer*

128I. Race and Criminal Justice. F

An introduction to comparative and historical analyses of the relations between race and criminal justice in the U.S. Emphasis on examinations of structural mechanisms that help maintain and perpetuate racial inequality in law, criminal justice, and jury trials. (Also offered as Sociology 128I. Students cannot receive credit for both courses.) Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 120. *H. Fukurai*

128J. The World Jury on Trial. S

Adoption of the jury and its varied forms in different nations provides ideal opportunities to examine differences between systems of popular legal participation. Course considers reasons why the right to jury trial is currently established in Japan or Asian societies, but abandoned or severely curtailed in others. American jury contrasted with other forms of lay participation in the legal process. (Also offered as Sociology 128J. Students cannot receive credit for both courses.) Enrollment restricted to juniors and seniors. Enrollment limited to 30. *The Staff*

128M. International Law and Global Justice. W

Examines war crimes, crimes against humanity, and the evolution and role of the International Criminal Court (ICC). Examines the evolution of the concept of international law, the rationale for its birth and existence, roots of international conflicts and genocides, possible remedies available to victims, mechanisms for the creation and enforcement of international legal order, as well as the role of colonialism, migration, poverty, race/ethnic conflicts, gender, and international corporations in creating and maintaining conflicts and wars. (Also offered as Sociology 128M. Students cannot receive credit for both courses.) Enrollment restricted to juniors and seniors. Enrollment limited to 30. *The Staff*

130. Race and the Law. *

Explores the complex relationship between race and the law in American society. Included subjects are critical race theory, civil rights and voting rights law, issues of the criminal justice system, intersections with issues of class and gender, and the social construction of race through law and legal decisions. Enrollment restricted to legal studies majors during priority enrollment. *The Staff*

131. Wildlife, Wilderness, and the Law. F

Introduction to wildlife, wilderness, and natural resources law, policy, and management. Examines rules governing resource allocation and use including discussion of fundamental legal concepts. Explores laws and management policies affecting wildlife and wilderness, including their origins and impacts. Examines how conflicts over natural resources are being negotiated today. Enrollment restricted to sophomore, junior, and senior legal studies majors during the priority period. *R. Langridge*

132. California Water Law and Policy. W

Explores the rich history and fundamental legal concepts surrounding water in California. Students identify, evaluate, and debate some critical water policy questions faced by Californians today and in the future. (Also offered as Politics 132. Students cannot receive credit for both courses.) *R. Langridge*

133. Law of Democracy. W

Explores the role of law in both enabling and constraining the actions of elected politicians in the U.S. Among issues examined are voting rights, redistricting, and campaign finance. Course asks how the law shapes and limits our

ability to choose our elected leaders, and in turn, how the law is shaped by political forces. (Also offered as Politics 133. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment. *The Staff*

135. Native Peoples Law. S

Explores the legal relationship between native peoples and the state. Examines the development of that relationship and several of the key legal issues currently confronting native peoples as they attempt to redress the injustices of the past. Enrollment restricted to legal studies majors during priority enrollment only. (General Education Code(s): E.) *The Staff*

136. Federal Indian Law and International Comparative Indigenous Peoples' Law. *

Indian law refers to the body of law dealing with the status of Indian tribes, their inherent powers of self-government, their special relationship to the federal government, and the actual or potential conflicts of governmental power. Primary objective will be to address tribal reassertion of aboriginal sovereignty over culture and land in the context of increasing world recognition of indigenous rights. Enrollment restricted to legal studies majors during priority period. (General Education Code(s): E.) *The Staff*

137. International Environmental Law and Policy. *

International environmental law (IEL) endeavors to control pollution and depletion of natural resources within a framework of sustainable development and is formally a branch of public international law—a body of law created by nation states for nation states, to govern problems between nation states. Examines landmark developments of IEL since 1972 within a historical continuum to better understand their strengths and weaknesses. Enrollment restricted to legal studies majors during priority period. *The Staff*

138. Political Anthropology. *

The ideas, in selected non-Western societies, about the nature of power, order, social cohesion, and the political organization of these societies. (Also offered as Anthropology 138. Students cannot receive credit for both courses.) Offered in alternate academic years. *T. Pandey*

139. War Crimes. *

Explores complex international human rights/humanitarian law issues surrounding genocide and other mass violence, beginning with the Nuremberg trials following World War II up to recent atrocities in Rwanda, Bosnia, and elsewhere. Covers basic legal framework of human rights law, examines specific situations on a case by case basis, and discusses what options the international community, the nations themselves, and individuals have in the wake of such catastrophes. Enrollment restricted to legal studies majors during priority period. *The Staff*

142. Anthropology of Law. W

An ethnographically informed consideration of law, dispute management, and social control in a range of societies including the contemporary U.S. Topics include conflict management processes, theories of justice, legal discourse, and relations among local, national, and transnational legal systems. (Also offered as Anthropology 142. Students cannot receive credit for both courses.) Enrollment restricted to anthropology and legal studies majors. *D. Brenneis*

144. Social and Political Philosophy. *

A study of selected classical and contemporary writings dealing with topics such as the nature and legitimacy of

the liberal state, the limits of political obligation, and theories of distributive justice and rights. (Also offered as Philosophy 144. Students cannot receive credit for both courses.) Prerequisite(s): one course in philosophy. Offered in alternate academic years. *D. Guevara*

146. Philosophy of Law. W

Exploration of selected problems in jurisprudence: "legal reasoning" and social policy, rules and individual cases, the mental element in the law, punishment and responsibility, causation and fault, liberty and paternalism, etc. (Also offered as Philosophy 146. Students cannot receive credit for both courses.) *J. Neu*

147A. Psychology and Law. W

Current and future relationships between law and psychology, paying special attention to gaps between legal fictions and psychological realities in the legal system. Topics include an introduction to social science and law, the nature of legal and criminal responsibility, the relationship between the social and legal concepts of discrimination, and the nature of legal punishment. (Also offered as Psychology 147A. Students cannot receive credit for both courses.) Psychology 3 and 40 are recommended prior to taking this course. Enrollment restricted to psychology, pre-psychology, and legal studies majors. *C. Haney*

147B. Psychology and Law. S

Continuing discussion of current and future relationships between law and psychology and to contrasting psychological realities with legal fictions. Special attention is given to the criminal justice system including the psychology of policing and interrogation, plea bargaining, jury selection and decision making, eyewitness identification, and the psychology of imprisonment. (Also offered as Psychology 147B. Students cannot receive credit for both courses.) Prerequisite(s): course 147A. *C. Haney*

149. Environmental Law and Policy. *

Surveys a wide range of topics in environmental law, including population control, state and federal jurisdiction, land and resources control, public land management, pollution control, and private rights and remedies. Students read a large number of judicial cases and other legal documents. (Also offered as Environmental Studies 149. Students cannot receive credit for both courses.) Enrollment restricted to junior and senior legal studies majors. Enrollment limited to 60. *D. Kelso*

150. Children and the Law. *

Explores the legal rights of children. Topics may include juvenile justice, gang offenses, free speech and Internet censorship, religious rights, child custody and support, adoption, foster care, abuse and sexual harassment, special needs, public benefits, and medical care. Enrollment restricted to legal studies majors during priority period. *The Staff*

152. Courts and Litigation. *

A study of the role of courts in society and the uses of litigation to address and deflect social problems. Focus is on recent developments in American litigation, but comparative materials may be considered. Enrollment restricted to legal studies majors during priority period. *The Staff*

154. The Legal Profession. *

Lawyers stand between the legal system and those who are affected by it. Examines this relationship descriptively and normatively, and from the point of view of sociological theory. Concentrates on the U.S. profession, with some comparative material. Enrollment restricted to legal studies majors during priority period. *The Staff*

156. Administrative Jurisprudence. *

The rise of the regulatory state brings with it a host of questions regarding the exercise of state power and separation of powers. Takes up some of these questions; in particular, questions about administrative agencies and their relationship to the judiciary, the legislature and private individuals and groups. Enrollment restricted to legal studies majors during priority period. *The Staff*

157. Political Jurisprudence. F

Explores some themes in legal and political theory, especially on the relationship of theories of justice, law, and ethics. Enrollment restricted to legal studies majors during priority period. *The Staff*

159. Property and the Law. W

Beginning with an examination of the concept of property, the class covers how different cultures characterize property and determine "ownership" and the laws and policies that define property in modern society. Topics include theories of property law, common property, property and natural resources, zoning, regulatory takings, and property on the Internet. Enrollment restricted to legal studies majors during priority period. *R. Langridge*

160A. Industrial Organization. S

The structure and conduct of American industry with strong emphasis on the role of government, regulation, anti-trust, etc. The evolution of present-day industrial structure. The problems of overall concentration of industry and of monopoly power of firms. Pricing, output decisions, profits, and waste. Approaches include case study, theory, and statistics. (Also offered as Economics 160A. Students cannot receive credit for both courses.) Prerequisite(s): Economics 100A or 100M. *The Staff*

162. Legal Environment of Business. F

A study of law and the legal process, emphasizing the nature and function of law within the U.S. federal system. Attention is given to the legal problems pertaining to contracts and related topics, business association, and the impact of law on business enterprise. (Also offered as Economics 162. Students cannot receive credit for both courses.) Prerequisite(s): Economics 100A. *R. Bosso*

169. Economic Analysis of the Law. S

The application of the theories and methods of neoclassical economics to the central institutions of the legal system, including the common law doctrines of negligence, contract, and property; bankruptcy and corporate law; and civil, criminal, and administrative procedure. (Also offered as Economics 169. Students cannot receive credit for both courses.) Prerequisite(s): Economics 100A or 100M or permission of instructor. *D. Wittman*

171. Law of War. *

Examines legal regulation of international violent conflict. Students examine development of normative standards within international law and creation of institutions to both adjudicate violations and regulate conduct. (Also offered as Politics 171. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment only. *The Staff*

173. International Law. W

Origins and development of international law: international law is examined both as a reflection of the present world order and as a basis for transformation. Topics include jurisdiction and sovereignty, treaties, use of force, commercial law, and human rights. (Also offered as Politics 173. Students cannot receive credit for both courses.) Enrollment restricted to legal studies majors during priority enrollment period. *The Staff*

180. Power, Politics, and Protest. *

Examines the many ways in which organized groups engage in political protest against those whom they understand to dominate them. Course first establishes the framework for the discussion of power, politics, and protest and then examines a variety of forms taken by political protest worldwide. *T. Pandey*

183. Women in the Economy. W

Study of gender roles in economic life, past and present. Topics include occupational structure, human capital acquisition, income distribution, poverty, and wage differentials. The role of government in addressing economic gender differentials is examined. (Also offered as Economics 183. Students cannot receive credit for both courses.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; Economics 1, 2, and 100A; Economics 113 strongly recommended. (General Education Code(s): W.) *L. Kletzer*

193. Field Study. F,W,S

Field research performed off-campus, under the supervision of a member of the legal studies faculty. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195A. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. When taken as a multiple-term course extending over two or three quarters, the grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. When taken as a multiple-term course extending over two or three quarters, the grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students submit petition to sponsoring agency. *The Staff*

195C. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. When taken as a multiple-term course extending over two or three quarters, the grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students submit petition to sponsoring agency. *The Staff*

196. Senior Capstone. W,S

Examines related legal topics from an interdisciplinary perspective. Each focuses broadly on the relationship between law as a distinct system and law as an attempt to achieve justice, which requires that law remain open to claims of political morality generally. To what extent are legal norms internal to a separate system called "law" and to what extent are claims of political right in general relevant to question of what law is? Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior legal studies majors. (General Education Code(s): W.) *The Staff*

198. Independent Field Study. F,W,S

Individual studies undertaken off-campus for which faculty supervision is not in person, but by correspondence. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Individual studies undertaken off-campus for which faculty supervision is not in person, but by correspondence. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

A student normally approaches a faculty member and proposes a course 199 on a subject he or she has chosen. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

A student normally approaches a faculty member and proposes a course 199 on a subject he or she has chosen. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Linguistics

243 and 241 Stevenson College
(831) 459-2905
(831) 459-4988
<http://ling.ucsc.edu>

*Faculty and Professional Interests***Professor**

JUDITH AISSEN
Syntax, morphology, Optimality Theory, Mayan languages

SANDRA CHUNG
Syntax, semantics, Austronesian languages

DONKA FARKAS
Semantics, morphology, syntax, Romance languages, Hungarian

JORGE HANKAMER
Syntax, morphology, computational linguistics, Turkish

JUNKO ITO
Phonology, morphology, Germanic languages, Japanese

WILLIAM A. LADUSAW
Semantics, syntax, pragmatics

JAMES MCCLOSKEY
Syntax, semantics, sociolinguistics, Irish

ARMIN MESTER
Phonology, prosodic morphology, Japanese, Latin

JAYE PADGETT
Phonology, phonetics, Russian, Slavic

GEOFFREY K. PULLUM, Emeritus

WILLIAM F. SHIPLEY, Emeritus

Assistant Professor

PRANAV ANAND
Semantics, pragmatics, syntax

ADRIAN BRASOVEANU
Semantics, pragmatics, Optimality theory, Romance and Balkan languages, philosophical logic

MATTHEW WAGERS
Psycholinguistics, language comprehension, memory

Program Description

Linguistics is an exact and structured discipline. As the study of human language, it has connections to many other fields in the humanities (philosophy, literature),

the social sciences (anthropology, psychology, sociology), the natural sciences (biology, neuroscience, acoustics), computer science, computer engineering, and artificial intelligence.

The central areas of linguistics proper investigate the knowledge that speakers of a language acquire about its structure. Syntax is concerned with the rules that combine words into larger units of phrases and sentences. Semantics studies the meanings of linguistic units and how they are combined to form the meanings of sentences. Phonetics deals with the physical properties of language sounds. Phonology investigates the ways in which these speech sounds pattern in the sound systems of particular languages. Morphology studies the way in which words are put together out of prefixes, roots, and suffixes. Pragmatics is the study of language use.

All faculty in the Linguistics Department have primary research and teaching interests in one or more of these areas. Other perspectives on language study represented include sociolinguistics, psycholinguistics, the study of poetic language, and the study of language change.

The programs offered by the Linguistics Department are designed to acquaint students with the central aspects of linguistic structure and the methodologies and perspectives of the field. The department offers two undergraduate majors, Linguistics and Language Studies, and a graduate program in theoretical linguistics. The linguistics major leads to a B.A. degree in linguistics; the language studies major leads to a B.A. degree in language studies (see Language Studies, page 318). The graduate program leads to the M.A. and Ph.D. degrees in linguistics.

Requirements for the Linguistics Major

All students are required to complete the following 12 courses in linguistics and related disciplines.

Seven foundation courses in linguistics:

- 50, *Introduction to Linguistics: Sounds and Words*
- 52, *Syntax I*
- 53, *Semantics I*
- 101, *Phonology I*
- 102, *Phonology II*
- 113, *Syntax II*
- 116, *Semantics II*

Five upper-division elective courses in linguistics.

Students may petition the department to have elective courses offered through other institutions or other UC programs applied toward the major requirements. At most three such courses can be applied toward the major. Such courses must be upper-division and clearly fit into a coherent program of study in linguistics

Foreign language/mathematics competency requirement: Linguistics majors are required to demonstrate either foreign language or mathematics competency as follows:

- Foreign language competency: students must successfully complete six quarters of language study at UCSC (three quarters for Latin or Greek) or demonstrate an equivalent level of competence through a recognized language test or evidence of credit from another institution.
- Mathematics competency: Alternatively, students with a strong formal background can choose to satisfy the mathematics competency requirement by demonstrating sufficient preparation in mathematics for advanced formal work in linguistics. This requirement is satisfied by passing two courses chosen from the following list: Mathematics 11A,

19A, or 21; Computer Science 12A; Computer Engineering 16; Economics 11A; or any course which has one of these courses as a prerequisite.

Senior exit requirement: In their senior year, linguistics majors must satisfy the senior exit requirement in one of two ways:

Option 1: Successful completion of a capstone course. Students may designate an appropriate upper-division Linguistics course as their capstone course.

- In addition to fulfilling the normal requirements for the designated course, such students concurrently enroll in the Linguistics, 190 *Senior Research Series* (two credits, enrollment limited to 12) with the same instructor, and produce a research paper, or other significant project.
- Prior to enrolling in 190, students must have senior standing, completed Linguistics 52, *Syntax I*, and Linguistics 101, *Phonology I*.

Option 2: Successful completion of a senior thesis supervised by a linguistics faculty member.

- The proposal for a senior thesis must be submitted for departmental approval at least three quarters prior to the quarter of graduation.
- Students enroll in Linguistics 195, *Senior Thesis* or Linguistics 194, *Senior Project* with the same faculty adviser.

Concentrations within the Major

The major provides a strong background in the central subdisciplines of linguistics. Students who wish to pursue linguistic theory further are encouraged to take other upper-division linguistics courses and seek permission to enroll in the graduate sequences in phonology, syntax, or semantics.

Students may wish to take elective courses in other subdisciplines of linguistics.

Psycholinguistics focuses on the psychological mechanisms of language. Computational linguistics focuses on computational approaches to linguistic analysis and the linguistic analysis of computer languages. Applied linguistics focuses on bilingualism, second-language acquisition, and translation.

Students who wish to pursue these subdisciplines should consult the Department of Linguistics for lists of elective courses in these areas. Students may also focus on the grammar of one or more languages by taking structure courses in linguistics (180 series) and related courses in other disciplines. Linguistics majors with a language focus are also encouraged to consider academic study at foreign universities through the UCSC Education Abroad Program. Students preparing for careers in teaching should contact the Education Department office, 217 Social Sciences 1, (831) 459-2589, for information on the requirements for a California teaching credential.

Requirements for the Minor

To graduate with a minor in linguistics, students must complete eight linguistics courses.

- 50, *Introduction to Linguistics: Sounds and Words*
- 52, *Syntax I*
- 53, *Semantics I*
- 101, *Phonology I*
- Four upper-division electives in linguistics

There is no senior exit requirement and no foreign language/mathematics competency requirement for the minor.

Courses

Courses numbered 80 are lower-division topical courses. They treat the phenomenon of language from a variety of perspectives:

- 80B, *Modern English Grammar*. A modern non-prescriptive approach to English grammar.
- 80C, *Language, Society, and Culture*. An exploration of ways in which language structure and use reflect societal distinctions and cultural practice.
- 80D, *Language and Mind*. A critical examination of the view of human language underpinning the research program initiated by Noam Chomsky and of its implications for theories of the human mind and brain.
- 80V, *Structure of the English Vocabulary*. A systematic study of the elements of English words: their historical origins and their sound, meaning, spelling, and function.

These courses have no prerequisites. They are intended to serve as general education courses, and introduce the concepts of linguistics through their relation to other areas of general interest.

Courses 50, *Introduction to Linguistics: Sounds and Words*; 52, *Syntax I*; 55, *Syntactic Structures*; and 53, *Semantics I* are "disciplinary introductions." These courses have no linguistics prerequisites and serve as entry courses to the specialized upper-division sequences. Upper-division courses generally have at least one of these courses as a prerequisite.

Courses 101, *Phonology I*; 102, *Phonology II*; 113, *Syntax II*; and 116, *Semantics II* are the core upper-level courses in linguistic structure and are offered each year. The two phonology courses (101 and 102) provide an introduction to the study of the sound systems of languages. These courses use a problem-solving approach to developing understanding of phonological theory and phonological regularities in various languages. The intermediate syntax course (113), which has course 52, *Syntax I*, and course 57, *Semantics I* as prerequisites, continues the development of syntactic theory begun in course 52, extending the range to more complex constructions and rules and introducing alternative theoretical approaches. The semantics course (116), which has as prerequisites course 53, *Semantics I*, and either course 52, *Syntax I*, or course 55, *Syntactic Structures*, addresses advanced problems in the analysis of meaning.

Several upper-division elective courses are offered each year. For a list of these courses, contact the Linguistics Department.

To enroll in the graduate (200-level) courses, undergraduates need special permission from the instructor. Permission is usually granted only to especially motivated undergraduates who have completed all the core course requirements for the major with excellent performance.

Disqualification Policy

The Linguistics Department has adopted a major disqualification policy for linguistics and language studies majors that is intended to encourage students to take seriously their performance in the introductory courses and to make a strong effort to pass those courses. Students who receive more than one No Pass, D, W, and/or F in the following introductory courses will not be permitted to major in linguistics or language studies:

- Linguistics 50, *Introduction to Linguistics Sounds and Words*
- Linguistics 52, *Syntax I*
- Linguistics 53, *Semantics I*
- Linguistics 55, *Syntactic Structures*
- Linguistics 101, *Phonology I*

Students who fail one of these courses will be sent a letter reminding them of this policy and warning them that they are at risk of disqualification should they fail to pass a subsequent introductory course.

Students may appeal their disqualification by writing a formal letter to the department chair. This letter should explain any extenuating circumstances that influenced their poor performance in the introductory courses. For example, if some event led to poor performance in multiple courses in a single quarter, a student has a potential case for appeal. In contrast, academic dishonesty or poor performance spanning multiple quarters will be considered evidence that a student is ill suited for the majors.

The letter of appeal must be submitted to the Linguistics Department office (Stevenson 243) no later than 15 days from the date the disqualification notice was mailed, or the 10th day of classes in the quarter of their disqualification, whichever is later. Department will subsequently notify the student and the student's college of the appeal decision no later than 15 days after the submission of the appeal.

Preparation for the UCSC Master's Degree

Each year a number of UCSC students who have B.A. degrees in linguistics or language studies are admitted into the graduate program to pursue the M.A. in theoretical linguistics. Interested students should discuss the possibility with one or more faculty members and formally apply online to the graduate program during the fall quarter of the senior year. For up-to-date information about the application process, consult our web site (<http://ling.ucsc.edu>); and see the Linguistics Department manager.

Graduate Program

The graduate program in linguistics at UCSC is a small, focused five-year program in linguistic theory leading to the degree of doctor of philosophy. The research interests of faculty and students draw on the framework of generative grammar, with a primary focus on theoretical syntax, semantics, and phonology; research and course strengths also include the structure of various languages, phonetics, morphology (theoretical and computational), mathematical foundations, and the philosophy of linguistics. The department admits approximately five new students to the doctoral program each year; more enter to receive a master's degree associated with the doctoral program. The master's degree can be completed in one or two years, depending on the student's previous background in linguistics.

While committed to training in theoretical depth, the program makes possible an unusual breadth of theoretical understanding. Research in syntax focuses on ways in which generative theory and language-particular analysis inform one another. Faculty expertise covers a range of current theories: principles and parameters theory, minimalism, phrase structure grammar, and optimality theoretic syntax. Work in phonology is pursued in various current frameworks, including optimality theory and dispersion theory. It ranges from prosodic theory and prosodic morphology to issues in

segmental phonology, feature theory, and the phonetics-phonology relationship. Research in semantics applies formal, model-theoretic techniques to illuminate the interface between syntactic structure and interpretation and the role of semantic competence in the pragmatics of utterance interpretation.

The faculty have language expertise in a variety of languages, including Chamorro, German, Hungarian, Irish, Japanese, Latin, Rumanian, Russian, Spanish, Turkish, and Tzotzil.

From the beginning of their studies, students are engaged in original research and critical evaluation, since the aim of the program is to provide sophisticated training as a foundation for a career in academic research and teaching. The program begins with a sequence of foundation and core courses in linguistic theory. Subsequent course work emphasizes theoretical depth; it is increasingly centered around the doctoral student's own research, culminating in the presentation of a dissertation on some aspect of linguistic theory and analysis.

Undergraduate Preparation

Applications are invited from students who have completed an undergraduate linguistics major or who have demonstrated excellence in some related discipline (psychology, mathematics, computer science, anthropology) and have the equivalent of a minor in linguistics. A student applying for admission to this program should, in any case, have a good foundation in at least one of the central fields of linguistic structure: phonology, morphology, syntax, or semantics. Students entering the program with a deficiency in one or more areas will make up the deficiency by taking appropriate undergraduate courses at UCSC during the first year of graduate study.

Requirements for the M.A.

Courses. A minimum of 45 credits of graduate-level work. This must include the core courses in phonology, syntax, and semantics. Electives are chosen from upper-division or graduate courses offered by linguistics and related disciplines, in addition to independent study with linguistics faculty.

Languages. Reading competence in one foreign language, to be demonstrated by examination.

Research paper. Submission of a research paper in a core area of theoretical linguistics and approval of a committee of two faculty.

Requirements for the Ph.D.

Courses. A minimum of 60 credits of graduate-level work. This includes foundation sequences in phonology, syntax, and semantics.

Languages. Reading competence in one foreign language, to be demonstrated by examination.

Qualifying papers and examination. By the end of the third year, two research papers, one in phonology/morphology and one in syntax/semantics, are to be presented as part of the requirements for admission to candidacy. At this time, the prospective candidate is examined by the faculty on topics related to the student's major area of research, as part of the Qualifying Exam. The student is expected to defend a dissertation prospectus by the end of the fourth year.

Dissertation. The final requirement for the Ph.D. degree is the presentation of a dissertation representing a significant contribution in some central area of linguistic research.

Application and Admission

To apply, please consult the Department of Linguistics web site (<http://ling.ucsc.edu>).

Lower-Division Courses

50. Introduction to Linguistics: Sounds and Words. W

An introduction to the major areas, problems, and techniques of modern linguistics. (General Education Code(s): IH.) *A. Mester*

52. Syntax I. F,W

An introduction to syntactic investigation, developed through the study of central aspects of English syntax. A major purpose is to introduce students to the study of language as an empirical science. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): IH.) *S. Chung, J. Aissen*

53. Semantics I. F,W

Introduction to the logical foundations of natural language semantics. Logical and semantic relations, simple set theory, logical representations (propositional and predicate calculi, modal and tense logics) and their interpretations. A basic literacy course in the language of logical representation. (General Education Code(s): IH.) *P. Anand, D. Farkas*

55. Syntactic Structures. S

Provides a basic introduction to the methods and results of generative grammar. It simultaneously provides an overview of the major syntactic constructions of English. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): IH.) *J. Hankamer*

80B. Modern English Grammar. *

Elementary introduction to modern standard English grammar, both formal and informal, both written and spoken. Stresses the importance of linguistic evidence in understanding grammatical correctness; offers a demystification and critique of older traditional grammar in the light of recent research. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

80C. Language, Society, and Culture. W

The study of language from a sociological perspective. Multilingualism, language change and variation, pidgins and creoles, the origin and diversification of dialects. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *J. McCloskey*

80D. Language and Mind: Chomsky's Program. *

A critical overview of the research program initiated by Noam Chomsky and its implications for theories of the human mind and brain. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *J. McCloskey*

80G. Introduction to Unix. *

Introduction to computing, the Internet, and the World Wide Web through the language of the Unix operating system. Oriented to the beginner, the course presupposes no previous acquaintance with any particular sort of computer. It covers the basic concepts of text editing and formatting, writing Web pages in basic HTML, and promotes a rigorous understanding of Unix commands and shell scripts. Views communication with a computer as a matter of learning a few simple though powerful languages. (Also offered as Computer Science 80G. Students cannot receive credit for both courses.) (General Education Code(s): T2-Natural Sciences.) *A. Van Gelder*

80V. Structure of the English Vocabulary. *

A systematic study of the elements of English words: besides the practical goal of vocabulary consolidation and expansion, explores the historical origin and development of word elements, as well as their sound, meaning, and function in the contemporary language. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

101. Phonology I. F,S

Introduction to how sounds pattern in grammars—why they vary, how they combine, etc. Emphasis is on developing theories to explain the patterns. Topics include distinctive feature theory, phonemic analysis, autosegmental phonology, and principles of syllabification and stress. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 50. (General Education Code(s): W.) *A. Mester, J. Ito*

102. Phonology II. W

Advanced phonological theory. Topics include markedness; underspecification theories; advanced topics in feature geometry, syllable theory, and stress theory; and optimality theory. Readings include published articles. Emphasis on theory construction and argumentation based on data. Prerequisite(s): course 101. *J. Ito*

105. Morphology. F

Study of the principles of word formation: derivation, inflection, and compounding; cross-linguistic study of morphological processes, morphological investigation and analysis. Prerequisite(s): course 52 or 55, and course 101. Offered in alternate academic years. *J. Hankamer*

108. Poetry and Language. *

An introduction to the linguistic aspects of poetry, e.g., rhyme, meter, and larger-scale organization of poetic form. The emphasis is on English poetry, complemented by brief sketches of other poetic traditions. Students taking this course should have some basic knowledge of language structure (e.g., as provided by course 50). Offered in alternate academic years. *S. Chung*

113. Syntax II. S

Further aspects of English syntax; universal and language-particular constraints on syntactic structures and rules. Further developments and extensions of generative theory. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 52 and 53. (General Education Code(s): W.) *J. McCloskey*

114. Syntax III. *

Advanced topics in syntax and semantics. Prerequisite(s): course 113 and satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *J. Hankamer*

116. Semantics II. S

Major issues in natural language semantics: nature of lexical entries, thematic relations, propositional representation or "logical form"; relation between semantic interpretation and syntactic representations, quantification and scope relations, reference and presupposition, coreference and anaphoric relations. Prerequisite(s): course 53, and either course 52 or 55. *The Staff*

117. Pragmatics. S

Covers topics central in the study of pragmatics, the interpretation of language use. Topics include conversational

implicature, speech acts and discourse understanding, and social deixis. Prerequisite(s): course 53. Offered in alternate academic years. *D. Farkas*

118. Semantics III. W

Uses the tools learned in courses 53 and 116 (*Semantics I* and *Semantics II*), giving students the opportunity to explore important topics with heavy emphasis placed on reading primary-source literature. Readings form the basis for weekly lectures and the discussion section. Prerequisite(s): course 116. Enrollment limited to 25. *P. Anand*

120. Structure of English. *

Survey of grammatical structure of English and terminology of grammatical description. Covers phonological, morphological, and syntactic structure of English and contrasts it with other languages. Prerequisite(s): course 52 or 55, and 101. *The Staff*

124. Language Typology. F

Introduces the branch of linguistics whose goal is to describe and explain the structural diversity of the world's languages. Focuses on what is known about variation in particular domains (e.g., syllable structure, word order, evidentiality), and how it might be explained. Prerequisite(s): course 52 or 55, and course 101. Enrollment limited to 40. *J. Aissen*

125. Foundations of Linguistic Theory. F

Survey of some of the history and foundational assumptions of generative grammar; also looks at some of the influence of generative linguistic theorizing on disciplines outside linguistics, notably psychology and philosophy. Prerequisite(s): course 113 or 116. Enrollment limited to 25. *P. Anand*

140. Language Change. S

Methods and problems in the study of change in linguistic systems. Reconstruction of proto-languages; the comparative method. Theories of change and implications for the theory of grammar. Prerequisite(s): course 102. Enrollment limited to 25. *The Staff*

151. Phonetic Analysis. W

Introduction to instrumental phonetic analysis—analysis using experimental methods. Emphasis is on the acoustics and perception of speech. Prerequisite(s): course 101. *The Staff*

152. Applied Phonetics. S

Examines areas in which phonetic analysis and experimentation are used in practice. Emphasizes problem-solving, experiments, and analytical tasks. Prerequisite(s): course 151. Enrollment limited to 25. *The Staff*

154. Language and Social Identity. W

Introduction to sociolinguistics exploring the relationship between language and such social parameters as social status, ethnicity, race, gender, etc., including the role of language differences in the creation of social stereotypes. Emphasis on gathering, examining, and reporting data. Prerequisite(s): course 50. Enrollment restricted to senior language studies majors. Enrollment limited to 25. *J. McCloskey*

160. Language Engineering. *

Addresses a particular problem in language engineering, chosen for its practical and theoretical interest and its tractability. The entire course focuses on a team project to design a solution to the problem. Permission of instructor required. *B. Hockey*

181. Structure of Romance Languages. *

Examines the phonological and syntactic structures of Romance languages. Some knowledge of Italian, French, or Spanish is required. Prerequisite(s): course 55 or 52, and 101. *The Staff*

182. Structure of Spanish. *

The phonology and syntax of Spanish, studied from a modern linguistic perspective. Some knowledge of Spanish is required. Prerequisite(s): course 55 or 52, and 101. *The Staff*

183. Structure of French. F

The phonology, morphology, and syntax aspects of French. Some knowledge of French is helpful. Prerequisite(s): course 55 or 52, and 101. *D. Farkas*

185. Structure of Russian. S

The phonology, morphology, and syntax of Russian. Some knowledge of Russian is helpful. Prerequisite(s): course 52 or 55, and course 101. Enrollment limited to 30. Offered in alternate academic years. *J. Padgett*

186. Structure of German. *

Phonological, morphological, and syntactic aspects of the structure of the German language. Some knowledge of German is required. Prerequisite(s): course 55 or 52, and 101. *The Staff*

187. Structure of Japanese. F

The phonology, morphology, and syntax of Japanese. Some knowledge of Japanese is required. Prerequisite(s): course 55 or 52, and 101. Offered in alternate academic years. *J. Ito*

190. Senior Research (2 credits). F,W,S

Students produce a research paper or other significant project to satisfy the capstone requirement. Prerequisite(s): course 101, and either course 52 or 55. Concurrent enrollment in a specified upper division course is required. Enrollment restricted to senior linguistics and language studies majors. *The Staff*

193. Field Study. F,W,S

Students submit petition to sponsoring agency. *The Staff*

195. Senior Thesis. F,W,S

Deadline for submission of thesis proposal is one year in advance of proposed completion. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

197. Squib Writing. *

Students write one squib (one to ten pages) per week except for weeks three and seven, when they write two squibs. A selection of the squibs is presented in class; one or two will be rewritten. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior linguistics and language studies majors with an advanced understanding of linguistics. Enrollment limited to 15. (General Education Code(s): W.) *J. Hankamer*

198. Independent Field Study. F,W,S

Provides for department-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision by correspondence). Preparation and approval must be completed by the fifth day of instruction of any given quarter. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

211. Phonology A. F

First part of a three quarter introduction to phonology. Topics of the sequence include fundamentals of acoustic phonetics; introduction to optimality theory; theories of syllabification, stress, and prosodic organization; prosodic morphology; advanced issues in faithfulness and correspondence; segmental and suprasegmental processes. Enrollment restricted to graduate standing or consent of instructor. *A. Mester*

212. Phonology B. W

Second part of a three quarter introduction to phonology. Topics of the sequence include fundamentals of acoustic phonetics; introduction to optimality theory; theories of syllabification, stress, and prosodic organization; prosodic morphology; advanced issues in faithfulness and correspondence; segmental and suprasegmental processes. Prerequisite(s): course 211. Enrollment restricted to graduate standing or consent of instructor. *J. Padgett*

213. Phonology C. S

Third part of a three quarter introduction to phonology. Topics of the sequence include fundamentals of acoustic phonetics; introduction to optimality theory; theories of syllabification, stress, and prosodic organization; prosodic morphology; advanced issues in faithfulness and correspondence; segmental and suprasegmental processes. Prerequisite(s): course 212. Enrollment restricted to graduate standing or consent of instructor. May be repeated for credit. *J. Ito*

216. Phonology Proseminar. *

One or more topics in phonological theory. Topics vary from year to year, covering literature and current research in phonology. Prerequisite(s): course 212. Enrollment restricted to graduate standing or consent of instructor. May be repeated for credit. *J. Padgett, J. Ito, A. Mester*

219. Phonology Seminar. F

Advanced topics in phonology drawn from the current research interests of the instructor. Prerequisite(s): course 212. Enrollment restricted to graduate standing or consent of instructor. May be repeated for credit. *J. Padgett*

221. Syntax A. F

Introduction to syntactic theory. Phrase structure; sub-categorization; lexical entries; passive; infinitival constructions. Enrollment restricted to graduate standing or consent of instructor. *J. Hankamer*

222. Syntax B. W

Continuation of *Syntax A*. The syntax of unbounded dependencies, including constituent questions, relative clauses, clefts, topicalization. Constraints on extraction; unbounded versus successive cyclic movement; the licensing of gaps. Prerequisite(s): course 221. Enrollment restricted to graduate standing or consent of instructor. *J. Hankamer*

223. Syntax C. S

Continuation of *Syntax B*. The syntax of anaphora. Topics vary from year to year, and may include the following: coreference in antecedent-pronoun relations; reflexives and reciprocals; disjoint reference; bound-variable anaphora; ellipsis; semantic and pragmatic constraints on anaphora. Prerequisite(s): course 222. Enrollment restricted to graduate standing or consent of instructor. *J. McCloskey*

226. Proseminar in Syntax. *

In-depth investigation of some topic in syntactic theory. Topics vary from year to year, covering literature and current research in grammatical structure from varying theoretical perspectives. Prerequisite(s): course 222. *J. Aissen*

229. Syntax Seminar. S

Advanced topics in syntax drawn from the current research interests of the instructor. Prerequisite(s): course 222. Enrollment restricted to graduate standing or consent of instructor. May be repeated for credit. *J. Aissen*

231. Semantics A. F

Introduction to linguistic semantics: nature of lexical entries, thematic relations, representation of logical form; relation between semantic interpretation and syntactic representation, quantification and scope relations, reference and presupposition. Enrollment restricted to graduate standing or consent of instructor. *D. Farkas*

232. Semantics B. W

Model-theoretic semantics for natural language. Truth-conditional, compositional semantics. Various logical ontologies and their application to natural language categories. Dynamic interpretation of discourse and anaphoric relations. Treatment of illocutionary force. Prerequisite(s): course 231. Enrollment restricted to graduate standing or consent of instructor. *The Staff*

233. Semantics C. *

Third and final course in the graduate introduction to semantics, focusing on questions at the border between semantics and pragmatics. Concerns include: modality, conditionals, non-declarative meaning, and context and context structure viewed from a dynamic perspective. Prerequisite(s): course 232. Enrollment restricted to graduate students. *The Staff*

236. Proseminar in Semantics. *

In-depth investigation of some topic in semantics and pragmatics. Topics vary from year to year, covering literature and current research in linguistic semantics and pragmatics. Prerequisite(s): course 231. Enrollment restricted to graduate standing or consent of instructor. *The Staff*

239. Semantics Seminar. F

Advanced topics in semantics drawn from the current research interests of the instructor. Prerequisite(s): course 232. Enrollment restricted to graduate standing or consent of instructor. May be repeated for credit. *The Staff*

240. The Pedagogy of Linguistics (1 credit).

F,W,S

Provides training for graduate students in university-level pedagogy in general and in the pedagogy of linguistics specifically. Under the supervision of a faculty member, coordinated by a graduate student with substantial experience as a teaching assistant. May be repeated for credit. *The Staff*

265. Mathematical Foundations of Linguistics. *

A survey of the basic mathematical notions fundamental to the understanding of work in theoretical syntax, semantics, and phonology. Topics covered include basic set theory, formal logic, boolean algebra, graph theory, and formal language theory. Enrollment restricted to graduate standing or consent of instructor. *The Staff*

290. Research Seminar. W

A research seminar for undergraduate and graduate students to develop the skills of the profession. Critical reading, reviewing, teaching, presentation, and writing. Students submit petition to sponsoring agency. Enrollment restricted to graduate standing or consent of instructor. Enrollment limited to 10. *J. Aissen*

295. Directed Reading. F,W,S

Directed reading which does not involve a term paper. Enrollment restricted to graduate standing or consent of instructor. *The Staff*

296. Linguistics Colloquium (2 credits). F,W,S

Independent graduate-level activities and assignments relating to development of familiarity with professional activities in academic linguistics: organizing and attending colloquia and conferences, both on- and off-campus; participation in discussions at such events; and preparation of commentaries on academic papers and other papers. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *J. Aissen*

297. Independent Study. F,W,S

Enrollment restricted to graduate standing or consent of instructor. *The Staff*

299. Thesis Research. F,W,S

The Staff

Literature

303 Humanities 1

(831) 459-4778

<http://literature.ucsc.edu/>

Faculty and Professional Interests

Professor

JORGE ALADRO FONT

Spanish mysticism; theory and historical developments of imagery in the Middle Ages to the baroque period; Renaissance and baroque Hispanic literature; Italian ideas in the Spanish Renaissance; Cervantes

GEORGE T. AMIS, Emeritus

KAREN BASSI

Greek and Latin literatures; Greek dramagender; literary and cultural theory; pre- and early modern studies; historiography; visual and performance studies

MURRAY BAUMGARTEN

Dickens; Victorian literature and culture; the Bible; translation; modern Jewish writing; the Holocaust

HARRY BERGER, JR., Emeritus

GABRIEL BERNIS, Emeritus

MARGARET R. BROSE

Italian literature; 19th- and 20th-century poetry and poetics; the novel; Romanticism; medieval literature; gender studies; autobiography

JULIANNE BURTON-CARVAJAL

Twentieth- and 21st-century Latin(o) American visual media; particularly film; melodrama as a transnational form; gender and authorship; history; cultures; and representations of California; particularly the Central Coast

CHRISTOPHER CONNERY

World literature and cultural studies; globalism and geographical thought; the 1960s; Marxism; pre-modern and modern Chinese cultural studies; cultural revolution

NATHANIEL DEUTSCH

Hebrew Bible; rabbinic literature; Jewish mysticism; Hasidism; Eastern European Jewish life; ethnography

ROBERT M. DURLING, Emeritus

JOHN M. ELLIS, Emeritus

CARLA FRECCERO

Renaissance studies; French and Italian language and literature; early modern studies; postcolonial theories and literature; contemporary feminist theories and politics; queer theory; U.S. popular culture; posthumanism; animal studies

PASCALE GAITET

Nineteenth- and 20th-century French literature; sociolinguistics; political history; Celine; Genet

MARY-KAY GAMEL

Performance studies; ancient Mediterranean performance; Greek and Latin literatures; myth; reception of Greek and Roman texts and artifacts; film; feminist approaches to literature and performance

SUSAN GILLMAN

Nineteenth-century American literature and culture; theories of culture; race; and gender; world literature and cultural studies

WLAD GODZICH

Theory of literature; philosophy and literature; emergent literature; translation theory; globalization and culture; European integration; knowledge society; literatures of Africa; the Caribbean; Europe (Central; Eastern; and Western); Brazil; Canada; detective and crime fiction; science fiction; medicine and literature Theory of literature; emergent literature; globalization and culture; European integration

KIRSTEN SILVA GRUESZ

Transnational Americas studies; Chicano/Latino literatures and cultures; 19th-century U.S. and Latin American literature; poetry; history of the book; reading and literacy; bilingualism

JAMES B. HALL, Emeritus

JOHN O. JORDAN

Dickens; Victorian literature and culture; the English novel; literature of South Africa; narrative theory

SHARON KINOSHITA

Intercultural relations in 12th- and 13th-century literature; Mediterranean studies; globalism; postcolonial theory; world literature and cultural studies

NORMA KLAHN

Latin American literary and cultural studies (specialization: Mexico); Chicano/Latino literature and culture from a cross-border perspective; modernity/postmodernity; poetics and politics; genre theory (novel; poetry; autobiography); contemporary critical theories (i.e., border; ethnic; feminist; transnational/global)

H. M. LEICESTER JR.

Psychoanalysis; poststructuralism; gender theories; theory of cultural change; cultural studies and popular culture: opera; film; American country music

JOHN P. LYNCH, Emeritus

NATHANIEL E. MACKEY

Twentieth-century American literature; Afro-American literature; creative writing

TYRUS MILLER

Modernist; avant-garde; and postmodernist literature; the interrelations of the arts in the 20th century; aesthetics; cinema and film theory; the Frankfurt School; philosophy and social theory; contemporary poetry and language arts

HELENE MOGLEN, Emerita

MADELINE MOORE, Emerita

MARTA MORELLO-FROSCH, Emerita

DANIEL SELDEN

Afroasiatic languages and literatures; Greek and Latin; Hellenistic culture; the classical tradition; history of criticism; literary theory playwriting

PRISCILLA W. SHAW, Emerita

DEANNA SHEMEK

Italian literature and cultural history; Renaissance studies; early modern popular culture; narrative (early modern to contemporary); women's studies; literary theory

PAUL N. SKENAZY, Emeritus

GRETA SLOBIN, Emerita

S. PAGE STEGNER, Emeritus

RICHARD TERDIMAN

Nineteenth- and 20th-century French and European literature and culture; literary and cultural theory; contemporary critical theory; cultural globalization

THOMAS A. VOGLER, Emeritus

GEORGES VAN DEN ABEELE

Early modern French philosophy; literature; and culture; Francophone literature; travel narrative and tourism studies; relations between philosophy and literature; poststructuralist and postmodernist critical theory; film and film theory; East-West literary relations; West Coast regional history and literature

MICHAEL J. WARREN, Emeritus

ROB WILSON

Transnational and postcolonial literatures; especially as located in Asia/Pacific emergences as posited against American empire of globalization; cultural poetics of America; the sublime; Longinus to Hiroshima; mongrel poetics of experimental writing; especially poetry

KAREN TEI YAMASHITA

History and anthropology of Japanese immigration to Brazil; Asian American literature; modern fiction; playwriting

Associate Professor

LOUIS CHUDE-SOKEI

Modern and contemporary American literature; literatures of the African diaspora (Caribbean; African-American; and West African); Africana criticism and theory; media and popular culture; music and cultural politics; Modern and contemporary African American literature; Caribbean and West African literatures; post-colonial literature and theory; modernism; black diaspora; cultural studies; popular culture

VILASHINI COOPAN

Postcolonial studies; comparative and world literature; literatures of slavery and diaspora; globalization studies; cultural theory of race and ethnicity

JODY GREENE

Seventeenth- and 18th-century British and French literature and culture; pre- and early modern studies; early modern colonialisms; critical theory; gay and lesbian cultural studies; gender studies; history of authorship; history of the book; human property

MARGO HENDRICKS

Early modern English literature and culture; theories and discourses of race; gender; drama; and theory; women playwrights; pre- and early modern studies

LOURDES MARTÍNEZ-ECHAZÁBAL

Latin American and Caribbean literatures; Afro-Latin American literatures; cultures; and societies; found(n)ational narratives; Brazilian literature; literatures of Cuba and the Cuban diaspora; critical race theory

LOISA NYGAARD

Eighteenth- and early 19th-century German literature; romanticism; aesthetics and politics of landscape; military theory

MICAH PERKS

Reading and writing contemporary fiction; memoir; historical fiction; gender; literature; and culture; alternative communities

JUAN POBLETE

Latin(o) American literatures; transnational/global cultures (literature; radio; film); Latin(o) American cultural studies; 19th-century studies; the history of reading practices

Assistant Professor

A. HUNTER BIVENS

Twentieth- and 21st-century German literature and film; Marxism and critical theory; psychoanalysis; lyric poetry; literary realism; the novel

Lecturer

GEORGE P. HITCHCOCK, Emeritus

**Professor**

MICHAEL H. COWAN (American Studies)

American cultural theory and history; history of American studies; symbolic expression in American life; urban cultural studies; American literary studies; studies in the institutional culture of higher education

TERESA DE LAURETIS (History of Consciousness)

Semiotics; psychoanalysis; feminism; film theory; literary theory; queer studies

CHARLES W. HEDRICK JR. (History)

Greek and Roman history; epigraphy; historiography; political theory

AKASHA HULL, Emerita

GARY B. MILES, Emeritus

FORREST G. ROBINSON (American Studies)

Nineteenth- and 20th-century American literature; including Mark Twain; the American West; and popular culture; biography and American culture theory

DAVID SWANGER, Emeritus

Lecturer

ROSWELL SPAFFORD, Emerita

Program Description

The study of literature at UCSC is organized as an interdisciplinary field coordinated through a single Department of Literature, rather than through separate departments of English, modern languages, and classics. This structure fosters innovative and comparative approaches to literature among both faculty and students. Courses in the major encompass traditional literary history and interpretation as well as cross-cultural inquiry and current theoretical debates.

The literature major permits focused work in national literary traditions. Students may concentrate in English-language literatures; in French, German, or Italian; in Latin and/or Greek; or in Spanish/Latin American/Latino literatures. Alternatively, students may organize their studies by period. Students who choose pre- and early modern studies focus on early literary traditions from antiquity through the Middle Ages, the Renaissance, and the neo-classical period, while those engaged in modern literary studies concentrate on literature of the 18th, 19th, 20th, and 21st centuries. In

addition, the world literature and cultural studies concentration emphasizes non-Western literatures, literature in a global context, as well as non-literary forms of cultural production. Finally, the Literature Department also offers a concentration in creative writing in which, in addition to studying literature, students work with faculty in upper-division workshops to improve their own creative writing skills.

Literature majors at UCSC are trained in critical reading, writing, and thinking, as well as in literary interpretation. These skills have wide applicability: they may lead to careers in other media such as film, theater, video, the visual arts, and electronic media; and they offer avenues into related disciplines such as history, philosophy, psychology, sociology, anthropology, politics, and history of art and visual culture. Literature majors traditionally enter a wide variety of careers ranging from law and journalism to management, government, international studies, publishing, technical writing, and teaching at all levels.

The Literature Department faculty strongly recommends that all students study a second language. Proficiency in more than one language vastly enhances understanding of any literature and of language arts in general. Graduate programs in literature and other humanities disciplines generally require competence in another language besides English.

Letter Grade Requirement

Letter grades are required for 75 percent of courses applied toward the literature major, including the senior seminar, which must be taken for a letter grade.

Literature Major Options

Students wishing to major in literature may choose either the standard literature major or the intensive literature major. The intensive literature major is recommended particularly for students who plan to continue their studies in graduate school. The requirements for the intensive major include the study of literature in two languages; proficiency in a second language is therefore required.

The Standard Literature Major

Thirteen courses are required: three lower-division and ten upper-division courses. One of the latter can be a Senior Seminar, which can be used to satisfy the campus comprehensive (exit) requirement. In exceptional cases, and with faculty permission, students may write a senior thesis to satisfy the exit requirement.

Students must successfully complete Literature 1, *Literary Interpretation*, or its equivalent prior to declaring the literature major or minor.

Lower-Division Courses

Lower-division courses are introductions to critical reading and writing. Students should complete their lower-division course work before beginning upper-division work.

Three lower-division courses are required:

- Literature 1, *Literary Interpretation*: close reading and analysis of literary texts
- one Literature 61-series course: categories, methodologies, and problems of literary study
- one Literature 80-series course: topical, thematic, and comparative studies of literary texts

Upper-Division Courses

Upper-division courses provide more detailed treatment of literary and theoretical problems, themes, and peri-

ods. Students are strongly encouraged to take courses across chronological periods and national boundaries.

Ten upper-division courses are required:

- Literature 101, *Theory and Interpretation*: approaches to literary and cultural theories
- six upper-division courses in an area of concentration (described below)
- three upper-division electives in literature

Distribution requirements. Among the 10 upper-division courses, at least two must focus on literature written prior to the year 1750; one course must focus on non-Western literature or literature in a global perspective; and one course must focus on poetry. Some courses fulfill more than one of these distribution requirements. A list of annual course offerings indicating distribution codes for each course is available in the department office or on the Literature Department web page at <http://literature.ucsc.edu>.

With prior permission from a faculty adviser, one elective may be replaced by an upper-division course related to the student's area of concentration and chosen from another program in the humanities, arts, or social sciences.

The Intensive Literature Major

Fifteen courses are required: three lower-division and 12 upper-division courses. One of the upper-division courses may be a Senior Seminar, which can be used to satisfy the campus comprehensive (exit) requirement.

Lower-Division Courses

The same requirements apply as for the standard literature major. Students who choose the intensive literature major are required to achieve competence in a second-language literature. Upper-division literature course work may require completion of a lower-division language sequence or the equivalent.

Upper-Division Courses

The intensive major requires 12 upper-division courses. Distribution requirements for the intensive major are the same as those for the standard literature major. In addition, students must complete at least two courses in a second-language literature studied in the original language. As in the standard major, with prior permission from a faculty adviser, one elective may be replaced by an upper-division course related to the student's area of concentration and chosen from another program in the humanities, arts, or social sciences.

The Concentrations

The purpose of the upper-division area of concentration is to help students shape a coherent program of study. The department provides several defined concentrations, described below. For all concentrations except national/transnational literatures, texts may be read in the original or in translation.

National/Transnational Literatures

These concentrations examine literature within the frameworks of particular languages or national and regional traditions. National/transnational concentrations require that texts be read in the original language.

- English-language literatures
The study of American and British literature, as well as literatures of other English-speaking peoples around the world.
- French literature
The study of French and Francophone literatures, languages, and cultural practices of France, Africa, and the Caribbean.

- German literature
The study of the literature, language, and cultural practices of the German-speaking areas of central Europe including Germany, Austria, and Switzerland.
- Greek and Latin literatures
The study of the literature, languages, and cultural practices of ancient Greece and Rome. Students may choose to concentrate in Greek or Latin or both.
- Italian literature
The study of Italian literature, language, and cultural practices from the Middle Ages to the present.
- Spanish/Latin American/Latino literatures
The study of literatures, language, and cultural practices of Spain, Latin America, and Latino populations in the United States.

Creative Writing

The Department of Literature offers a sequence of workshops from introductory through advanced levels in both poetry and fiction. Other activities available to interested students include participation in the production of literary journals on campus, attendance at readings by visiting writers, and use of a creative writing reading room.

Admission to this concentration is selective. Interested students are required to take one lower-division workshop at UCSC before applying to the creative writing concentration.

Students accepted into the concentration must complete three advanced writing workshops and a senior project (e.g., a group of stories, a significant portion of a novel, a collection of poems). To apply for admission to the creative writing concentration, students should submit a completed application form (available at the Literature Department office) and a thoughtful selection from their work (8–10 pages of poetry or fiction). Once accepted into the concentration, students are required to declare (or redeclare) the major in literature. At that time, students should meet with their adviser to discuss plans for a senior project.

Pre- and Early Modern Studies

The interdisciplinary study of literatures and cultures from antiquity through the early eighteenth century, especially in Europe. This concentration includes the study of popular culture and everyday life as well as readings in masterpieces of classical, medieval, early modern (Renaissance), and neo-classical literature.

Modern Literary Studies

The study of literature of the eighteenth, nineteenth, twentieth, and twenty-first centuries. This concentration examines ways in which modernity in general and literary modernism and postmodernism in particular emerge and develop in different countries and cultures.

World Literature and Cultural Studies

The study of literature and cultural production both within a global context and within specific histories and economies. Courses move beyond the literary text to include nonverbal forms of representation such as social movements and everyday life practices.

Comprehensive Requirement

Seniors may select one of the following options to satisfy the campus exit requirement:

- *Senior seminar.* The senior seminar may be counted as one of the required upper-division courses. The senior seminar need not be in the student's area of concentration. Several senior seminars are offered

each quarter; extensive writing is required in all seminars.

- *Senior thesis.* A student who wishes to propose a senior thesis (30–40 pages) must apply to a Literature Department faculty sponsor at least two quarters before the projected date of graduation. The application must include a proposed subject, a brief outline, a bibliography, and a sample of previous written work. Only those students who have received written permission from a faculty supervisor may complete a thesis to satisfy the senior exit requirement. A student whose application has been approved may receive course credit toward the major for one independent study (course 195) in a literature concentration.

For students in the creative writing concentration, a creative writing project under the supervision of a faculty member (Literature/Creative Writing 194 or 195) is required. Students must successfully complete Literature 101 before taking any comprehensive requirement.

General Information

Creative writing courses. Any qualified student may take creative writing courses for credit toward graduation. Only students accepted into the creative writing concentration, however, may use Literature/Creative Writing 180, 183, 194, and 195 to satisfy major requirements.

Declaring the major. Students declare a major in literature by completing and submitting a Proposed Study Plan and Declaration of Major/Minor petition. All students considering a literature major should consult with staff and/or faculty advisers as early as possible and declare the major before the end of their sophomore year. Transfer students are urged to declare the major in the first quarter at UCSC. Students must complete Literature 1 or its equivalent prior to declaring the major.

Double major. A student studying literature as part of a double major must fulfill all of the requirements for any concentration in the literature major in addition to all of the requirements in another major field. No course may be counted toward both majors.

The literature minor. The minor in literature comprises eight courses:

- three lower-division required courses (including Literature 1 or its equivalent; see major requirements above);
- Literature 101, *Theory and Interpretation*;
- four other upper-division literature courses.

Transfer credit. A student may petition to receive credit toward the lower-division requirements of the major for up to three courses taken at other institutions. An introduction to literature course may be used to satisfy the Literature 1 course requirement. Any other two literature courses may be applied toward the Literature 61 series and the Literature 80 series course requirements. Transfer of Credit petition forms are available in the Literature Department office.

Credit for repeated courses. Courses that vary significantly in material or methodology from one presentation to the next may be repeated for credit and are so designated in the course description in the UCSC General Catalog.

Advising. Faculty advisers are available in the Literature Department office throughout the week during each academic term; students may make appointments in advance to meet with them. Staff advisers are also

available on a drop-in basis. Students are encouraged to consult with a faculty adviser once a quarter.

Senior checklist. Three quarters before anticipated graduation, all literature majors must complete a checklist in collaboration with a department adviser. The purpose of the checklist is to confirm progress toward graduation and the satisfaction of all major requirements. Completion and approval of a senior checklist are required for graduation.

Opportunities for study abroad. The University of California's Education Abroad Program (EAP) operates study centers in countries throughout the world, all associated with host institutions of high academic standing. EAP serves over 1500 upper-division students from the nine UC campuses every year. Students who participate in a UC Education Abroad Program study year may petition to apply up to three upper-division courses from EAP toward the literature major, or two upper-division courses toward the literature major. Petition forms are available in the department office.

Latin American and Latino Studies and Literature combined major. The departments of Latin American and Latino Studies and Literature offer a combined major. See Latin American and Latino Studies, page 319, for additional information.

The Graduate Programs

The Doctoral Program

The UCSC doctoral program offers an innovative multidisciplinary approach to literary studies under the auspices of the Department of Literature. While the program affords a coherent academic experience for all students, the final choice of programmatic emphasis and a trajectory of concerns is decided by each individual. Because the program is relatively small, students are able to work closely with faculty throughout their graduate careers and are encouraged to take advantage of the rich array of events, research clusters, and lectures offered on campus.

The doctoral program reflects wide-ranging faculty interests in American, Asia/Pacific, and New World studies; world literature and cultural studies; European literature from the classical to the early modern period (pre- and early modern studies); eighteenth-, nineteenth-, and twentieth-century literatures; gender and sexuality studies; post-colonial and emergent literatures; and textual studies. Students may elect to participate in cooperative programs between literature and feminist studies, Latin American and Latino studies, or American studies and receive a designated emphasis in the form of a parenthetical notation on their doctoral degree.

Among the areas that represent special strength in the department are contemporary American literature and poetics; Latin American/Latino literature; literatures of the Americas, a cross-border hemispheric perspective that envisions the Americas as an area of study; world literature and cultural studies, which treats literary, intellectual, and cultural production in globally historicized contexts; nineteenth-century studies; and pre- and early modern studies, where comparative and interdisciplinary work is encouraged and which includes classical literature and philosophy, medieval and Renaissance French, Italian, and English cultures and literatures (including visual culture), and Spanish Golden Age literature. Within all areas, faculty draw on cutting-edge critical practices such as feminism, race and gender studies, Marxism, postcolonial theory, psychoanalysis, queer theory, and cultural studies.

The program requires significant literary work in two languages. All students are required to complete a minimum of two courses, preferably three, in a second-language literature in which the reading is done in the original language. The second literature must serve as a component of the qualifying exam that certifies the student's readiness to begin writing the dissertation. Primary concentrations are available in English/American, French, and Spanish/Latin American/Latino literatures. Secondary concentrations are available in all of the above, plus German, Italian, Latin, and Greek, as well as other non-English literatures relevant to developing comparative frameworks and individual areas of concentration.

The common requirements are as follows:

- a one-quarter proseminar, Literature 200, to be taken in the first year;
- quarterly two-credit advising courses (independent studies);
- twelve courses leading to the definition of an area of concentration. At least two courses must be in a second-language literature; up to four may be from the offerings of other departments; up to three may be independent study courses; and one course must focus on pre-1750 literature and culture;
- teaching assistant training, administered as a course offered by the Literature Department;
- three quarters of supervised teaching experience;
- a three-week summer intensive language course or equivalent, administered by the Literature Department;
- a qualifying examination (with written and oral components);
- a prospectus outlining and defining the dissertation project;
- a dissertation.

A master's degree is conferred upon request to Ph.D. candidates who have completed the course work requirements for the doctorate. (The teaching assistant training and supervised teaching experience are not considered part of the course work requirements for the M.A.) In addition to completing the required course work, students must write a master's thesis under the supervision of a faculty adviser or successfully complete the Literature Ph.D. Qualifying Exam.

Applications and requirements for obtaining these notations are available at the respective program and department offices. More detailed information for prospective graduate students, including application and admission to graduate studies, examinations, and requirements for the doctor of philosophy degree, is available from the Division of Graduate Studies and on the department web site: <http://literature.ucsc.edu/>.

The Master's Program

A separate master of arts degree program in literature is intended for students whose aim is to deepen and expand their literary/critical training and to proceed to a Ph.D. program at another institution. Priority for admission is given to students interested in underrepresented areas of study within the Literature Department's offerings, such as the non-English language literatures and, more broadly, critical theory.

The M.A. program requires students to complete the equivalent of nine seminars of graduate-level study in literature, including a written capstone requirement, the master's thesis. Requirements may not be completed in less than one year; the maximum time to obtain a degree is two years.

The common requirements are as follows:

- a one-quarter proseminar, Literature 200, to be taken in the first year;
- seven courses leading to the definition of an area of concentration. Up to two courses may be from the offerings of other departments, and one may be an independent study course;
- a thesis (written in conjunction with Literature 299, *Thesis Research*). Typically, a thesis will range in length from 30–35 pages, plus a bibliography.

The Literature Department does not normally provide financial support to students pursuing the M.A. degree; some teaching assistantships do become available. Admission to the M.A. program does not constitute admission to the Ph.D. program, and students may not automatically transfer into the Ph.D. program from the M.A. program; they must reapply. Further information and application materials are available from the Division of Graduate Studies: <http://graddiv.ucsc.edu>.

Literature

Lower-Division Courses

1. Literary Interpretation. W,S

Close reading and analysis of literary texts, including representative examples of several different genres and periods. An introduction to practical criticism required of all literature majors; should be completed prior to upper-division work in literature. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to first-year students and sophomores, or literature and proposed literature majors and literature minors. (General Education Code(s): IH, W.) *J. Poblete, P. Gaiter*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

61. Introduction to Literary Genres.

61F. Introduction to Reading Fiction. S

Close reading of short stories and some novels with the aim of developing critical methods for the analysis and interpretation of prose fiction. Topics include character, plot, narrative structure, and the poetics of prose. (General Education Code(s): IH.) *N. Deutsch*

61H. Introduction to Film Analysis. *

Introduces techniques for the close reading of film, with particular attention to film form (shot-by-shot analysis), cinematic codes, narrative structure, and the ideological burdens of the basic cinematic apparatus. Case studies of select works by major directors from the Hollywood studio period. (General Education Code(s): IH.) *D. Selden*

61M. Approaches to Classical Myth. F

Introduction to Greek myths, including selected ancient texts and visual artifacts, historical and cultural context of their creation and reception, modern theoretical approaches such as structuralism and psychoanalysis, and interpretations in various media. (General Education Code(s): IH.) *K. Bassi*

61P. Introduction to Reading Poetry. W

An introduction to selected modes and forms of poetry with an emphasis on close textual analysis. Examples will be taken from different historical periods and poetic traditions. (General Education Code(s): IH.) *The Staff*

61R. Race in Literature. *

An investigation into the various uses and abuses of "race" in 20th-century fiction. Authors may include Jean Rhys, Paul Bowles, Mark Twain, Russell Banks, Darius James, Joseph Conrad, Nella Larsen, LeRoi Jones/Amiri Baraka, Leslie Marmon Silko, and V.S. Naipaul. (General Education Code(s): IH, E.) *L. Chude-Sokei*

80. Topics in Literature.**80A. Biblical Narratives. ***

No book has so decisively influenced the development of the Western world as the Bible. Traces the Bible's influence on narrative, themes, and ideas in Western literature. Explores major Biblical stories and themes in a comparative context and traces their reappearance in Western literature and imaginative works. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

80K. Topics in Medical Humanities. W

Medical humanities designate an interdisciplinary field of humanities (literature, philosophy, ethics, history, and religion), concerned with their application to medical education and practice. The humanities provide insight into the human condition, suffering, personhood, and our responsibility to each other; and offer a historical perspective on medical practice. Students may not receive credit for this course and Modern Literary Studies 145E. (General Education Code(s): T4-Humanities and Arts.) *W. Godzich*

80L. The Holocaust: The Destruction of European Jewry. S

Focus is on the destruction of the Jews of Europe by Nazi Germany. Issues are historically grounded, and include works of literature, social sciences, philosophy, and film. (Also offered as History 80W. Students cannot receive credit for both courses.) (General Education Code(s): T4-Humanities and Arts, E.) *P. Kenez, M. Baumgarten*

80M. Romantic Fiction. *

A study of novels, short stories, and fairy tales by authors from America, England, France, and Germany. Readings include works by Poe, Hawthorne, Mary Shelley, Goethe, Hoffman, Rousseau, and Mérimée. (General Education Code(s): T4-Humanities and Arts.) *L. Nygaard*

80N. Latino Expressions in the U.S. F

An introduction to Latino literature and culture in the U.S. A study of the creative expressions of Chicanos/as, Nuyoricans, Cuban Americans, and other Latin Americans in the U.S. (General Education Code(s): T4-Humanities and Arts, E.) *K. Gruesz*

80X. Global Narratives. *

An introduction to works (novels, film, autobiography, travel literature) considered in relation to life in the modern world system. Topics and contexts include colonialism, postcolonialism, transnational capitalism, migrancy, diaspora, global cities, travel, and tourism. (General Education Code(s): T4-Humanities and Arts, E.) *V. Cooppan*

88A. Terror and Philosophy (1 credit). *

Discussion of terror and terrorism from a philosophical perspective, with a focus on Jürgen Habermas and Jacques Derrida. Enrollment restricted to first-year students. Enrollment limited to 15. *W. Godzich*

99. Tutorial. F,W,S

The Staff

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses**101. Theory and Interpretation. F,S**

Contemporary approaches to literary and cultural theory, with emphasis on how theoretical perspectives advance and broaden the reading of literary texts. Introduction to important new theoretical developments and their antecedents. Literature majors should complete this course as early as possible. Topics: (F) postcolonialism and globalization; (S) Marxist theory. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to literature and proposed literature majors and literature minors. May be repeated for credit. (General Education Code(s): W.) *S. Kinoshita, C. Connery*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Creative Writing**Lower-Division Courses****10. Introduction to Creative Writing. F,W,S**

Introduction to the crafts and techniques of poetry, fiction, and creative non-fiction, identifying and exploring traditional and non-traditional literary forms and genres while working on individual creative writing projects. An author reading and two workshop section per week. Prerequisite: satisfaction of the Entry Level Writing requirement. Enrollment restricted to first-year students, sophomores, and juniors. May be repeated for credit. (General Education Code(s): A.) *The Staff*

52. Intermediate Fiction Writing. F,W,S

An intermediate-level course in fiction designed for prospective creative writing majors. Prerequisite(s): permission of writing at first class meeting. May be repeated for credit. (General Education Code(s): A.) (FW) *M. Sanders-Self, (S) The Staff*

53. Intermediate Poetry Writing. F,W,S

An intermediate-level course in poetry designed for prospective creative writing majors. Prerequisite(s): permission of writing at first class meeting. May be repeated for credit. (General Education Code(s): A.) *D. Farquhar, G. Young, D. Lau*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses**170. Methods and Materials. W,S**

Focuses on a particular process or subject used in the production of a literary text. Course is intended to work as a bridge between invention and scholarship. Topics: (W) the lyric subject; (S) Section 01—Borderlands writing, Section 02—prose poem. Enrollment restricted to creative writing literature majors. May be repeated for credit. (General Education Code(s): A.) *G. Young, (W) D. Marriott, (S) R. Wilson*

180. Advanced Writing: Fiction. F,W

Intensive work in writing fiction. Satisfies the Creative Writing Literature concentration. Enrollment restricted to creative writing literature majors or permission of instructor. May be repeated for credit. (General Education Code(s): A.) *K. Yamashita, K. Fowler II*

183. Advanced Writing: Poetry. F,W

Intensive work in writing poetry. Satisfies the Creative Writing Literature concentration. Enrollment restricted to creative writing literature majors or permission of instructor. May be repeated for credit. (General Education Code(s): A.) (F) *N. Mackey, (W) G. Young*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) *The Staff*

194. Creative Project Seminar.

Seminar for students beginning work on their creative writing senior project. Led by a faculty member, the seminar helps prepare each student to complete the project. Attention is given to focusing of creative topics, review of work in progress, work rhythms, and revision.

194A. Poetry. S

Satisfies the Creative Writing Literature concentration. Prerequisite(s): Literature 101. Enrollment restricted to senior creative writing literature majors. *G. Young*

194B. Fiction. S

Satisfies the Creative Writing Literature concentration. Prerequisite(s): Literature 101. Enrollment restricted to senior creative writing literature majors. *K. Yamashita*

195. Senior Essay. F,W,S

Prerequisite(s): Literature 101. Students submit petition to sponsoring agency. *The Staff*

198. Group Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

English-Language Literatures**Upper-Division Courses****102. Canons.****102A. The Traditional British Canon, Part I. ***

The constitution of the "canon" of English literature from Chaucer to Cowper. Satisfies the English and Pre- and Early Modern Studies Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. *The Staff*

102B. The Traditional British Canon, Part II. *

Explores poetry and prose from 1800 to 1950 through extensive reading in the Romantics, Victorians, Moderns, articulating the connections among them, connecting their work to key social, political, scientific, and technological moments defining these eras. Satisfies the English and Modern Literature concentrations; also satisfies the Poetry distribution requirement. *The Staff*

103. Periods and Movements.**103A. British Literature and Culture to 1740. F**

Literature and society to 1740. Topic: early modern women writers. Satisfies the English and Pre- and Early Modern Studies Literature concentrations; also

- satisfies the Pre- and Early Modern Studies distribution requirement. May be repeated for credit. *M. Hendricks*
- 103E. Studies in Romanticism. S**
A survey of major romantic themes and authors between 1780 and 1820. Explores relationships to preromantic and postromantic authors. The main goal is to achieve familiarity with a wide range of individual poems in the general context of romanticism. Satisfies the British, English, and Modern Literature concentrations; also satisfies the Poetry distribution requirement. (Formerly *Introduction to Romanticism.*) *H. Leicester*
- 103G. Experiment and Tradition in 20th-Century Literature. S**
A study of English and/or American writings from 1900 to 1950, with particular attention to the theoretical, historical, and artistic premises behind the concept of "modernism." Topic: Performing Publics: The Modernist and Avant Garde. Satisfies the English, and Modern Literature concentrations. *K. Hicks*
- 103I. The Harlem Renaissance. ***
Examination of major writings of the Harlem Renaissance, with attention to cultural and historical background. Satisfies the English and Modern Literature concentrations; also satisfies the Poetry distribution requirement. (General Education Code(s): E.) *N. Mackey*
- 103J. Contemporary American Literature. ***
A selective examination of major writing since WWII, with attention to both literary issues and historical context. Satisfies the English and Modern Literature concentrations. May be repeated for credit. *The Staff*
- 103K. American Literature: 1900 to WWII. W**
Surveys American literature in and around the climate of "modernism." Beginning with texts written at the turn of the century, course ranges widely through the early to mid-20th century. Special attention will be given to works produced before and between World Wars, as well as to the various artistic, social and international movements characterizing that period. Satisfies the English and Modern Literature concentrations. *L. Chude-Sokei*
- 103L. Colonial American Literature. ***
Examines the literary and cultural construction of English America in the 16th and 17th centuries. Focus is on the role of race, pluralism, and community in the early modern English invention of America. Exploring a variety of media (literary texts, visual illustrations, and theater among others), course traces the development of "American" literature written pre-1800. Satisfies the English and Pre- and Early Modern Studies literature concentrations; also satisfies the Pre- and Early Modern distribution requirement. *M. Hendricks*
- 110. Prose.**
- 110A. Studies in the English Novel. S**
From the 18th to the 20th century. Texts include work by Fielding, Austen, Brontë, Dickens, Conrad, and Woolf. Satisfies the English and Modern Literature concentrations. *The Staff*
- 110D. The 19th- and 20th-Century English Novel. ***
The 19th- and 20th-century novel: Hardy to Joyce. Satisfies the English and Modern Literature concentrations. *The Staff*
- 110F. Nineteenth-Century American Fiction. ***
Examination of selected fiction written between the end of the 18th century and the Civil War, with attention to historical and cultural as well as literary issues. Satisfies the English and Modern Literary Studies concentrations. *The Staff*
- 120. Poetry.**
- 120C. Nineteenth-Century American Poetry. ***
The major figures and important movements from Poe to Emerson through Whitman and Dickinson. Satisfies the English and Modern Literature concentrations; also satisfies the Poetry distribution requirement. *K. Gruesz*
- 130. Drama.**
- 130C. Introduction to American Drama. ***
Examines drama in the United States. Issues such as race, sexuality, gender, class, and the art of drama are explored. Satisfies the English and Modern Literature concentrations. May be repeated for credit. (General Education Code(s): E.) *M. Hendricks*
- 150. Ethnic Writing.**
- 150C. Asian American Literature. ***
Examination of Asian American literary works (fiction, poetry, dramatic essays) in the context of the historical presence of Asian Americans in the United States from the 1850s. Emphasis on comparison of select works from ethnic Asian writings. Satisfies the English and Modern Literature concentrations. (General Education Code(s): E.) *K. Yamashita*
- 150F. African-American Women Writers. ***
Explores the cultural, aesthetic, political, and feminist issues in select works by African-American women. Through close analysis of the works, students develop an understanding of the intersections that race, gender, and class play in the literary imaginations of these writers. Satisfies the English Language and Modern Literary Studies concentrations. (General Education Code(s): E.) *M. Hendricks*
- 150G. "The Ambivalent American": Race, Nation, and Self in Korean American Literature. S**
Examines Korean American literature as a case study for looking at issues of race and nation, traditional canon formation, and genre building in relationship to the role of minority literature in U.S. literary studies. Satisfies the English Language and Modern Literary Studies concentrations. (General Education Code(s): E.) *B. Rhee*
- 155. Regional Writing.**
- 155B. Regions in American Literature. F**
Examines development of regional writing in the U.S. Topic: San Francisco. Satisfies the English and Modern Literature concentrations. May be repeated for credit. *R. Wilson*
- 155D. Studies in South African Literature. W**
A survey of writing from South Africa since 1948, focusing on social and political themes. Authors include Paton, Gordimer, Mphahlele, Fugard, Ndebele, Head, Brutus, Coetzee, and others. Satisfies the English and Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *J. Jordan*
- 160. Transnational Writing.**
- 160C. Postcolonial Writing. F**
Introduces students to a selection of postcolonial theory and texts. Topic: literature of the Caribbean and Pacific. Satisfies the English and Modern Literature concentrations. May be repeated for credit. *E. Scheese*
- 170. Individual Authors.**
- 170A. Geoffrey Chaucer. ***
Close study of Chaucer's poetry, with some attention to relevant cultural, philosophical, and historical issues in the context of the late medieval period. Particular emphasis on *The Canterbury Tales*. Satisfies the English and Pre- and Early Modern Studies Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. *H. Leicester*
- 170C. William Shakespeare. S**
Satisfies the English and Pre- and Early Modern Studies Literature concentrations; also satisfies the Pre- and Early Modern distribution requirement. May be repeated for credit. *M. Hendricks*
- 170U. The Lawrence Myth: D.H. and T.E. Lawrence. ***
Considers the writing and myths of D. H. Lawrence and T. E. Lawrence (Lawrence of Arabia) in the culture of Great Britain between 1910 and 1930. *T. Miller*
- 180. Topics.**
- 180B. The Gothic Imagination in Fiction, Film, and Theory. ***
Explores how the Gothic imagination constructs nightmare versions of bourgeois society, revealing cultural anxieties about the family, sexuality, religion, science, the self; and gender, socioeconomic, and racial identity. Readings include essays by Freud and Lacan and such fiction as *The Monk*, *Frankenstein*, *Dracula*, *Maus*, and *Beloved*. Films change each year, but may include *Alien* and *Sweetie*. Satisfies the English, and Modern Literature concentrations. May be repeated for credit. *H. Moglen*
- 180D. Twain, Slavery, and the Literary Imagination. S**
Using Mark Twain's later writings and other literary/non-literary materials, explores responses to popular and legal discourse on "blood," race, sex, resurgence of racism, and imperialism. Satisfies the English and Modern Literature concentrations. *S. Gillman*
- 190. Senior Seminars.**
- 190A. Individual Authors. F,W,S**
Intensive examination of works by individual authors. Topics: (F) Section 01—William Carlos Williams, Section 02—Jack Kerouac; (W) Section 01—Charles Dickens, Section 02—V.S. Naipaul; (S) J.M. Coetzee. Satisfies the English Literature concentration; also satisfies the Senior Seminar distribution requirement. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. May be repeated for credit. *R. Wilson, L. Chude-Sokei, (F) N. Mackey, (WS) J. Jordan*
- 190D. New World Poetics. ***
A study of a number of poets from the United States, Latin America, and the Caribbean, with particular attention to the ways in which the New World locale occasions a call to reorder society, perception, history, and poetic practice. Satisfies the English, and Modern Literature concentrations; also satisfies the Poetry and Senior Seminar distribution

requirements. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. (General Education Code(s): E.) *N. Mackey*

190E. Studies in 20th-Century British Literature. *

Intensive study of selected authors or other issues in 20th-century British literature. Satisfies the English and Modern Literature concentrations; also satisfies the Senior Seminar distribution requirement. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. *V. Cooppan*

190F. Studies in U.S. Literature. W

Intensive examination of issues in U.S. literature. Topic for winter 2008: *The Book of Everything*. Satisfies the English and Modern Literature concentrations; also satisfies the Senior Seminar distribution requirement. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. May be repeated for credit. *K. Gruesz*

190K. Studies in Poetry. *

Satisfies the English and Modern concentrations; also satisfies the poetry and senior seminar distribution requirements. Prerequisite(s): literature 101. Enrollment restricted to senior literature majors. *The Staff*

190L. Studies in English Language Literature. W

Studies of selected authors or issues in English language literature. Topic for winter 2009: novelistic representations of the Indian subcontinent under British rule, anti-imperialist nationalism, independence, and diaspora. Satisfies the English and Modern Literature concentrations; also satisfies the senior seminar distribution requirement. Prerequisite(s): Literature 101. Enrollment restricted to senior Literature majors. *V. Cooppan*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. Students submit petition to sponsoring agency. *The Staff*

195. Senior Essay. F,W,S

Students submit petition to sponsoring agency. Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

French Literature

Upper-Division Courses

131. The Middle Ages. F

Study of 12th- and 13th-century texts, with attention to problems of history and social change. In modern translations with selected readings in Old French or Provençal. Topic: Amour courtois et société féodale. Satisfies the French and Pre- and Early Modern Studies Literature concentrations; also satisfies the Pre- and Early Modern distribution requirement. May be repeated for credit. *S. Kinoshita*

134. French Literature Outside France. W

A study of texts written in French-speaking cultures: Belgium, Canada, Africa, the Caribbean. Satisfies the French, Modern, and World Literature concentrations; also satisfies the Global distribution requirement. May be repeated for credit. (General Education Code(s): E.) *P. Gaiet*

136. Introduction to Modernity. *

Study of 19th- and 20th-century literary innovation and/or representations of sociohistorical events. Satisfies the French and Modern Literature concentrations. May be repeated for credit. *R. Terdiman*

152. Texts and Contexts. S

Examines implications of social and political change in terms of literary theory and practice. Places equal emphasis on literary and other kinds of cultural texts: historical, political, and cinematic. Topic: French animals, early and modern. Satisfies the French and Modern Literature concentrations. May be repeated for credit. *C. Freccero*

195. Senior Essay. F,W,S

Prerequisite(s): Literature 101. Students submit petition to sponsoring agency. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

German Literature

Upper-Division Courses

102. Introduction to German Literature. W

Wide reading of works representing the major authors, periods, and genres of German literature. Satisfies the German and Modern Literature concentrations. *T. Honnief*

120. Fear of the Foreign: Xenophobia in German Literature and Culture. *

Considers recent violence against immigrants and asylum-seekers in Germany, and moves on to examine images of people perceived as "foreign" or alien in German literature and culture from early times to the present. Satisfies the German and Modern Literature concentrations. *L. Nygaard*

150. German Romanticism. S

A study of the emergence and development of German Romanticism. Central concerns are the Romantics' attitude toward the role of the imagination in literature and their attempts to revitalize myth and folklore in their works. Authors read include Tieck, Novalis, Hoffmann, Eichendorff, and Heine. Satisfies the German and Modern Literature concentrations. *L. Nygaard*

164. Modern German Fiction. *

Selected readings from the novel and novella in 20th-century German literature. Satisfies the German and Modern Literature concentrations. *The Staff*

167. Modern German Literature and Film. F

Discusses a range of modern and contemporary German texts, including poetry, drama, and film. Satisfies the German and Modern Literature concentrations. May be repeated for credit. *A. Bivens*

195. Senior Essay. F,W,S

Prerequisite: Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Greek Literature

Upper-Division Courses

100. Introduction to Greek Literature. S

Satisfies the Greek and Pre- and Early Modern Studies Literature concentrations; also satisfies the Pre- and Early Modern distribution requirement. May be repeated for credit. *K. Bassi*

103. Greek Drama. W

Topic: Aeschylus' *Prometheus Bound*. Satisfies the Greek and Pre- and Early Modern Studies Literature concentrations; also satisfies the Pre- and Early Modern Studies distribution requirement. May be repeated for credit. *K. Bassi*

105. Special Topics in Greek Literature. F

Readings in selected ancient Greek texts for advanced students. Texts vary from year to year. Focus is on translation and interpretation; requirements normally include both translation exams and interpretive essays. Topic: St. Paul and Universalism. Satisfies the Greek and Pre- and Early Modern Literature concentrations; also satisfies the Global and Pre- and Early Modern Distribution Requirement. Taught in conjunction with Pre- and Early Modern Literature 102. May be repeated for credit. *D. Selden*

193. Field Study. F,W,S

Provides for an individual program of study sponsored by a faculty member and carried on off campus. May be taken concurrently or consecutively for up to three courses of credit. Designed for upper-division students, with proposal supported by a faculty member willing to supervise, and approval of the chair of the Literature Department. Students submit petition to sponsoring agency. *The Staff*

195. Senior Thesis. F,W,S

Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Italian Literature

Upper-Division Courses

102. Introduction to Italian Literature. F

A close reading of a small number of texts (lyric, dramatic, narrative) representing the major authors and periods of Italian literature, with intensive practice in spoken and written Italian. Satisfies the Italian and Modern Literature concentrations. *M. Brose*

130. Author and Contexts.

Designed to give an in-depth study of a given author's literary production and its cultural context.

130B. Boccaccio. W

Critical study of the *Decameron*. Satisfies the Italian, Pre- and Early Modern Studies Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. *D. Shemek*

130D. Dante's Divine Comedy. S

Reading of the *Inferno*, the *Purgatorio* and selected canti of the *Paradiso*, along with selections from Dante's lyrics and from medieval Italian and French poetry. Satisfies the Italian and Pre- and Early Modern Studies Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. *M. Brose*

150. Studies in Italian Theater.**150C. Italian Theater. ***

Survey of Italian theater from its beginnings in medieval ritual through the development of Renaissance staged comedy and the commedia dell'arte, pastoral and tragicomedy, opera, melodrama, and 20th-century avant-garde and political theater. Satisfies the Italian and Pre- and Early Modern Studies concentrations; also satisfies the Pre- and Early Modern Studies distribution requirement. Intended for students proficient in Italian. *D. Shemek*

195. Senior Thesis. F,W,S

Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Latin Literature*Upper-Division Courses***100. Introduction to Latin Literature. S**

Satisfies the Latin and Pre- and Early Modern Studies Literature concentrations; also satisfies the Pre- and Early Modern distribution requirements. May be repeated for credit. *H. Blood*

102. Roman Poetry. W,S

Topic: (W) Virgil's *Aeneid*; (S) Ovid. Satisfies the Latin and Pre- and Early Modern Studies Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. May be repeated for credit. *D. Selden, K. Bassi*

104. Special Topics in Latin Literature. F

Satisfies the Latin and Pre- and Early Modern Literature concentrations; also satisfies the Poetry and Pre- and Early Modern distribution requirements. May be repeated for credit. *The Staff*

193. Field Study. F,W,S

Provides for an individual program of study sponsored by a faculty member and carried on off campus. May be taken concurrently or consecutively for up to three courses of credit. Designed for upper-division students, with proposal supported by a faculty member willing

to supervise, and approval of the chair of the Literature Department. Students submit petition to sponsoring agency. *The Staff*

195. Senior Thesis. F,W,S

Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Modern Literary Studies*Upper-Division Courses***124. The European Novel. F****124A. Eighteenth Century to Modernism. F**

Major works of European fiction in their social, cultural, and intellectual contexts. Emphasizes the 19th- and 20th-century novels. Works are read in translation. Satisfies the Modern Literature concentration. *R. Terdiman*

125. Modern Cinema.**125D. Cinema and Social Change in Latin America. ***

Surveys selected Latin American and Latino feature and documentary films from 1950 to the present. Topics include gender, sexuality, race and (trans)national identity, revolution, repression and resistance; migration, exile, and return. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *J. Burton-Carvajal*

125L. Films on the Border. W

Surveys a range of cinematic representations of the U.S.-Mexico border region from Hollywood, independent, Chicano/Latino, Mexican, and local sources. Studies the border in both concrete and symbolic registers. Satisfies the Modern Literary Studies and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *J. Burton-Carvajal*

125N. The Horror Film. F

Shifting definitions of horror in the movies from the late silent period to the present through close analysis of representative films and critical texts: genre construction, history of modes of production, and shifts in discourse of horror. Satisfies the Literature and Film and Modern Literature concentrations. *H. Leicester, Jr.*

144. Modern Jewish Cultures.

Modernity transformed Jewish culture: we will explore the ways in which changed social, political, and economic conditions produced new gender roles; professional, personal, communal, and cultural experiences; and generated powerful fictions, autobiographies, films and poems. Among the writers we will read are Isaac Bashevis Singer, Rebecca Goldstein, Saul Bellow, Martin Buber, Hannah Arendt, and S.Y. Agnon.

144D. Jewish Writers and the American City. S

An examination of some major Jewish writers and their responses to the American city. Major

writers: Henry Roth, Saul Bellow, Bernard Malamud, J. Kaplan, Philip Roth. A look at Yiddish and other minority writers, and including sociological and historical materials on the American city. Satisfies the English and Modern concentrations. (General Education Code(s): E.) *The Staff*

144E. Hebrew Poetry. F

Hebrew poetry—Biblical, medieval, modern—explores cultural and literary issues central to our contemporary world. Texts and discussion focus on Jewish and Israeli literary traditions. Satisfies the Modern Literature concentration; also satisfies the Poetry distribution requirement. May be repeated for credit. *The Staff*

144G. Global Jewish Writing. *

Comparative analysis of modern Jewish writers from Western and non-Western diasporas. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *M. Baumgarten*

144H. Jewish Writers and the European City. W

Interrogates the master narrative of a specific European city and discusses the ways in which Jewish life and Jewish actions helped to shape that story and were shaped by it. Topic: Venice. Satisfies the Modern Literary Studies concentration. May be repeated for credit. *M. Baumgarten*

144K. The Transnational Subject. S

Examines how alternative subjectivities are adopted in narratives structured around hidden national identities. Topic: Jewish writers in the Russian tradition. Satisfies the Modern Literary Studies and World Literature concentrations; also satisfies the Global distribution requirement. *W. Nickell*

144L. Israeli-Palestinian Conflict in Israeli Film and Performance. *

Discusses the Israeli-Palestinian conflict as constructed in Israeli movies and performing arts. Introduces Israeli films and plays from 1948 to the present that deal with this subject. Provides a critical perspective on innovative cinematic and dramatic responses to the changing course of events. Satisfies the Modern Literary Studies and World Literature concentrations; also satisfies the global distribution requirement. *The Staff*

145. Special Topics in Modern Literature**145B. Modern Literature. ***

Study of 19th- and/or 20th-century literature, with attention to its literary and historical context. Satisfies the Modern Literary Studies concentration. May be repeated for credit. *The Staff*

145D. Introduction to Music Drama. *

Introduction to opera from Mozart to Berg. Close analysis of text setting, musical form, dramaturgy, and performance (singing/acting), with particular attention to politics, gender, subject-formation, and opera's constitutive role in the rise, as well as critique, of modern bourgeois culture. No previous training in music theory required, although some affinity for classical music desirable. Satisfies the Modern Literature concentration. *D. Selden*

145E. Topics in Medical Humanities. *

Medical humanities is an interdisciplinary field of humanities (literature, philosophy, ethics, history, and religion) concerned with its application to medical education and practice. The humanities provide insight into the human condition, suffering, personhood, and

our responsibility to each other; and offer an historical perspective on medical science. Course helps prepare students for the reading comprehension and writing parts of the MCAT. Satisfies the Modern Literature concentration. Students cannot receive credit for this course and Literature 80K. (Also offered as History of Consciousness 145E. Students cannot receive credit for both courses.) *W. Godzich*

145F. Animal Studies in Literature. *
Examines the disruptive presences of nonhuman animals and nonanimal aliens as they appear in a variety of narrative forms: prose fiction, non-fiction, and poetry. Organized around central themes relating to the presence of animals in literature, including representation, difference, desire, and subjectivity. Satisfies the Modern Literature concentration. *The Staff*

145G. Beyond Identity. S
Recent scholarly attention has focused on identity construction among individuals, collectivities, and even products (branding). This seminar focuses on getting one's bearing in a changing organization of knowledge and on determining one's place within it. Satisfies the Modern Literature concentration. *W. Godzich*

155. Russian Literature in Translation.

155A. Nineteenth-Century Russian Fiction in Translation. *
Masterpieces of poetry and prose from the Golden Age of Russian literature, from Pushkin to Chekhov. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. *W. Nickell*

155E. Classic Russian Novels. *
Detailed literary analysis of novels by Gogol, Goncharov, Tolstoy, Dostoevsky, and Pasternak. Focus upon aesthetic devices of texts, as well as upon ethical and philosophical issues that inform them. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. *W. Nickell*

155H. Russian Avant-Garde. W
A study of the main movement in Russian modernism, from symbolism to Acmeism, Futurism, Suprematism and Constructionism, including visual arts, film, and formalist literary theory through reading the poetry and prose of Blok, Bely, Akhmatova, Mandelstam, Mayakovsky, and Zamyatin in translation. Explores the changing concepts of art and its function in society, both before and after the Revolution of 1917. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution concentration. *W. Nickell*

160. French Literature in Translation.

160G. Narratives of Girlhood. *
The study of narratives (fiction and memoir) representing developments of female characters from childhood to adolescence, with particular attention paid to modes of narration, relation of the self to social context, representation of authority, and familial interactions. Satisfies the Modern Literature concentration. *P. Gaitet*

160K. Great French Novels. F
Provides an introduction to important French novels of the nineteenth and twentieth centuries. All works are read in English. Satisfies the Modern Literature concentration. *P. Gaitet*

167. German Authors in Translation.

167G. Goethe's Faust . F
An intensive study of Goethe's *Faust*, Parts I and II. All works are read in English. Satisfies the Modern Literature concentration; also satisfies the Poetry distribution requirement. *L. Nygaard*

167K. Kafka in Translation. W
An intensive study of the works of Franz Kafka, with close readings in particular of the aphorisms and shorter texts, and with reference to the literary, social, and historical context in which Kafka's work emerged. *A. Bivens*

168. German Literature in Translation.

168C. Modern German Fiction. *
Selected readings from the novel and novella in 20th-century German literature. All works are read in English. Satisfies the Modern Literature concentration. *The Staff*

180. Latin American Literature in Translation.

180B. The New Latin American Novel. *
Examination of contemporary narrative from Latin America. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *The Staff*

180F. Latin American Women Writers. *
Explores literary production by women in relation to social movements and historical events. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *L. Martínez-Echazábal*

187. Modern Literature. F

187D. The Man without Qualities (2 credits). *
A close reading of the English translation of Robert Musil's 1200-page unfinished novel *The Man Without Qualities* as well as some of the 650 pages of the *Nachlass* (posthumous papers). Enrollment restricted to literature majors. Enrollment limited to 18. *W. Godzich*

190. Senior Seminar.

Seminar offered to literature majors as a way to satisfy the senior exit requirement. Offered at different times by different instructors, focus is on topics of interest in modern literary studies. All students are required to complete an essay of significant length as part of the seminar course work. Prerequisite: Literature 101. May be repeated for credit. *The Staff*

190K. Readings in Tolstoy. F

Intensive study of Tolstoy's major work *War and Peace*. Satisfies the Modern and World Literature concentrations; also satisfies the Global and Senior Seminar distribution requirements. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. *W. Nickell*

190M. The Magic Mountain . *

An intensive study of Thomas Mann's great novel of ideas, *The Magic Mountain*, with a focus on its brilliant analysis of German and European culture in the early years of the 20th century, and its prophetic anticipation of the rise of German Nazism and other Fascist movements. *The Staff*

190N. Topics in Modern Literary Studies. S

Selected authors or issues in modern literary and cultural studies. Topic: Bertolt Brecht. Satisfies the Modern Lit-

erature concentration; also satisfies the Senior Seminar distribution requirement. Enrollment restricted to senior literature majors. May be repeated for credit. *A. Bivens*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) *The Staff*

195. Senior Essay. F,W,S

Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Pre- and Early Modern Literature

Upper-Division Courses

102. Ancient Literature in Cross-Cultural Perspective. F

Topic: (F) St. Paul and Universalism. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global and Pre- and Early Modern distribution requirements. Taught in conjunction with Greek Literature 105. Prerequisite(s): Greek Literature 100 or Latin Literature 100 or Literature 80A or permission of instructor. May be repeated for credit. *D. Selden*

103. Lyric Traditions in Comparative Perspective. *

Close reading of Greek and Roman lyric poems, including major works by Sappho, Catullus, Pindar, and Horace. Special attention to poetics and aesthetics; to social, political, and economic contexts; to the influence of Greek and Roman lyric on later literatures; and to independent parallels seen in "lyric" forms from non-Western cultures. Satisfies the Pre- and Early Modern Studies concentration; also satisfies the Poetry and Pre- and Early Modern Studies distribution requirements. *The Staff*

107A. Reading Egyptian Hieroglyphs, Part 1. W

Introduction to Egyptian hieroglyphs as a graphic, conceptual, and communicative system. Covers the basic elements of classical Egyptian grammar, drawing primarily on inscriptions from extant Egyptian monuments. Students read one prose and one poetical text from the Middle Kingdom. Satisfies the Pre- and Early Modern Studies and World Literature concentrations; also satisfies the Global and Pre- and Early Modern distribution requirements. Strongly recommended: two years previous study of a foreign language at the college level or the equivalent. *D. Selden*

107B. Reading Egyptian Hieroglyphs, Part 2. S

Advanced Middle Egyptian grammar (2 weeks). Close reading of the *Tale of Sinuhe* in Egyptian, selected hymns and love poetry from the New Kingdom. Satisfies the Pre- and Early Modern Studies and World Literature concentrations; also satisfies the Global, Pre- and Early Modern, and Poetry distribution requirements. Together, Egyptian Hieroglyphs 1 and 2 fulfill the language requirements for the intensive major. Prerequisite(s): course 107A or permission of instructor. *D. Selden*

124. Myth, Ritual, and Culture in the Ancient World. *

Reconstruction of aspects of Indo-European culture through readings in English translation of Hittite, Sanskrit, Greek, Irish, Norse, and other related ancient mythology and poetry. Satisfies the Pre- and Early Modern Literature concentration; also satisfies the Poetry and Pre- and Early Modern distribution requirements. *The Staff*

128. Medieval Epic. F

Medieval reworkings of stories and motifs drawn from the "barbarian" or Germanic tradition including *Beowulf*, *The Song of Roland*, *Nibelungenlied*, *Snorri Sturlason: King Harald's Saga from Heimskringla*, and *Njal's Saga*. *H. Leicester*

129. Drama under the Sun King. *

Masterpieces of French classical theater from the reign of Louis XIV, with particular attention to the social, cultural, and political context of their production: Corneille, Moliere, Racine. *The Staff*

131. Love and Madness in Medieval Literature. F

A study of the development of the courtly love tradition in medieval Italy and France, with close attention to the construction of gender and authorship, and to the interconnections between Eros, madness, and death. Works include troubadour poetry, the romances of Chretien de Troyes, tales of Marie de France, Dante, Petrarch, Boccaccio. *The Staff*

134. The Idea of Poetry. *

Focus is on the theories of rhetoric and poetry written between 1580 and 1620. Texts include English, Italian, French, and Spanish works. Satisfies the Pre- and Early Modern Studies concentration; also satisfies the Poetry and Pre- and Early Modern Studies distribution requirements. *The Staff*

142. Love and Death: A History of the Vernacular Lyric. *

Examines the emergence of vernacular lyric poetry and its evolution in the troubadour, Italian, and English traditions, with particular emphasis on erotic love, figurations of gender, and nuances in lyric form. Satisfies the Pre- and Early Modern concentration; also satisfies the Poetry and the Pre- and Early Modern distribution requirements. *The Staff*

144. Pre- and Early Modern Jewish Cultures.**144D. Translation, Midrash, Interpretation. ***

Focuses on theory and practice of translation, and on Midrash, their interrelation and the ways in which they inflect our understanding of literary and cultural interpretation. Satisfies the Pre- and Early Modern Studies concentration; also satisfies the Pre- and Early Modern Studies distribution requirement. *M. Baumgarten*

150. Pre- and Early Modern Literature in Translation.**150C. Italian Renaissance. S**

Study of Renaissance in Italy as concept and educational/artistic revolution, with special attention to literary works and to dialogue among the arts and sciences. Authors vary but may include Boccaccio, Petrarch, Machiavelli, and Michelangelo. Satisfies Pre- and Early Modern concentration; also satisfies Pre- and Early Modern distribution requirement. *D. Shemek*

162. Renaissance Versions of Gender. W

An introduction to the vast array of early modern literature dedicated to formulating, advancing, and protesting European models of ideal feminine behavior. Texts include poetry, tales, letters, dialogues, and treatises, which lay the foundations for many of the debates within modern feminism. *M. Hendricks*

183. Dante's Divine Comedy. *

Reading of the *Inferno*, the *Purgatorio*, and selected canti of the *Paradiso*, along with selections from Dante's lyrics and from medieval Italian and French poetry. Satisfies the Pre- and Early Modern Literature concentration; also satisfies the Poetry and Pre- and Early Modern distribution requirements. *M. Brose*

190. Senior Seminar.

Seminar offered to literature majors as a way to satisfy the senior exit requirement. Offered at different times by different instructors, focus is on topics of interest in pre- and early modern studies. All students are required to complete an essay of significant length as part of the seminar course work. Prerequisite: Literature 101. May be repeated for credit.

190P. Topics in Pre- and Early Modern Studies. S

Examination of individual authors or critical problems in ancient, medieval, or early modern/Renaissance literature. Topic: the epic tradition. Satisfies the Pre- and Early Modern Literature concentration; also satisfies the Pre- and Early Modern and Senior Seminar distribution requirements. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. May be repeated for credit. *M. Hendricks*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) *The Staff*

195. Senior Essay. F,W,S

Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Russian Literature*Upper-Division Courses***199. Tutorial. F,W,S**

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Spanish/Latin American/Latino Literature*Lower-Division Courses***60. Introduction to Literary Genres. F**

The study of poetry, drama, and prose in Spain and Latin America. (General Education Code(s): IH, E.) *N. Silleras-Fernández*

*Upper-Division Courses***102. Introduction to Hispanic American Literature.****102A. From the Conquest to Sor Juana. ***

A study of Hispanic American literature from the chronicles of the conquest through the 17th century. Readings deal with transformations in both the idea of empire and the rights of the conquered. Includes the works of Colón, Cortés, El Inca Garcilaso de la Vega, Sor Juana Inés de la Cruz, and others. Satisfies the Global, Pre- and Early Modern Studies and Spanish Literature concentrations; also satisfies the Global and Pre- and Early Modern distribution requirements. *N. Klahn*

102B. Romanticism to Modernism. *

Follows the literary manifestations of the growing consciousness of the Latin American writer: discovery of native themes, imitation of European models, search for a "new language" literally and figuratively. Relates historical events with literary movements. Satisfies the Modern, Spanish, and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *L. Martínez-Echazábal*

130. Studies in Latin American Literary Genres.**130E. Latin American Poetry. F**

Poets from "modernismo" to the present in Spanish America. Studies how this poetry attempts to define Latin America, its past, its present history, and its vision for the future. Satisfies the Modern, Spanish, and World Literature concentrations; also satisfies the Global and Poetry distribution requirements. (General Education Code(s): E.) *N. Klahn*

131. National Literatures of Latin America.

A study of the literary expression of a particular Latin American country or region, with texts representing a variety of authors, periods, and genres.

131H. Cuba. S

Satisfies the Modern, Spanish, and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *L. Martínez-Echazábal*

134. Special Topics in Latin American Literature.**134C. Fiction and Marginality: The Marginal at the Center. W**

Marginalized perspectives take center stage in this course that studies ways Latin American/Latino authors textually contest dominant representations and realities, opening symbolic spaces for emergent historical subjects who gain agency and authority by re/presenting unmapped terrains. Texts include chronicles, "testimonios," writings of the self, and novels. Satisfies the Modern, Spanish, and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *N. Klahn*

134L. Historia de la lectura y los lectores: Recepción y consumo cultural en el mundo L. Americano. *

Explores historical readers and reading practices in at least three different formations: colonial, national-popular, and transnational. Proposes a historical-theoretical reconstruction of the place of reading and readers at key moments in the history of culture in Latin America. Satisfies the Modern, Spanish, and

World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *J. Poblete*

134N. El Cuento Hispanoamericano: Variedades estéticas de la literatura breve en América Latina. W

Explores different aesthetic options of famous Latin American masters of the short story. Includes authors such as Quiroga, Borges, Cortázar, Gorodischer, Monterroso. Among the different types of writing to be explored are fantastic, detective, metaliterary, social critique, historical, and philosophical. Satisfies the Modern, Spanish, and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *J. Poblete*

135. Latin American Cinema.

135A. Mexico through the Movies. *

Traces commercial and alternative filmmaking in Mexico from its origins to the present through the works of major directors (e.g. Luis Buñel, Emilio Fernández), with particular emphasis on the historical and actual function of film in Mexican culture. Course satisfies the Modern, Spanish/Latin American/Latino, and World Literature concentrations, and the Global distribution requirement. (Formerly course 134J.) (General Education Code(s): E.) *J. Burton-Carvajal*

135C. La Globalización en/del Cine Latino/Américo. *

Examines globalization of Latin/o American cinema as a cultural industry. Classical issues of cultural politics and political economy are revisited from the viewpoint of current global processes. Also provides access to the representation of different aspects of globalization in Latin/o American cinema. Course satisfies the Modern, Spanish/Latin American/Latino, and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *J. Poblete*

135F. Cine y Literatura. F

Introduction to analysis and interpretation of major Spanish-language films derived from literary works by Latin American and Spanish authors. Explores mechanisms of representation and adaptation. *J. Burton-Carvajal*

150. Introduction to the Golden Age. *

An introduction to representative works of the main genres of the period by authors such as Garcilaso de la Vega, Luis de León, San Juan de la Cruz, Santa Teresa de Jesús, Lope de Vega, Francisco de Quevedo, and Calderón de la Barca, and to life in Spain during the 16th and 17th centuries. Satisfies the Pre- and Early Modern Studies and Spanish Literature concentrations; also satisfies the Pre- and early Modern distribution requirement. *The Staff*

195. Senior Essay. F,W,S

Prerequisite(s): Literature 101. *The Staff*

198. Group Tutorial. F,W,S

May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

World Literature and Cultural Studies

Upper-Division Courses

104. Magic Divination Astrology. *

Cross-cultural study of magic, divination, and astronomical prognostication as rituals of power that both express and negotiate differences in gender, race, ethnicity, and class. Literature 101 or previous experience with critical theory strongly recommended. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Pre- and Early Modern and Global distribution requirements. May be repeated for credit. *D. Selden*

105. International Cyberpunk. W

Cyberpunk, considered a subgenre within science fiction, has achieved international prominence and presents interesting interpretative challenges. Course examines some issues as manifested in representative texts. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. *W. Godzich*

109. Topics in Cultural Studies. *

Studies in the theory of cultural studies. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. May be repeated for credit. (General Education Code(s): E.) *The Staff*

112. Narratives of Resistance. *

Selections from writers from around the world, whose common theme is resistance to domination. In most cases, the domination is multiple and complex, involving gender oppression, and racial and colonial domination. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *The Staff*

113. The Future. S

Examines modes of thinking and imagining the future throughout human history, and considers the fate of the future today. Topics include apocalyptic religion, utopia and dystopia, progress, revolution, finance, and everyday life. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. *C. Connery*

115A. Fiction in a Global Context. F,S

Comparative examination of fiction in the modern world and of fictional responses to social change and crisis. Topic: (F) the Black Fantastic; (S) introduction to the postcolonial. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. May be repeated for credit. *L. Chude-Sokei, V. Cooppan*

117. History and Memory in the New World. *

Writers in the U.S., Latin America, and the Caribbean have been drawn repeatedly to the theme of intercultural conflict as they recall the traumatic history of the hemisphere. Examining fiction, poetry, and film expands the horizons of "American" literature. Satisfies the Modern and World Literature concentrations; also satisfies the Global distribution requirement. (General Education Code(s): E.) *K. Gruesz*

118. Literature of the Asian Diaspora. F

Study of literature of the Asian diaspora, attempting to discover and define a growing body of contemporary writing under this rubric, including immigrant/migrant histories, memories of exile and refuge, as well as the fiction of imagined homelands. (General Education Code(s): E.) *K. Yamashita*

124. Cultural Theory in Historical Perspective. *

Examination of representations of medieval and early modern Mediterranean history. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global and Pre- and Early Modern distribution requirements. May be repeated for credit. (General Education Code(s): E.) *S. Kinoshita*

135. Classical Chinese Culture and Literature, 10th Century B.C.E. through Sixth Century C.E. *

Survey of writing and culture from the 10th century B.C.E. through the sixth century C.E., focusing on poetry, philosophical and historical writing, supernatural fiction, Buddhist/Taoist texts in contexts of fragmentation, empire building, dynastic collapse, rebellion, eremitism, and courtly society. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global, Poetry, and Pre- and Early Modern distribution requirements. (Also offered as History 141A. Students cannot receive credit for both courses.) (General Education Code(s): E.) *C. Connery*

136. Classical Chinese Culture and Literature, Sixth Century through 16th Century. *

Survey of writing and culture from the Tang through early Ming dynasties (6th century C.E. through 16th century C.E.). Themes include literary, religious, and philosophical innovation; courtly life; cultural contacts with non-Chinese people; and transformations of state and society. Satisfies the Pre- and Early Modern and World Literature concentrations; also satisfies the Global, Poetry, and Pre- and Early Modern distribution requirements. (Also offered as History 141B. Students cannot receive credit for both courses.) (General Education Code(s): E.) *C. Connery*

190. Senior Seminar.

Seminar offered to literature majors as a way to satisfy the senior exit requirement. Offered at different times by different instructors; focus is on topics of interest in world literature and cultural studies. All students are required to complete an essay of significant length as part of the seminar course work. Prerequisite(s): Literature 101.

190A. Topics in World Literature and Cultural Studies. *

Satisfies the Modern and World Literature concentrations; also satisfies the Global and Senior Seminar distribution requirements. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. May be repeated for credit. (General Education Code(s): E.) *The Staff*

190B. Studies in Slavery, Race, and Nation in the Americas. *

Compares literatures and histories of slavery, abolitionism, and nationalism in 19th-century Cuba and the U.S. Readings include slave narratives by Juan Francisco Manzano (Cuba) and Harriet Jacobs (U.S.) and antislavery novels by black nationalist Martin Delany, Cuban nationalist Cirilio Villaverde, and "sentimental" reformers Harriet Beecher Stowe and Gertrudis Gomez de Avellaneda. Satisfies the Modern and World Literature concentrations; also satisfies the Global and Senior Seminar distribution requirements. Prerequisite(s): Literature 101. Enrollment restricted to senior literature majors. (General Education Code(s): E.) *S. Gillman*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. *The Staff*

195. Senior Essay. F,W,S

Prerequisite(s): Literature 101. May be repeated for credit. *The Staff*

198. Group Tutorial. F,W,S

The Staff

199. Tutorial. F,W,S

May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Literature: Graduate Courses**200. Proseminar. F**

The proseminar provides a common experience for entering students, facilitates exchange of ideas and approaches to literary and extra-literary texts, critical issues, and theoretical problems. It focuses on broad aspects of the history of theory and criticism, on the students' critical writing, and on aspects of professional development. Enrollment restricted to graduate students. *W. Godzich*

201. The Pedagogy of Literature (1 credit). F

Provides training for graduate students in university-level pedagogy in general and in the pedagogy of literature specifically. Coordinated by a graduate student who has had substantial experience as a teaching assistant, under the supervision of a faculty member. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

202. Colloquium (2 credits). F,W,S

Student receives credit for attending designated number of freestanding lectures, colloquia, symposia, or conferences during the term and reports orally, or in writing, to instructor. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

204. Readings in Literature (2 credits). *

Focuses on selected texts or authors in literature and/or theory. Students meet with instructor to discuss readings and deepen their knowledge on a particular author, critic, theorist, or text. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

291F. Advising (2 credits). F,W,S

Independent study formalizing the advisee-advisor relationship. Regular meetings to plan, assess, and monitor academic progress and to evaluate course work as necessary. May be used to develop general bibliography of background reading and trajectory of study. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

English-Language Literatures: Graduate Courses**260. Transnational Literatures. S**

Investigation of English language literature which transcends national boundaries. Topic: Diaspora and black techno-poetics. Enrollment restricted to graduate students. May be repeated for credit. *L. Chude-Sokei*

270. Individual Authors. *

Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

280. Topics in English Language Literature. F,W

Topics: (F) *The Tempest*, *Moby Dick*; (W) 19th-century U.S. poetry. Enrollment restricted to graduate students. May be repeated for credit. F. Robinson, (F) *H. Berger*, (W) *K. Gruesz*

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with teaching of undergraduates. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

French Literature: Graduate Courses**230. Studies in Literary and Cultural History. F,S**

In-depth examination of one period of French literature. Topics: (F) *Amour courtois et société féodale*; (S) French animals, early and modern. Enrollment restricted to graduate students. May be repeated for credit. *S. Kinoshita, C. Freccero*

240. Studies in Literary Genres. *

An in-depth examination of one genre of French literature. Enrollment restricted to graduate students. May be repeated for credit. (S) *The Staff*

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. *The Staff*

295. Directed Reading. F,W,S

Directed reading which does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

German Literature: Graduate Courses**294. Teaching-Related Independent Study. F,W,S**

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

Greek Literature: Graduate Courses**294. Teaching-Related Independent Study. F,W,S**

Directed graduate research and writing coordinated with the teaching of undergraduates. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

Italian Literature: Graduate Courses**294. Teaching-Related Independent Study. F,W,S**

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

Latin Literature: Graduate Courses**294. Teaching-Related Independent Study. F,W,S**

Directed graduate research and writing coordinated with the teaching of undergraduates. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

Modern Literary Studies: Graduate Courses**219. Feminist Theories/Historical Perspectives. F**

A reciprocal, critical investigation of the concerns and debates raised by contemporary gender theories (feminist, gay, and lesbian) on the one hand, and various historically specific texts and contexts, on the other. Enrollment restricted to graduate students. *C. Freccero*

221. Women Modernists. *

The study of selected experimental texts by early 20th-century British and American women writers. Enrollment restricted to graduate students. *T. Miller*

231. Studies in Literary and Cultural History. W,S

Topics: (W) from the Bildungsroman to the rise of fascism; (S) Marxist theory. Enrollment restricted to graduate students. May be repeated for credit. *L. Nygaard, R. Tendiman*

270. Narrative Theory. *

A survey of 20th-century narratology, emphasizing structuralist and poststructuralist theories of narrative. Enrollment restricted to graduate students. May be repeated for credit. *J. Jordan*

280. Topics in Theory. F,W,S

Explores issues arising in both the modern practice of criticism and in writings on the theory of criticism. Topics: (F) György Lukács: narrative and historical repre-

sentation; (W) Judaism and literary theory; (S) Latin(o) American critical theory. Enrollment restricted to graduate students. May be repeated for credit. *T. Miller, N. Deutsch, J. Poblete*

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduates students. May be repeated for credit. *The Staff*

Pre- and Early Modern Literature: Graduate Courses**204. Studies in Early Modernity. ***

In-depth examination of a topic in Early Modern Studies. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

220. Individual Authors. S

Focuses on work of a single author in literary historical and/or historical context. Topic: Petrarch. Enrollment restricted to graduate students. May be repeated for credit. *M. Brose*

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. Students submit petition to sponsoring agency. *The Staff*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

Spanish/Latin American/Latino Literature: Graduate Courses**213. Latin American Film: Gender, Genre, Race, and Nation. W**

Using selected feature films from Argentina, Cuba, and Mexico (1940–present), students develop expertise in the semiotics of the cinematic, historiography of "peripheral" national cinemas, genre theory, gender theory, and expressions of the national in both commercial and independent filmmaking. Reading knowledge of Spanish is desirable. Enrollment restricted to graduate students. *J. Burton-Carvajal*

216. Modernism and Postmodernism: The Debate in Latin America. *

Addresses the problematics of these concepts as they relate to literary and cultural production in Latin America. Topic for spring 2008: poetics, politics and translation. Enrollment restricted to graduate students. *N. Klahn*

223. Writing and Re-Writing of the Conquest and Colonial Period in Spanish America. F

Study of 1) the writings (chronicles, memoirs, diaries, letters) comprising European and indigenous accounts of the encounter and indigenous, criolla, and mestiza writings during the colony; and 2) the re-writings of these events in contemporary post-colonial novels. Enrollment restricted to graduate students. *N. Klahn*

226. Teoria Critica en America Latina. S

Overview of contemporary theoretical issues in Latin American cultural critique. Enrollment restricted to graduate students. *J. Poblete*

231. National Literatures of Latin America.**231A. Cuba. ***

Enrollment restricted to graduate students. *L. Martinez-Echazabal*

295. Directed Reading. F,W,S

Directed reading that does not involve a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Students Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

World Literature and Cultural Studies: Graduate Courses**201. Theory and Methods. S**

Global theories of history and cultural production. Topic: Atlantic studies. Enrollment restricted to graduate students. May be repeated for credit. *S. Gillman*

209. Topics in Cultural Studies. F,W,S

Topics: (F) Asia/Pacific. (W) Section 01—Medieval Mediterranean; Section 02—world versions of pastoral. Enrollment restricted to graduate students. May be repeated for credit. *C. Connery, S. Kinoshita, R. Wilson*

295. Directed Reading. F,W,S

Directed reading which does not require a term paper. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

Marine Biology

See Biological Sciences, page 135.

Marine Sciences

See Ocean Sciences, page 373.

Mathematics

194 Baskin Engineering
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<http://www.math.ucsc.edu>

Faculty and Professional Interests

Professor

ROBERT BOLTJE
Group theory, algebraic number theory

BRUCE N. COOPERSTEIN
Groups of Lie type, incidence geometry

CHONGYING DONG
Infinite-dimensional Lie algebras and their representations, conformal field theory

ALEXANDER GAMBURD
Spectral problems in number theory, probability, and combinatorics

VIKTOR GINZBURG
Global analysis, symplectic topology; Hamiltonian dynamical systems, Poisson geometry, symmetries, and group actions

DEBRA LEWIS
Geometric Hamiltonian mechanics, geometric integration, bifurcation theory, applications of variational methods, control theory

GEOFFREY MASON

Vertex operator algebras and applications to conformal field theory and string theory: modular forms; group theory; quasi-Hopf algebras

RICHARD MONTGOMERY

Celestial mechanics, differential geometry, gauge theory, mechanics (quantum and classical), and singularity theory

JIE QING

Nonlinear analysis, harmonic analysis, partial differential equations with applications to differential geometry, mathematical physics

MARIA SCHONBEK

Nonlinear partial differential equations, with emphasis on fluid equations

ANTHONY J. TROMBA

Global nonlinear analysis, calculus of variations, minimal surfaces and Plateau's problem, Riemann surfaces

JONATHAN WEITSMAN

Geometry and mathematical physics

Associate Professor

TORSTEN EHRHARDT

Functional analysis, Operator theory, Toeplitz matrices, Banach algebras, Random Matrix Theory, Wiener-Hopf factorization

HIROTAKE TAMANOI

Algebraic topology, string topology, mathematical aspects of string theory

Assistant Professor

SAMIT DASGUPTA

Algebraic number theory, arithmetic geometry, special values of L-functions

MARTIN H. WEISSMAN

Representation theory, automorphic forms, number theory

Emeriti

RALPH H. ABRAHAM

NICHOLAS BURGOYNE

ARTHUR E. FISCHER

MARVIN J. GREENBERG

AL KELLEY

EDWARD M. LANDESMAN

TUDOR S. RATTU

GERHARD RINGEL

MARSHALL SYLVAN

HAROLD WIDOM

Lecturer

FRANK BÄUERLE

NANDINI BHATTACHARYA

MARK R. EASTMAN

YONATAN KATZNELSON

EDWARD MIGLIORE

RICHARD R. MITCHELL

PATRICK TANTALO

Program Description

Mathematics is both a fundamental discipline and an essential tool for students of biology, chemistry, computer engineering, computer science, Earth sciences, economics, electrical engineering, information systems management, physics, and psychology. Researchers in all these areas are constantly developing new and cutting-edge ways of applying mathematics to their field. A strong mathematics background is vital to the advanced study of the physical and biological sciences and plays an integral role in studying the social sciences.

The UCSC mathematics program offers a wide variety of undergraduate mathematics courses:

- Courses 2 and 3 do not require thorough preparation in mathematics at the high school level. However, students interested in studying mathematics are strongly encouraged to take algebra, geometry, and trigonometry before entering the university. Prospective freshmen are also encouraged to take the mathematics placement exam during their senior year of high school at a UCSC-scheduled exam. If they place into course 2 or 3, they should take those courses at UCSC during the summer, so they can begin the calculus series when they enter in the fall. Failure to begin the calculus series in the fall could delay progress in some majors.
- Lower-division courses with numbers in the range 11A-B through 30 (calculus, linear algebra, multivariable calculus, differential equations, and problem solving) prepare students for further study in mathematics, the physical and biological sciences, or quantitative areas of the social sciences. Science majors take a combination of these courses as part of their undergraduate studies.
- Upper-division courses, with numbers in the range 100-199, are intended for majors in mathematics and closely related disciplines. Some of these courses provide students with a solid foundation in key areas of mathematics such as algebra, analysis, geometry, and number theory, whereas others introduce students to more specialized areas of mathematics. Calculus, linear algebra, multivariable calculus, and proof and problem solving are prerequisite to most of these advanced courses.

Within the major, there are three concentrations leading to the B.A. degree: pure mathematics, computational mathematics, and mathematics education. These programs are designed to give students a strong background for graduate study, for work in industry or government, or for teaching. Each concentration requires nine courses, one of which must be a senior thesis or senior seminar. Please read the pure mathematics, computational mathematics, and mathematics education program descriptions below for specific information about course requirements. A minor in mathematics is also offered.

The mathematics program also provides an excellent liberal arts background from which to pursue a variety of career opportunities. UCSC graduates with degrees in mathematics hold teaching posts at all levels, as well as positions in law, government, civil service, insurance, software development, business, banking, actuarial science, forensics, and other professions where skills in logic, numerical analysis, and computing are required. In particular, students of mathematics are trained in the art of problem-solving, a skill absolutely essential to all professions.

Academic Advising

Academic advising is available at the Mathematics Department office. The undergraduate adviser provides information about requirements, prerequisites, policies and procedures, learning support, scholarships, and special opportunities for undergraduate research. In addition, the adviser assists with the drafting of study plans, as well as certifying degrees and minors. Students are urged to stay informed and involved with their major, as well as to seek advice should problems arise.

The Mathematics Department's web site (<http://www.math.ucsc.edu>) is a critical resource for students. Here you will find a link to the undergraduate program; the materials at that link constitute the undergraduate handbook. Students should visit this first to seek answers to their questions, because it hosts a wealth of

information. Each student in the major is encouraged to regularly review the materials posted to stay current about requirements, course curriculum, and departmental policy.

Requirements

Students who plan to take a mathematics course at UCSC must demonstrate sufficient preparation by their score on either the mathematics placement exam (MPE), the College Entrance Examination Board Advanced Placement (AP) calculus exam, the International Baccalaureate Higher Level Mathematics Exam, or by passing the appropriate prerequisite course.

UC Santa Cruz Mathematics Placement Exam

Mathematics placement exam scores are valid for one year. Students whose areas of study require precalculus or calculus courses are strongly advised to take the placement exam and the required courses early in their academic careers. The placement exam is given at the beginning of each quarter, weekly through the seventh week of each quarter, and at prospective-student orientations. Bring photo identification for entry into the placement exam.

If your MPE score is	May enroll in this course
12-19	2
20-30	3
31-39	11A*
40-45	19A
46 or higher	19A or 20A

* Students who plan to major in computer engineering, computer science, electrical engineering, information systems management, mathematics, or physics and who receive a score in the range 31-39 on the MPE should take courses 3 and 19A-B rather than courses 11A-B.

College Board Advanced Placement Calculus Exams

Students who have received 4 credits for the College Entrance Examination Board Advanced Placement (AP) calculus exam should normally enroll in course 19B, and those with 8 credits should normally enroll in course 23A. However, students who received a score of 3 on the calculus AB or BC AP exam, should enroll in course 19A or 19B, respectively, to improve their knowledge of calculus before continuing their studies. Students who wish to challenge themselves, and who received a score of 4 or 5 on the AB or a score of 3, 4, or 5 on the BC exam may choose courses 20A and 20B, *Honors Calculus*. Non-mathematics majors should consult their major departments before enrolling in a mathematics course.

If your AP AB score is	May enroll in this course
3	Mathematics 11A or 19A
4 or 5	Mathematics 20A or 11B or 19B

If your AP BC score is	May enroll in this course
3	Mathematics 11B or 19B or 20A
4 or 5	Mathematics 20A or 22 or 23A

International Baccalaureate Higher Level Exam in Mathematics

Students who have received a score of 5, 6, or 7 on the International Baccalaureate (IB) Higher Level Exam in Mathematics may enroll in course 20A, *Honors Calculus*; 22, *Calculus of Several Variables*; or 23A, *Multivariable Calculus*. Non-mathematics majors should

consult their major departments before enrolling in a mathematics course.

Prerequisite Courses

Students who have passed course 2 may enroll in course 3. Students who have passed course 3 may enroll in course 11A or 19A. Students who have passed an articulated precalculus course at a college or university may enroll in course 11A or 19A, but they must verify eligibility of the course and course completion with the Mathematics Department staff.

Premajor Requirements

Premajor requirements for all concentrations in the major are courses 20A-B, *Honors Calculus*; or 19A-B, *Calculus for Science, Engineering, and Mathematics*; 21, *Linear Algebra*; and 23A-B, *Multivariable Calculus*. The mathematics education concentration has one additional premajor requirement, Applied Mathematics and Statistics (AMS) 5, *Statistics*. For some non-mathematics majors, courses 11A-B can be substituted for 19A-B, but they are not recommended for students planning to major in computer engineering, computer science, electrical engineering, information systems management, or physics. Although not considered a premajor requirement, course 100 is a prerequisite for most upper-division mathematics courses.

It should be emphasized that the nature of mathematics changes dramatically between lower-division and upper-division courses. Students often find that the material becomes far more abstract and theoretical. In addition, the role of computation in assignments diminishes and a greater weight is placed on deductive reasoning and the integral role of mathematical proofs. Therefore, it is strongly recommended that only students who earn grades of B- or better in Mathematics 100 consider applying to the major in mathematics.

In addition, Mathematics 103, 110, or 128A are recommended as possibilities for a student's first upper-division course following Mathematics 100. Students are more successful in making the transition between lower and upper division after taking one of these courses. Mathematics 105A, 111A, 121A, and 124 are particularly demanding and should be taken later in the program. Be aware that top students spend roughly 15 hours per class beyond the lectures and sections, so plan your course load accordingly.

Major Requirements

Pure Mathematics

This concentration is intended for students who desire a comprehensive understanding of mathematics, including those considering graduate studies in the natural sciences. Students are required to complete at least nine courses (with laboratories, if appropriate) from among those numbered 100 or higher.

Six of these courses must be

- Mathematics 100, *Introduction to Proof and Problem Solving*;
- Mathematics 103, *Complex Analysis*;
- Mathematics 105A, *Real Analysis*;
- Mathematics 111A, *Algebra*;
- one of Mathematics 121A, *Differential Geometry*, Mathematics 124, *Introduction to Topology*, or Mathematics 128A, *Classical Geometry: Euclidean and Non-Euclidean*;
- and either Mathematics 194, *Senior Seminar*, or Mathematics 195, *Senior Thesis*.

The remaining three courses are selected by the student from among Mathematics 24 and Mathematics 30 and mathematics courses numbered above 100.

A typical program for a pure mathematics major might include the following:

<i>1st year</i>	Mathematics 20A-B or 19A-B, 21, 23A
<i>2nd year</i>	Mathematics 23B, 24, 100, 103, 110 or 128A
<i>3rd year</i>	Mathematics 105A-B, 111A-B, 106 or 124
<i>4th year</i>	Mathematics 117, 121A, 194

The first two years of a typical program for a pure mathematics major who begins mathematics studies with precalculus might include the following:

<i>1st year</i>	Mathematics 3, 19A-B
<i>2nd year</i>	Mathematics 21, 23A-B, 24, 100

Computational Mathematics

This concentration is intended to prepare students for technical careers in industry or government while providing a solid mathematical background. Students are required to complete a minimum of seven mathematics courses (with laboratories, if appropriate) as follows:

- Mathematics 24, *Ordinary Differential Equations*;
- Mathematics 100, *Introduction to Proof and Problem Solving*;
- Mathematics 103, *Complex Analysis*, or Mathematics 105A, *Real Analysis*;
- Mathematics 110, *Introduction to Number Theory*;
- Mathematics 111A, *Algebra*;
- Mathematics 145, *Introductory Chaos Theory*, or Applied Mathematics and Statistics 146, *Introduction to Dynamical Systems*, or Applied Mathematics and Statistics 147, *Computational Methods and Applications*;
- and either Mathematics 194, *Senior Seminar*, or Mathematics 195, *Senior Thesis*.

In addition, students must complete two courses selected from the following:

- Applied Mathematics and Statistics 113, 131, 146, 147, 162
- Biomolecular Engineering 110
- Computer Engineering 107, 108, 117, 153, 177
- Computer Science 101, 102, 104A, 109, 112, 122, 130, 132, 142
- Electrical Engineering 103, 130, 135, 151, 154

Mathematics majors who wish to enroll in Computer Science 101 or Computer Science 122 should contact the instructor to request a permission code.

A typical program for a computational mathematics major might include the following:

<i>1st year</i>	19A-B, 23A, CMPS 12A and 12B
<i>2nd year</i>	21, 23B, 24, 100, 110, CMPE 16
<i>3rd year</i>	103; 105A; 145 or AMS 146, or 147; CMPS 101
<i>4th year</i>	106A, 111A, CMPS 109, 194

Mathematics Education

This concentration is intended to prepare students for teaching kindergarten through high school (K-12) mathematics. In addition to the pre-major requirements (which for this track include Applied Mathematics and Statistics 5, *Statistics*), students are required to complete the following nine courses:

- Mathematics 100, *Introduction to Proof and Problem Solving*;
- either Mathematics 103, *Complex Analysis*, or 105A, *Real Analysis*;

- Mathematics 110, *Introduction to Number Theory*;
- Mathematics 111A, *Algebra*;
- Mathematics 128A, *Classical Geometry: Euclidean and Non-Euclidean*;
- Applied Mathematics and Statistics 131, *Introduction to Probability Theory*;
- Mathematics 181, *History of Math*;
- Mathematics 188, *Supervised Teaching Experience*;
- and either Mathematics 194, *Senior Seminar*, or Mathematics 195, *Senior Thesis*.

UCSC students can pursue a degree in mathematics while preparing to teach at the secondary level. In California, students seeking a single-subject credential (for secondary teaching) in mathematics are required to take the CSET, a series of exams that must be passed in order to enter a teaching-credential program (formerly The National Teachers Examination). Students who complete the mathematics education track, plus three additional specified courses, qualify for the California Single Subject Program, exempting themselves from the CSET. Both the Mathematics Department undergraduate adviser and the Education Department advising office have more information about the additional required courses.

A typical program for a mathematics education major might include the following:

<i>1st year</i>	Mathematics 19A-B, 23A
<i>2nd year</i>	Mathematics 21, 23B, 100; Applied Mathematics and Statistics 5
<i>3rd year</i>	Mathematics 30, 103, 110, 181; Applied Mathematics and Statistics 131
<i>4th year</i>	Mathematics 111A, 128A, 188, 194

Minor Requirements

The minor is intended for students who are interested in mathematics and want a strong mathematical foundation for studying in areas that rely heavily on analytical skills. Students are required to complete at least seven courses, with course 100 required. The courses that may be counted toward fulfillment of the minor requirements are courses 21, 23B, course 24, and those numbered 100 or higher. No senior seminar or thesis is required.

A typical mathematics minor program for a physics major might be:

<i>1st year</i>	Mathematics 19A-B, 23A
<i>2nd year</i>	Mathematics 21, 23B, 24, 100
<i>3rd year</i>	Mathematics 103, 105A, 106A, 121A or 124
<i>4th year</i>	Mathematics 107, 145 or Applied Mathematics and Statistics 146

Disqualification from the Major or Minor

The Mathematics Department disqualification policy regarding performance in the major or minor is effective fall 2008. Students who receive a W, D, F, or NP grade in any single mathematics course twice or three or more upper-division mathematics courses combined, will be considered not making normal progress and will be disqualified from the major or minor. Students at risk of disqualification should meet with an undergraduate adviser to discuss their options for continuing in the major.

Students who have reason to believe that there are valid, extenuating circumstances surrounding their failure of a course for the second time, or their failure in three courses, may appeal their disqualification from

the major or minor. The appeal must be in writing and explain the reasons why the student should not be disqualified. Supporting evidence should be included. An appeal must be submitted to the department's advising office no later than 15 days from the date the disqualification notice was mailed. The department's lead undergraduate adviser and undergraduate chair will review appeals. Decisions will be made within 30 days upon receipt of an appeal.

Course Information

Mathematics 2, *College Algebra for Calculus*, is designed for students who do not meet the requirements for admission to Mathematics 3, Precalculus, and who need comprehensive and careful preparation for calculus. Mathematics 2 emphasizes algebra, graphs, and functions. The prerequisite for course 2 is a minimum placement examination score of 12.

Mathematics 3, *Precalculus*, is recommended for students who need some preparation in algebra and trigonometry prior to taking calculus. This course covers functions and their inverse, exponentials, logarithms, and trigonometry.

Mathematics 11A-B, *Calculus with Applications*, are intended for biology and Earth sciences majors. However, students in these majors who score 40 or more points on the Mathematics Placement Exam are strongly encouraged to take the 19A-B sequence, which is required for most upper-division mathematics courses. Laboratory sections are mandatory.

Mathematics 19A-B, *Calculus for Science*, Engineering, and Mathematics, are intended for chemistry, computer engineering, computer science, electrical engineering, information systems management, mathematics, and physics majors. Laboratory sections are mandatory.

Mathematics 20A-B, *Honors Calculus*, are intended for students who would enjoy delving particularly deeply into the foundational and theoretical issues of calculus. Laboratory sections are mandatory.

Mathematics 21, *Linear Algebra*, covers vector spaces, matrices, determinants, systems of linear equations, and eigenvalues. It is intended for students in the physical and biological and social sciences and is prerequisite to Mathematics 111A.

Mathematics 22, *Introduction to Calculus of Several Variables*, is intended for science students whose schedules do not permit a full and comprehensive two quarters of multivariable calculus. Students who intend to pursue further studies in mathematics must take Mathematics 23A-B and not 22. Laboratory sections are mandatory.

Mathematics 23A-B, *Multivariable Calculus*, are intended for mathematics majors and minors and students in computer engineering, computer science, electrical engineering, information systems management, and physics majors which require more rigorous mathematical training. Laboratory sections are mandatory.

Mathematics 100, *Introduction to Proof and Problem Solving*, is an introduction to the methodology of advanced mathematics, emphasizing proof techniques. Basic areas such as set theory and logic are introduced, together with extensive applications within mathematics. This course serves as a prerequisite for nearly all upper-division courses.

Graduate-level courses. All graduate courses are open to undergraduates who have taken the recommended prerequisites; students should consult with the course instructor. Advanced undergraduates are strongly

advised to take or audit graduate courses that interest them.

Graduate Program

The Mathematics Department offers programs leading to the M.A. and Ph.D. degrees. Contact the Division of Graduate Studies for further information on the M.A. and Ph.D. programs, as well as on university application procedures.

M.A. Degree Requirements

Students are required to complete two of Mathematics 200, 201, 202, 203; two of Mathematics 204, 205, 206; one of Mathematics 208, 209, 210; and complete five additional courses in mathematics or a related subject by approval. In addition, students must do one of the following:

- pass an M.A.-level preliminary examination;
- write a master's thesis.

Ph.D. Degree Requirements

All of the following are required:

- obtain a Ph.D.-level pass on two of the three written preliminary examinations, or a Ph.D.-level pass on one and a master's-level pass on the remaining two. Students who opt for the Ph.D.-level pass on two of the three preliminary examinations must complete the full sequence in the track associated with the preliminary examination they did not pass;
- satisfy the foreign language requirement;
- pass the qualifying examination;
- complete three quarters as a teaching assistant;
- complete six graduate courses in mathematics other than Mathematics 200, 201, 202, 203, 204, 205, and 206. No more than three courses may be independent study or thesis research courses;
- write a Ph.D. thesis and present the thesis defense.

Students admitted to the Ph.D. program may receive an M.A. degree en route to the Ph.D.; students admitted to the M.A. program may transfer to the Ph.D. program upon passing the required preliminary examinations at the Ph.D. level.

Lower-Division Courses

2. College Algebra for Calculus. F,W,S

Operations on real numbers, complex numbers, polynomials, and rational expressions; exponents and radicals; solving linear and quadratic equations and inequalities; functions, algebra of functions, graphs; conic sections; mathematical models; sequences and series. Prerequisite(s): placement exam score of 12 or higher. *The Staff*

3. Precalculus. F,W,S

Inverse functions and graphs; exponential and logarithmic functions, their graphs, and use in mathematical models of the real world; rates of change; trigonometry, trigonometric functions, and their graphs; and geometric series. Students cannot receive credit for both course 3 and Applied Mathematics and Statistics 3. Applied Mathematics and Statistics 3 can substitute for course 3. Prerequisite(s): course 2 or placement exam score of 20 or higher. (General Education Code(s): Q.) *The Staff*

4. Mathematics of Choice and Argument. S

Techniques of analyzing and creating quantitative arguments. Application of probability theory to questions in justice, medicine, and economics. Analysis and avoidance of statistical bias. Understanding the application and

limitations of quantitative techniques. Prerequisite(s): course 2, or placement exam score of 12 or higher, or AP Calculus AB exam score of 3 or higher. Enrollment limited to 54. (General Education Code(s): Q.) *The Staff*

11A. Calculus with Applications. F,W,S

A modern course stressing conceptual understanding, relevance, and problem solving. The derivative of polynomial, exponential, and trigonometric functions of a single variable is developed and applied to a wide range of problems involving graphing, approximation, and optimization. Students cannot receive credit for both this course and course 19A or Applied Mathematics and Statistics 11A or Economics 11A. Prerequisite(s): course 3 or Applied Mathematics and Statistics 3; or placement exam score of 31 or higher; or AP Calculus AB exam score of 3 or higher. (General Education Code(s): IN, Q.) *The Staff*

11B. Calculus with Applications. F,W,S

Starting with the fundamental theorem of calculus and related techniques, the integral of functions of a single variable is developed and applied to problems in geometry, probability, physics, and differential equations. Polynomial approximations, Taylor series, and their applications conclude the course. Students cannot receive credit for this course and course 19B, or Applied Mathematics and Statistics 11B, or Economics 11B. Prerequisite(s): course 11A or AP Calculus AB exam score of 4 or 5, or BC exam score of 3 or higher, or IB Mathematics Higher Level exam score of 5 or higher. (General Education Code(s): IN, Q.) *The Staff*

19A. Calculus for Science, Engineering, and Mathematics. F,W,S

The limit of a function, calculating limits, continuity, tangents, velocities, and other instantaneous rates of change. Derivatives, the chain rule, implicit differentiation, higher derivatives. Exponential functions, inverse functions, and their derivatives. The mean value theorem, monotonic functions, concavity, and points of inflection. Applied maximum and minimum problems. Students cannot receive credit for both this course and course 11A or Applied Mathematics and Statistics 11A or Economics 11A. Prerequisite(s): course 3 or Applied Mathematics and Statistics 3 or placement exam score of 40 or higher or AP Calculus AB exam score of 3 or higher. (General Education Code(s): IN, Q.) *The Staff*

19B. Calculus for Science, Engineering, and Mathematics. F,W,S

The definite integral and the fundamental theorem of calculus. Areas, volumes. Integration by parts, trigonometric substitution, and partial fractions methods. Improper integrals. Sequences, series, absolute convergence and convergence tests. Power series, Taylor and Maclaurin series. Students cannot receive credit for both this course and course 11B, Applied Math and Statistics 11B, or Economics 11B. Prerequisite(s): course 19A or AP Calculus AB exam score of 4 or 5, or BC exam score of 3 or higher, or IB Mathematics Higher Level exam score of 5 or higher. (General Education Code(s): IN, Q.) *The Staff*

20A. Honors Calculus. F

Challenging course designed to approach single-variable calculus from the perspective of modern mathematics. Emphasis is on the evolution and historical development of core concepts underlying calculus and analysis. Prerequisite(s): placement exam score of 46 or higher; or AP Calculus AB exam score of 4 or 5; or BC exam of 3 or higher; or IB Mathematics Higher Level exam score of 5 or higher. Enrollment limited to 60. (General Education Code(s): IN, Q.) *The Staff*

20B. Honors Calculus. W

Challenging course designed to approach single-variable calculus from the perspective of modern mathematics. Emphasis is on the evolution and historical development of core concepts underlying calculus and analysis. Prerequisite(s): course 20A. Enrollment limited to 60. (General Education Code(s): IN, Q.) *The Staff*

21. Linear Algebra. F,W,S

Systems of linear equations, matrices, determinants. Introduction to abstract vector spaces, linear transformation, inner products, geometry of Euclidean space, and eigenvalues. One quarter of college mathematics is recommended as preparation. Prerequisite(s): course 2, or placement exam score of 20 or higher. (General Education Code(s): Q.) *The Staff*

22. Introduction to Calculus of Several Variables. F,W,S

Functions of several variables. Continuity and partial derivatives. The chain rule, gradient and directional derivative. Maxima and minima, including Lagrange multipliers. The double and triple integral and change of variables. Surface area and volumes. Applications from biology, chemistry, earth sciences, engineering, and physics. Students cannot receive credit for this course and course 23A. Prerequisite(s): course 11B or 19B or 20B or AP calculus BC exam score of 4 or 5. *The Staff*

23A. Multivariable Calculus. F,W,S

Vectors in n -dimensional Euclidean space. The inner and cross products. The derivative of functions from n -dimensional to m -dimensional Euclidean space is studied as a linear transformation having matrix representation. Paths in 3-dimensions, arc length, vector differential calculus. Taylor's theorem in several variables, extrema of real-valued functions, constrained extrema and Lagrange multipliers, the implicit function theorem, some applications. Students cannot receive credit for this course and course 22. Prerequisite(s): course 19B or 20B or AP calculus BC exam score of 4 or 5. *The Staff*

23B. Multivariable Calculus. F,W,S

Double integral, changing the order of integration. Triple integrals, maps of the plane, change of variables theorem, improper double integrals. Path integrals, line integrals, parametrized surfaces, area of a surface, surface integrals. Green's theorem, Stokes theorem, conservative fields, Gauss' theorem. Applications to physics and differential equations, differential forms. Prerequisite(s): course 23A. *The Staff*

24. Ordinary Differential Equations. S

First and second order ordinary differential equations, with emphasis on the linear case. Methods of integrating factors, undetermined coefficients, variation of parameters, power series, numerical computation. Students cannot receive credit for this course and Applied Mathematics and Statistics 27. Prerequisite(s): course 22 or 23A; course 21 is recommended as preparation. *The Staff*

30. Mathematical Problem Solving. F

Students learn techniques of problem solving such as induction, contradiction, exhaustion, dissection, analogy, generalization, specialization, and others in the context of solving problems drawn from number theory, probability, combinatorics, graph theory, geometry, and logic. Prerequisite(s): course 11A or 19A or 20A or Math Placement Exam score of 40 or higher. B. Cooperstein

99. Tutorial. F,W,S

The Staff

Upper-Division Courses

100. Introduction to Proof and Problem Solving. F,W,S

Students learn the basic concepts and ideas necessary for upper-division mathematics and techniques of mathematical proof. Introduction to sets, relations, elementary mathematical logic, proof by contradiction, mathematical induction, and counting arguments. Prerequisite(s): courses 11A and 11B or 19A and 19B or 20A and 20B. Enrollment limited to 50. *The Staff*

103. Complex Analysis. F,W

Complex numbers, analytic and harmonic functions, complex integration, the Cauchy integral formula, Laurent series, singularities and residues, conformal mappings. Prerequisite(s): course 23B; and either course 100 or Computer Science 101. *The Staff*

105A. Real Analysis. W,S

The basic concepts of one-variable calculus are treated rigorously. Set theory, the real number system, numerical sequences and series, continuity, differentiation. Prerequisite(s): course 23B and either course 100 or Computer Science 101. *The Staff*

105B. Real Analysis. S

Metric spaces, differentiation and integration of functions. The Riemann-Stieltjes integral. Sequences and series of functions. Prerequisite(s): course 105A. *The Staff*

105C. Real Analysis. *

The Stone-Weierstrass theorem, Fourier series, differentiation and integration of functions of several variables. Prerequisite(s): course 105B. *The Staff*

106. Systems of Ordinary Differential Equations. F

Linear systems, exponentials of operators, existence and uniqueness, stability of equilibria, periodic attractors, and applications. (Formerly course 106A.) Prerequisite(s): either Applied Mathematics and Statistics 27 or preferably courses 21 and 24; and either course 100 or Computer Science 101. *The Staff*

107. Partial Differential Equations. *

Topics covered include first and second order linear partial differential equations, the heat equation, the wave equation, Laplace's equation, separation of variables, eigenvalue problems, Green's functions, Fourier series. (Formerly course 106B.) Prerequisite(s): either courses 21 and 24 or Applied Mathematics and Statistics 27; and either course 100 or Computer Science 101; course 106 is recommended as preparation. *The Staff*

110. Introduction to Number Theory. F

Prime numbers, unique factorization, congruences with applications (e.g., to magic squares). Rational and irrational numbers. Continued fractions. Introduction to Diophantine equations. An introduction to some of the ideas and outstanding problems of modern mathematics. Prerequisite(s): course 100 or Computer Science 101. (General Education Code(s): Q.) *The Staff*

111A. Algebra. F,S

Group theory including the Sylow theorem, the structure of abelian groups, and permutation groups. Prerequisite(s): course 21 or Applied Mathematics and Statistics 27 and either course 100 or Computer Science 101. *The Staff*

111B. Algebra. W

Introduction to rings and fields including polynomial rings, factorization, the classical geometric constructions, and Galois theory. Prerequisite(s): course 111A. *The Staff*

114. Introduction to Financial Mathematics. *

Financial derivatives: contracts and options. Hedging and risk management. Arbitrage, interest rate, and discounted value. Geometric random walk and Brownian motion as models of risky assets. Ito's formula. Initial boundary value problems for the heat and related partial differential equations. Self-financing replicating portfolio; Black-Scholes pricing of European options. Dividends. Implied volatility. American options as free boundary problems. Corequisite(s): Applied Mathematics and Statistics 131 or Computer Engineering 107. *The Staff*

115. Graph Theory. W

Graph theory, trees, vertex and edge colorings, Hamilton cycles, Eulerian circuits, decompositions into isomorphic subgraphs, extremal problems, cages, Ramsey theory, Cayley's spanning tree formula, planar graphs, Euler's formula, crossing numbers, thickness, splitting numbers, magic graphs, graceful trees, rotations, and genus of graphs. Prerequisite(s): course 21 or Applied Mathematics and Statistics 27 and either course 100 or Computer Science 101. *The Staff*

117. Advanced Linear Algebra. S

Review of abstract vector spaces. Dual spaces, bilinear forms, and the associated geometry. Normal forms of linear mappings. Introduction to tensor products and exterior algebras. Prerequisite(s): course 21 or Applied Mathematics and Statistics 27 and either course 100 or Computer Science 101. *The Staff*

118. Advanced Number Theory. *

Topics include divisibility and congruences, arithmetical functions, quadratic residues and quadratic reciprocity, quadratic forms and representations of numbers as sums of squares, Diophantine approximation and transcendence theory, quadratic fields. Additional topics as time permits. Prerequisite(s): course 110 or 111A. *The Staff*

120. Coding Theory. *

An introduction to mathematical theory of coding. Construction and properties of various codes, such as cyclic, quadratic residue, linear, Hamming, and Golay codes; weight enumerators; connections with modern algebra and combinatorics. Prerequisite(s): course 21. *The Staff*

121A. Differential Geometry. W

Topics include Euclidean space, tangent vectors, directional derivatives, curves and differential forms in space, mappings. Curves, the Frenet formulas, covariant derivatives, frame fields, the structural equations. The classification of space curves up to rigid motions. Vector fields and differentiable forms on surfaces; the shape operator. Gaussian and mean curvature. The theorem Egregium; global classification of surfaces in three space by curvature. Prerequisite(s): courses 21 and 23B and either course 100 or Computer Science 101. Course 105A strongly recommended. *The Staff*

121B. Differential Geometry and Topology. *

Examples of surfaces of constant curvature, surfaces of revolutions, minimal surfaces. Abstract manifolds; integration theory; Riemannian manifolds. Total curvature and geodesics; the Euler characteristic, the Gauss-Bonnet theorem. Length-minimizing properties of geodesics, complete surfaces, curvature and conjugate points cover-

ing surfaces. Surfaces of constant curvature; the theorems of Bonnet and Hadamard. Prerequisite(s): course 121A. *The Staff*

124. Introduction to Topology. F

Topics include introduction to point set topology (topological spaces, continuous maps, connectedness, compactness), homotopy relation, definition and calculation of fundamental groups and homology groups, Euler characteristic, classification of orientable and nonorientable surfaces, degree of maps, and Lefschetz fixed-point theorem. Prerequisite(s): course 100; course 111A recommended. *The Staff*

128A. Classical Geometry: Euclidean and Non-Euclidean. F

Rigorous foundations for Euclidean and non-Euclidean geometries. History of attempts to prove the parallel postulate and of the simultaneous discovery by Gauss, J. Bolyai, and Lobachevsky of hyperbolic geometry. Consistency proved by Euclidean models. Classification of rigid motions in both geometries. Prerequisite(s): either course 100 or Computer Science 101. *The Staff*

128B. Classical Geometry: Projective. *

Theorems of Desargue, Pascal, and Pappus; projectivities; homogeneous and affine coordinates; conics; relation to perspective drawing and some history. Prerequisite(s): course 21. *The Staff*

130. Celestial Mechanics. *

Solves the two-body (or Kepler) problem, then moves onto the N-body problem where there are many open problems. Includes central force laws; orbital elements; conservation of linear momentum, energy, and angular momentum; the Lagrange-Jacobi formula; Sundman's theorem for total collision; virial theorem; the three-body problem; Jacobi coordinates; solutions of Euler and of Lagrange; and restricted three-body problem. Prerequisite(s): courses 19A-B and course 23A or Physics 5A or 6A; courses 21 and 24 strongly recommended. Enrollment limited to 35. *The Staff*

134. Cryptography. S

Introduces different methods in cryptography (shift cipher, affine cipher, Vigenere cipher, Hill cipher, RSA cipher, ElGamal cipher, knapsack cipher). The necessary material from number theory and probability theory is developed in the course. Common methods to attack ciphers discussed. Prerequisite(s): course 100; course 110 recommended as preparation. *The Staff*

140. Industrial Mathematics. W

Introduction to mathematical modeling of industrial problems. Problems in air quality remediation, image capture and reproduction, and crystallization are modeled as ordinary and partial differential equations then analyzed using a combination of qualitative and quantitative methods. Prerequisite(s): course 24 and either course 100 or Computer Science 101, and course 105A. *The Staff*

145. Introductory Chaos Theory. *

The Lorenz and Rossler attractors, measures of chaos, attractor reconstruction, applications from the sciences. Students cannot receive credit for this course and Applied Mathematics and Statistics 146. Prerequisite(s): course 22 or 23A; course 21; course 100 or Computer Science 101. Concurrent enrollment in course 145L is required. *The Staff*

145L. Introductory Chaos Laboratory (1 credit). *

Laboratory sequence illustrating topics covered in course 145. One three-hour session per week in microcomputer laboratory. Concurrent enrollment in course 145 is required. *The Staff*

148. Numerical Analysis. *

The theory of constructive methods in mathematical analysis and its application with scientific computation. Some typical topics are difference equations, linear algebra, iteration, Bernoulli's method, quotient difference algorithm, the interpolating polynomial, numerical differentiation and integration, numerical solution of differential equations, finite Fourier series. Prerequisite(s): course 22 or 23A; course 21 and 24 or Applied Mathematics and Statistics 27; course 100 or Computer Science 101. Concurrent enrollment in course 148L is required. *The Staff*

148L. Numerical Analysis Laboratory (1 credit). *

Laboratory sequence illustrating topics covered in course 148. One three-hour session per week in microcomputer laboratory. Concurrent enrollment in course 148 is required. *The Staff*

160. Mathematical Logic I. S

Propositional and predicate calculus. Resolution, completeness, compactness, and Löwenheim-Skolem theorem. Recursive functions, Gödel incompleteness theorem. Undecidable theories. Hilbert's 10th problem. Prerequisite(s): course 100 or Computer Science 101. *The Staff*

161. Mathematical Logic II. *

Native set theory and its limitations (Russell's paradox); construction of numbers as sets; cardinal and ordinal numbers; cardinal and ordinal arithmetic; transfinite induction; axiom systems for set theory, with particular emphasis on the axiom of choice and the regularity axiom and their consequences (such as, the Banach-Tarski paradox); continuum hypothesis. Prerequisite(s): course 100 or equivalent, or by permission of instructor. Enrollment limited to 45. *The Staff*

181. History of Mathematics. W

A survey from a historical point of view of various developments in mathematics. Specific topics and periods to vary yearly. *The Staff*

188. Supervised Teaching. F,W,S

Supervised tutoring in self-paced courses. May not be repeated for credit. Students submit petition to sponsoring agency. *The Staff*

194. Senior Seminar. W,S

Designed to expose the student to topics not normally covered in the standard courses. The format varies from year to year. In recent years each student has written a paper and presented a lecture on it to the class. Prerequisite(s): course 103 or 105A or 111A. Enrollment priority given to seniors. *The Staff*

195. Senior Thesis. F,W,S

Students research a mathematical topic under the guidance of a faculty sponsor and write a senior thesis demonstrating knowledge of the material. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Algebra I. F

Group theory: subgroups, cosets, normal subgroups, homomorphisms, isomorphisms, quotient groups, free groups, generators and relations, group actions on a set. Sylow theorems, semidirect products, simple groups, nilpotent groups, and solvable groups. Ring theory: Chinese remainder theorem, prime ideals, localization. Euclidean domains, PIDs, UFDs, polynomial rings. Prerequisite(s): courses 111A and 117 are recommended as preparation. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

201. Algebra II. W

Vector spaces, linear transformations, eigenvalues and eigenvectors, the Jordan canonical form, bilinear forms, quadratic forms, real symmetric forms and real symmetric matrices, orthogonal transformations and orthogonal matrices, Euclidean space, Hermitian forms and Hermitian matrices, Hermitian spaces, unitary transformations and unitary matrices, skewsymmetric forms, tensor products of vector spaces, tensor algebras, symmetric algebras, exterior algebras, Clifford algebras and spin groups. Prerequisite(s): Course 200 is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

202. Algebra III. S

Module theory: Submodules, quotient modules, module homomorphisms, generators of modules, direct sums, free modules, torsion modules, modules over PIDs, and applications to rational and Jordan canonical forms. Field theory: field extensions, algebraic and transcendental extensions, splitting fields, algebraic closures, separable and normal extensions, the Galois theory, finite fields, Galois theory of polynomials. Prerequisite(s): Course 201 is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

203. Algebra IV. F

Topics include tensor product of modules over rings, projective modules and injective modules, Jacobson radical, Wedderburn's theorem, category theory, Noetherian rings, Artinian rings, affine varieties, projective varieties, Hilbert's Nullstellensatz, prime spectrum, Zariski topology, discrete valuation rings, and Dedekind domains. Prerequisite(s): courses 200, 201, and 202. Enrollment restricted to graduate students. *The Staff*

204. Analysis I. F

Completeness and compactness for real line; sequences and infinite series of functions; Fourier series; calculus on Euclidean space and the implicit function theorem; metric spaces and the contracting mapping theorem; the Arzela-Ascoli theorem; basics of general topological spaces; the Baire category theorem; Urysohn's lemma; and Tychonoff's theorem. Prerequisite(s): course 105A or equivalent; course 105B is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

205. Analysis II. W

Lebesgue measure theory, abstract measure theory, measurable functions, integration, space of absolutely integrable functions, dominated convergence theorem, convergence in measure, Riesz representation theorem, product measure and Fubini's theorem. Lp spaces, derivative of a measure, the Radon-Nikodym theorem, and the fundamental theorem of calculus. Prerequisite(s): course 204. Enrollment restricted to graduate students. *The Staff*

206. Analysis III. S

Banach spaces, Hahn-Banach theorem, uniform boundedness theorem, the open mapping and closed graph theorems, weak and weak* topology, the Banach-Alaoglu theorem, Hilbert spaces, self-adjoint operators, compact operators, spectral theory, Fredholm operators, spaces of distributions and the Fourier transform, and Sobolev spaces. Prerequisite(s): Courses 204 and 205 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

207. Complex Analysis. W

Holomorphic and harmonic functions, Cauchy's integral theorem, the maximum principle and its consequences, conformal mapping, analytic continuation, the Riemann mapping theorem. Prerequisite(s): Course 103 is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

208. Manifolds I. F

Definition of manifolds; the tangent bundle; the inverse function theorem and the implicit function theorem; transversality; Sard's theorem and the Whitney embedding theorem; vector fields, flows, and the Lie bracket; Frobenius's theorem. Course 204 recommended for preparation. Enrollment restricted to graduate students. *The Staff*

209. Manifolds II. W

Tensor algebra. Differential forms and associated formalism of pullback, wedge product, exterior derivative, Stokes theorem, integration. Cartan's formula for Lie derivative. Cohomology via differential forms. The Poincaré lemma and the Mayer-Vietoris sequence. Theorems of deRham and Hodge. Prerequisite(s): course 208. Course 201 is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

210. Manifolds III. S

The fundamental group, covering space theory and van Kampen's theorem (with a discussion of free and amalgamated products of groups), CW complexes, higher homotopy groups, cellular and singular cohomology, the Eilenberg-Steenrod axioms, computational tools including Mayer-Vietoris, cup products, Poincaré duality, the Lefschetz fixed point theorem, the exact homotopy sequence of a fibration and the Hurewicz isomorphism theorem, and remarks on characteristic classes. Prerequisite(s): Courses 208 and 209 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

211. Algebraic Topology. F

Continuation of course 210. Topics include theory of characteristic classes of vector bundles, cobordism theory, and homotopy theory. Prerequisite(s): Courses 200, 201, and 202 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

212. Differential Geometry. S

Principal bundles, associated bundles and vector bundles, connections and curvature on principal and vector bundles. More advanced topics include: introduction to cohomology, the Chern-Weil construction and characteristic classes, the Gauss-Bonnet theorem or Hodge theory, eigenvalue estimates for Beltrami Laplacian, and comparison theorems in Riemannian geometry. Prerequisite(s): course 208. Enrollment restricted to graduate students. *The Staff*

213A. Partial Differential Equations I. F

First of the two PDE courses covering basically Part I in Evans' book; Partial Differential Equations; which includes transport equations; Laplace equations; heat

equations; wave equations; characteristics of nonlinear first-order PDE; Hamilton-Jacobi equations; conservation laws; some methods for solving equations in closed form; and the Cauchy-Kovalevskaya theorem. Courses 106 and 107 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

213B. Partial Differential Equations II. *

Second course of the PDE series covering basically most of Part II in Evans' book and some topics in nonlinear PDE including Sobolev spaces, Sobolev inequalities, existence, regularity and a priori estimates of solutions to second order elliptic PDE, parabolic equations, hyperbolic equations and systems of conservation laws, and calculus of variations and its applications to PDE. Prerequisite(s): Courses 106, 107, and 213A are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

214. Theory of Finite Groups. *

Nilpotent groups, solvable groups, Hall subgroups, the Frattini subgroup, the Fitting subgroup, the Schur-Zassenhaus theorem, fusion in p-subgroups, the transfer map, Frobenius theorem on normal p-complements. Prerequisite(s): Courses 200 and 201 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

215. Operator Theory. *

Operators on Banach spaces and Hilbert spaces. The spectral theorem. Compact and Fredholm operators. Other special classes of operators. Prerequisite(s): Courses 204, 205, 206, and 207 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

216. Advanced Analysis. *

Topics include: the Lebesgue set, the Marcinkiewicz interpolation theorem, singular integrals, the Calderon-Zygmund theorem, Hardy Littlewood-Sobolev theorem, pseudodifferential operators, compensated compactness, concentration compactness, and applications to PDE. Prerequisite(s): Courses 204, 205, and 206 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

217. Advanced Elliptic Partial Differential Equations. *

Topics include elliptic equations, existence of weak solutions, the Lax-Milgram theorem, interior and boundary regularity, maximum principles, the Harnack inequality, eigenvalues for symmetric and non-symmetric elliptic operators, calculus of variations (first variation: Euler-Lagrange equations, second variation: existence of minimizers). Other topics covered as time permits. Prerequisite(s): Courses 204, 205, and 206 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

218. Advanced Parabolic and Hyperbolic Partial Differential Equations. *

Topics include: linear evolution equations, second order parabolic equations, maximum principles, second order hyperbolic equations, propagation of singularities, hyperbolic systems of first order, semigroup theory, systems of conservation laws, Riemann problem, simple waves, rarefaction waves, shock waves, Riemann invariants, and entropy criteria. Other topics covered as time permits. Prerequisite(s): courses 205 and 206. Enrollment restricted to graduate students. *The Staff*

219. Nonlinear Functional Analysis. *

Topological methods in nonlinear partial differential equations, including degree theory, bifurcation theory, and monotonicity. Topics also include variational meth-

ods in the solution of nonlinear partial differential equations. Enrollment restricted to graduate students. *The Staff*

220A. Representation Theory I. *

Lie groups and Lie algebras, and their finite dimensional representations. Prerequisite(s): courses 200, 201, and 202. Courses 225A and 227 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

220B. Representation Theory II. *

Lie groups and Lie algebras, and their finite dimensional representations. Prerequisite(s): course 220A. Enrollment restricted to graduate students. *The Staff*

222A. Algebraic Number Theory. S

Topics include algebraic integers, completions, different and discriminant, cyclotomic fields, parallelotopes, the ideal function, ideles and adèles, elementary properties of zeta functions and L-series, local class field theory, global class field theory. Courses 200, 201, and 202 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

222B. Algebraic Number Theory. *

Topics include geometric methods in number theory, finiteness theorems, analogues of Riemann-Roch for algebraic fields (after A. Weil), inverse Galois problem (Belyi theorem) and consequences. Enrollment restricted to graduate students. *The Staff*

223A. Algebraic Geometry I. S

Topics include examples of algebraic varieties, elements of commutative algebra, local properties of algebraic varieties, line bundles and sheaf cohomology, theory of algebraic curves. Weekly problem solving. Courses 200, 201, 202, and 208 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

223B. Algebraic Geometry II. *

A continuation of course 223A. Topics include theory of schemes and sheaf cohomology, formulation of the Riemann-Roch theorem, birational maps, theory of surfaces. Weekly problem solving. Course 223A is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

225A. Lie Algebras. F

Basic concepts of Lie algebras. Engel's theorem, Lie's theorem, Weyl's theorem are proved. Root space decomposition for semi-simple algebras, root systems and the classification theorem for semi-simple algebras over the complex numbers. Isomorphism and conjugacy theorems. Prerequisite(s): Courses 201 and 202 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

225B. Infinite Dimensional Lie Algebras. W

Finite dimensional semi-simple Lie algebras: PBW theorem, generators and relations, highest weight representations, Weyl character formula. Infinite dimensional Lie algebras: Heisenberg algebras, Virasoro algebras, loop algebras, affine Kac-Moody algebras, vertex operator representations. Prerequisite(s): course 225A. Enrollment restricted to graduate students. *The Staff*

226A. Infinite Dimensional Lie Algebras and Quantum Field Theory I. *

Introduction to the infinite-dimensional Lie algebras that arise in modern mathematics and mathematical physics: Heisenberg and Virasoro algebras, representations of the Heisenberg algebra, Verma modules over the Virasoro

algebra, the Kac determinant formula, and unitary and discrete series representations. Enrollment restricted to graduate students. *The Staff*

226B. Infinite Dimensional Lie Algebras and Quantum Field Theory II. *

Continuation of course 226A: Kac-Moody and affine Lie algebras and their representations, integrable modules, representations via vertex operators, modular invariance of characters, and introduction to vertex operator algebras. Enrollment restricted to graduate students. *The Staff*

227. Lie Groups. W

Lie groups and algebras, the exponential map, the adjoint action, Lie's three theorems, Lie subgroups, the maximal torus theorem, the Weyl group, some topology of Lie groups, some representation theory: Schur's Lemma, the Peter-Weyl theorem, roots, weights, classification of Lie groups, the classical groups. Prerequisite(s): courses 200, 201, 204, and 208. Enrollment restricted to graduate students. *The Staff*

228. Lie Incidence Geometries. *

Linear incidence geometry is introduced. Linear and classical groups are reviewed, and geometries associated with projective and polar spaces are introduced. Characterizations are obtained. Enrollment restricted to graduate students. *The Staff*

229. Kac-Moody Algebras. *

Theory of Kac-Moody algebras and their representations. The Weil-Kac character formula. Emphasis on representations of affine superalgebras by vertex operators. Connections to combinatorics, PDE, the monster group. The Virasoro algebra. Enrollment restricted to graduate students. *The Staff*

232. Morse Theory. S

Classical Morse Theory. The fundamental theorems relating critical points to the topology of a manifold are treated in detail. The Bolt Periodicity Theorem. A specialized course offered once every few years. Prerequisite(s): Courses 208, 209, 210, 211, and 212 recommended as preparation. Enrollment restricted to graduate students. Offered in alternate academic years. *The Staff*

233. Random Matrix Theory. *

Classical matrix ensembles; Wigner semi-circle law; method of moments. Gaussian ensembles. Method of orthogonal polynomials; Gaudin lemma. Distribution functions for spacings and largest eigenvalue. Asymptotics and Riemann-Hilbert problem. Painlevé theory and the Tracy-Widom distribution. Selberg's Integral. Matrix ensembles related to classical groups; symmetric functions theory. Averages of characteristic polynomials. Fundamentals of free probability theory. Overview of connections with physics, combinatorics, and number theory. Prerequisite(s): courses 103, 204, and 205; course 117 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

234. Riemann Surfaces. *

Riemann surfaces, conformal maps, harmonic forms, holomorphic forms, the Riemann-Roch theorem, the theory of moduli. Enrollment restricted to graduate students. *The Staff*

235. Dynamical Systems Theory. S

An introduction to the qualitative theory of systems of ordinary differential equations. Structural stability, critical elements, stable manifolds, generic properties,

bifurcations of generic arcs. Prerequisite(s): courses 106A, 203, and 208. Enrollment restricted to graduate students. *The Staff*

238. Elliptic Functions and Modular Forms. F

The course, aimed at second-year graduate students, will cover the basic facts about elliptic functions and modular forms. The goal is to provide the student with foundations suitable for further work in advanced number theory, in conformal field theory, and in the theory of Riemann surfaces. Successful completion of graduate algebra sequence (courses 200-202) and either 207 or 103 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

239. Homological Algebra. *

Homology and cohomology theories have proven to be powerful tools in many fields (topology, geometry, number theory, algebra). Independent of the field, these theories use the common language of homological algebra. The aim of this course is to acquaint the participants with basic concepts of category theory and homological algebra, as follows: chain complexes, homology, homotopy, several (co)homology theories (topological spaces, manifolds, groups, algebras, Lie groups), projective and injective resolutions, derived functors (Ext and Tor). Depending on time, spectral sequences or derived categories may also be treated. Courses 200 and 202 strongly recommended. Enrollment restricted to graduate students. *The Staff*

240A. Representations of Finite Groups I. S

Introduces ordinary representation theory of finite groups (over the complex numbers). Main topics are characters, orthogonality relations, character tables, induction and restriction, Frobenius reciprocity, Mackey's formula, Clifford theory, Schur indicator, Schur index, Artin's and Brauer's induction theorems. Recommended: successful completion of courses 200-202. Enrollment restricted to graduate students. *The Staff*

240B. Representations of Finite Groups II. *

Introduces modular representation theory of finite groups (over a field of positive characteristic). Main topics are Grothendieck groups, Brauer characters, Brauer character table, projective covers, Brauer-Cartan triangle, relative projectivity, vertices, sources, Green correspondence, Green's indecomposability theorem. Recommended completion of courses 200-203 and 240A. Prerequisite(s): Courses 200, 201, 202, 203, and 240A recommended. Enrollment restricted to graduate students. *The Staff*

246. Representations of Algebras. *

Material includes associative algebras and their modules; projective and injective modules; projective covers; injective hulls; Krull-Schmidt Theorem; Cartan matrix; semisimple algebras and modules; radical, simple algebras; symmetric algebras; quivers and their representations; Morita Theory; and basic algebras. Prerequisite(s): courses 200, 201, and 202. Enrollment restricted to graduate students. *The Staff*

248. Symplectic Geometry. *

Basic definitions. Darboux theorem. Basic examples: cotangent bundles, Kähler manifolds and co-adjoint orbits. Normal form theorems. Hamiltonian group actions, moment maps. Reduction by symmetry groups. Atiyah-Guillemin-Sternberg convexity. Introduction to Floer homological methods. Relations with other geometries including contact, Poisson, and Kähler geometry. Prerequisite(s): course 204; courses 208 and 209 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

249A. Mechanics I. *

Covers symplectic geometry and classical Hamiltonian dynamics. Some of the key subjects are the Darboux theorem, Poisson brackets, Hamiltonian and Lagrangian systems, Legendre transformations, variational principles, Hamilton-Jacobi theory, geodesic equations, and an introduction to Poisson geometry. Courses 208 and 209 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

249B. Mechanics II. *

Hamiltonian dynamics with symmetry. Key topics center around the momentum map and the theory of reduction in both the symplectic and Poisson context. Applications are taken from geometry, rigid body dynamics, and continuum mechanics. Course 249A is recommended as preparation. Enrollment restricted to graduate students. *The Staff*

249C. Mechanics III. *

Introduces students to active research topics tailored according to the interests of the students. Possible subjects are complete integrability and Kac-Moody Lie algebras; Smale's topological program and bifurcation theory; KAM theory, stability and chaos; relativity; quantization. Course 249B is recommended as preparation. Enrollment restricted to graduate students. Offered in alternate academic years. *The Staff*

252. Fluid Mechanics. *

First covers a basic introduction to fluid dynamics equations and then focuses on different aspects of the solutions to the Navier-Stokes equations. Prerequisite(s): courses 106 and 107 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

254. Geometric Analysis. *

Introduction to some basics in geometric analysis through the discussions of two fundamental problems in geometry: the resolution of the Yamabe problem and the study of harmonic maps. The analytic aspects of these problems include Sobolev spaces, best constants in Sobolev inequalities, and regularity and a priori estimates of systems of elliptic PDE. Courses 204, 205, 209, 212, and 213 recommended as preparation. Enrollment restricted to graduate students. *The Staff*

256. Algebraic Curves. *

Introduction to compact Riemann surfaces and algebraic geometry via an in-depth study of complex algebraic curves. Courses 200, 201, 202, 203, 204, and 207 are recommended as preparation. Enrollment restricted to graduate mathematics and physics students. *The Staff*

260. Combinatorics. *

Combinatorial mathematics, including summation methods, binomial coefficients, combinatorial sequences (Fibonacci, Stirling, Eulerian, harmonic, Bernoulli numbers), generating functions and their uses, Bernoulli processes and other topics in discrete probability. Oriented toward problem solving applications. Applications to statistical physics and computer science. Enrollment restricted to graduate students. *The Staff*

280. Topics in Analysis. *

Enrollment restricted to graduate students. *The Staff*

281. Topics in Algebra. *

Enrollment restricted to graduate students. *The Staff*

282. Topics in Geometry. S

Enrollment restricted to graduate students. *The Staff*

283. Topics in Combinatorial Theory. *

Enrollment restricted to graduate students. *The Staff*

284. Topics in Dynamics. *

Enrollment restricted to graduate students. *The Staff*

285. Topics in Partial Differential Equations. *

Topics such as derivation of the Navier-Stokes equations. Examples of flows including water waves, vortex motion, and boundary layers. Introductory functional analysis of the Navier-Stokes equation. Enrollment restricted to graduate students. *The Staff*

286. Topics in Number Theory. *

Topics in number theory, selected by instructor. Possibilities include modular and automorphic forms, elliptic curves, algebraic number theory, local fields, the trace formula. May also cover related areas of arithmetic algebraic geometry, harmonic analysis, and representation theory. Courses 200, 201, 202, and 205 are recommended as preparation. Enrollment restricted to graduate students. *The Staff*

287. Topics in Topology. *

Topics in topology, selected by the instructor. Possibilities include generalized (co)homology theory including K-theory, group actions on manifolds, equivariant and orbifold cohomology theory. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

292. Seminar (no credit). F,W,S

A weekly seminar attended by faculty, graduate students, and upper-division undergraduate students. All graduate students are expected to attend. Enrollment restricted to graduate students. *The Staff*

296. Special Student Seminar. F,W,S

Students and staff studying in an area where there is no specific course offering at that time. Enrollment restricted to graduate students. *The Staff*

297. Independent Study. F,W,S

Either study related to a course being taken or a totally independent study. Enrollment restricted to graduate students. Enrollment restricted to graduate students. *The Staff*

298. Master's Thesis Research. F,W,S

Enrollment restricted to graduate students. *The Staff*

299. Thesis Research. F,W,S

Enrollment restricted to graduate students. Enrollment restricted to graduate students. *The Staff*

Medieval Studies

Students wishing to pursue a course of study in medieval studies should consult the concentration in pre- and early modern studies under Literature, page 337.

Merrill College

College Office
(831) 459-2144
<http://www2.ucsc.edu/merrill>

For college description and list of faculty, see page 84.

Lower-Division Courses

10. Becoming a Successful Student (2 credits). *

An interactive course providing the opportunity to assess and revise methods of and purposes in studying. Critical, effective approaches to reading, writing, participating in lectures and sections, taking exams, balancing competing responsibilities, and utilizing campus resources are explored. Contact college office for interview-only criteria. Enrollment limited to 30. *The Staff*

20N. Re-Evaluation Counseling. S

Class introduces the fundamentals of re-evaluation counseling (co-counseling) and focuses on those aspects of the theory and practice which facilitate living in a diverse world. Interview with instructor before first class meeting. Will be offered spring, 2009. Enrollment limited to 20. Offered in alternate academic years. *P. Roby*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

80A. Introduction to University Discourse: Cultural Identities and Global Consciousness. F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Examines world poverty, imperialism, and nationalism; peoples' need to assert their cultural identities; and the benefits of individuals' absorption in worthy causes. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T3-Social Sciences, C1, E.) *L. Martínez-Echazábal*

80B. Rhetoric and Inquiry: Cultural Identities and Global Consciousness. F

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Examines world poverty, imperialism, and nationalism; peoples' need to assert their cultural identities; and the benefits of individuals' absorption in worthy causes. Incorporates outside research. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T3-Social Sciences, C2, E.) *L. Martínez-Echazábal*

80C. Merrill Seminar. S

Research-based seminar on a topic of particular cultural, historical, or contemporary interest, open to all undergraduate students, taught by either a Merrill College Fellow or other member of the UCSC faculty. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *The Staff*

80L. Merrill Core Visual Laboratory (2 credits). F

Visual laboratory designed to work in tandem with the Merrill Core Course to enhance learning for students with diverse skills and learning styles. Open to first-year Merrill students currently enrolled in course 80A, 80B, or 80X. Required of students in the Merrill Frosh Scholars Program. Concurrent enrollment in course 80A, 80B, or 80X is required. *C. Gerster*

80X. Introduction to University Discourse: Cultural Identities and Global Consciousness (Frosh Scholar). F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Examines world

poverty, imperialism, and nationalism; people's need to assert their cultural identities; and the benefits of individuals' absorption in worthy causes. Permission of instructor required; selection for this year-long scholars program based on application submitted prior to fall quarter. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T3-Social Sciences, C1, E.) *L. Martínez-Echazábal*

80Z. Merrill Scholars Seminar. S

Research-based, writing-intensive seminar focusing on the construction of persuasive arguments. Explores topics of cultural, historical, and/or political interest, taught by a Merrill College Fellow. Topic will change yearly. Enrollment restricted to Merrill Frosh Scholars program participants. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2.) *The Staff*

85B. Merrill Classroom Connection Field Study (3 credits). F,W,S

Supervised hands-on experience assisting in local elementary classrooms. Students attend UCSC class meetings, complete relevant readings in educational theory, and present a final assignment. Attend first class meeting for instructor permission. May be repeated for credit. *L. Martínez-Echazábal*

85C. Merrill Classroom Connection Field Study (2 credits). F,W,S

Supervised hands-on experience assisting in local elementary school classrooms. Students also attend UCSC course meetings, complete relevant readings in educational theory, and present a final assignment. First-year Merrill College students are selected for this yearlong scholars program on the basis of an application submitted prior to fall quarter. Attend first class meeting for instructor permission. Enrollment limited to 22. May be repeated for credit. *L. Martínez-Echazábal*

93. Field Study. F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Up to three such courses may be taken for credit in any one quarter. Approval of student's adviser and provost required. *The Staff*

93F. Field Study (2 credits). F,W,S

Provides for individual program of study sponsored by the college and performed off campus. Approval of instructor required. May be repeated for credit. *The Staff*

93G. Field Study (3 credits). F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Approval of instructor required. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Various topics to be arranged between student and instructor. Students submit petition to sponsoring agency. *The Staff*

99F. Tutorial (2 credits). F,W,S

Various topics to be arranged between student and instructor. Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

120. Personal Empowerment. W

Intensive course on individual goal-oriented behavior, commonly called problem solving. Focus on purpose, goals, meaning, emotions, languages, model-building, reality, thinking, logic, creativity, the steps of problem

solving, common blocks, and techniques of unblocking. Meet with instructor prior to advance enrollment; priority given to upper-level students. Enrollment limited to 20. *F. Andrews*

151. American Indians and the Vietnam War. W

Examines memoirs of American Indians who served in the military during the Vietnam War. Examines the homecoming and transition back into society. Students interview American Indian Vietnam veterans. Enrollment limited to 20. (General Education Code(s): E.) *D. Tibbets*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar by an upper-division student under faculty supervision. (See course 42.) Students submit petition to sponsoring agency, supported by faculty member willing to supervise. *The Staff*

193. Field Study. F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Up to three such courses may be taken for credit in one quarter. Approval of student's adviser and provost required. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Up to three such courses may be taken for credit in one quarter. Approval of student's adviser and provost required. May be repeated for credit. *The Staff*

193G. Field Study (3 credits). F,W,S

Provides for individual programs of study sponsored by the college and performed off campus. Up to three such courses may be taken for credit in one quarter. Approval of student's adviser and provost required. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a faculty member. *The Staff*

195. Senior Research Project. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Provides for college-sponsored individual study programs off campus, for which faculty supervision is not in person (e.g., supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. This may be a multiple-term course extending over two or three quarters; in this case the grade and evaluation submitted for the final quarter apply to all previous quarters. Petitions may be obtained at the Merrill College office. Approval of student's adviser, certification of adequate preparation, and approval by the Merrill Provost required. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Various topics to be arranged between student and instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Microbiology and Environmental Toxicology

430 Physical Sciences Building
Telephone (831) 459-4719
FAX (831) 459-3524
<http://www.etox.ucsc.edu>

Faculty and Professional Interests

MANEL CAMPS, Assistant Professor
Molecular mechanisms of reactive DNA methylation toxicity

A. RUSSELL FLEGAL, Professor
Anthropogenic perturbations of biogeochemical cycles, applications of isotopic tracers in anthropology and archaeology

KAREN OTTEMANN, Associate Professor
Environmental responses of pathogenic bacteria

CHAD SALTIKOV, Assistant Professor
Microbial anaerobic respiratory processes that influence the biotransformation of pollutants in the environment

DONALD R. SMITH, Professor
Neurotoxicity, cellular and organismal responses to environmental toxins

VICTORIA AUERBUCH STONE, Assistant Professor
*Interactions between the pathogen *Yersinia pseudotuberculosis* and the innate immune system*

FITNAT YILDIZ, Associate Professor
*Microbiology, molecular genetics, genomics; the mechanism of persistence of survival of *Vibrio cholerae**



KENNETH W. BRULAND (Ocean Sciences)
Chemical oceanography, biogeochemistry of trace metals and radionuclides, aquatic chemistry, geochemistry

DONALD CROLL (Ecology and Evolutionary Biology)
Foraging ecology of marine birds and mammals, island conservation/ecology

ANDREW FISHER (Earth Sciences)
Hydrogeology, crustal studies, heat flow, modeling

GRANT HARTZOG (Molecular, Cell, and Developmental Biology)
Biochemistry, genetics, chromatin and transcriptional regulation

LINDSAY HINCK (Molecular, Cell, and Developmental Biology)
Neurobiology, cell biology, development

THEODORE HOLMAN (Chemistry and Biochemistry)
Bioinorganic and biological chemistry

DOUGLAS R. KELLOGG (Molecular, Cell, and Developmental Biology)
Coordination of cell growth and cell division

RAPHAEL KUDELA (Ocean Sciences)
Ecological modeling and remote sensing, satellite oceanography, phytoplankton ecology and harmful algal blooms

ROGER LININGTON (Chemistry)
Marine natural products, drugs for neglected diseases, chemical biology, chemical probes

TODD LOWE (Biomolecular Engineering)
Experimental and computation genomics, ncRNA gene finders, DNA microarrays to study the biology of Archaea

MARC MANGEL (Applied Mathematics and Statistics)
Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

ADINA PAYTAN (Earth and Planetary Sciences)
Biogeochemistry, paleoceanography, environmental and aquatic chemistry

PRADIP K. MASCHARAK (Chemistry and Biochemistry)
Bioinorganic chemistry, design of antitumor drugs, modeling of active sites of metalloenzymes, design of catalysts for hydrocarbon oxidation, studies on intermediates in non-heme oxygenase chemistry, design of NO-donors for photodynamic therapy

MATTHEW MCCARTHY (Ocean Sciences)
Organic geochemistry, marine organic geochemistry, global biogeochemical cycles

GLENN L. MILLHAUSER (Chemistry and Biochemistry)
Electron spin resonance; nuclear magnetic resonance, melanocortin receptor signaling, agouti proteins, prions, peptide synthesis

PETER T. RAIMONDI (Ecology and Evolutionary Biology)
Marine ecology, evolutionary ecology, experimental design, applied ecology

MARY W. SILVER (Ocean Sciences)
Biological oceanography, marine plankton, midwater ecology

JOSHUA STUART (Biomolecular Engineering)
Computational functional genomics, comparative analysis of gene regulation, cross-species inference of gene networks, probabilistic graphical models

JONATHAN ZEHR (Ocean Sciences)
Aquatic microbial ecology, biological oceanography

MARTHA C. ZÚÑIGA (Molecular, Cell, and Developmental Biology)
Molecular, cellular, and developmental biology of the immune system

Program Description

The Microbiology and Environmental Toxicology Department (formerly the Environmental Toxicology Department) sponsors both undergraduate and graduate courses in microbiology and environmental toxicology, both within the department and through affiliated departments. The curriculum offers a strong foundation in fundamental and applied toxicology in order to provide the breadth and depth of perspective required for this interdisciplinary science. Research interests of students and faculty in microbiology and environmental toxicology span the fields of biology, microbiology, chemistry, Earth sciences, ocean sciences, environmental studies, and human health.

Students are expected to combine rigorous academic training with development of sophisticated research skills needed to excel in the rapidly evolving field of microbiology and environmental toxicology. By understanding (1) sources, transport, and fate of toxins and (2) their interactions with biological systems, students learn to critically assess the complex effects of toxins at the molecular, cellular, organismal, and ecosystem levels.

Undergraduate Programs

While the Microbiology and Environmental Toxicology Department only awards graduate degrees, it does offer a select number of undergraduate courses to prepare and attract promising undergraduates for advanced studies in microbiology and environmental toxicology or related disciplines. Students interested in microbiology and environmental toxicology should major in a field such as biology; marine biology; molecular, cell, and developmental biology; biochemistry; chemistry; Earth sciences; engineering; or environmental studies while taking microbiology and environmental toxicology electives.

In addition, the program provides unique opportunities for exceptional undergraduates to conduct research in microbiology and environmental toxicology. These opportunities are limited to students who have demonstrated their potential in undergraduate courses in the basic sciences and environmental toxicology. With department approval, these undergraduates may also take graduate courses in microbiology and environmental toxicology. That coursework will be applied toward a graduate degree in microbiology and environmental toxicology if they are accepted into the program.

Graduate Programs

The graduate programs in microbiology and environmental toxicology, M.S. and Ph.D., are designed to prepare students for careers in research, teaching, industry, and government. Master's students typically finish in two years and Ph.D. students in four to six years. The primary criteria for admission to the programs are evidence of superior scholarship in the sciences and a demonstrated ability to conduct innovative research. Preparation in any of the basic natural sciences, computer science, and/or engineering disciplines equivalent to requirements for a bachelor's degree is required.

The department instructs through in-depth research experiences and courses that develop a knowledge base and critical thinking abilities. To solve problems in environmental and organism health, students must understand how toxic substances and pathogens move through the environment, enter organisms, and cause harm. In addition to chemical toxins, the program also recognizes microbial pathogens as toxic agents. Students also receive instruction on the organismal, cellular, and molecular mechanism, or intoxication. This instruction is conducted in a dynamic, interactive atmosphere composed of graduate-level lecture and laboratory courses, in-depth seminar classes, and weekly seminar and research presentations. Students gain expertise in the broad field of microbiology and environmental toxicology through in-depth research experiences and challenging courses. Research and training in the department focus on both aquatic and terrestrial systems and toxins that range from inorganic pollutants to bacterial pathogens. In the first years of study, both master's and doctoral students take microbiology and environmental toxicology core courses, as well as other courses selected to strengthen the student's academic training. During this time, the students also commence original thesis research in the laboratory of their major professor. Because the department is diverse and interactive, students become familiar with disciplines ranging from environmental chemistry to molecular genetics to physiology. Collaboration among laboratories within different departments to develop expertise is actively supported in the program.

Sample Pathways

Pathways within the microbiology and environmental toxicology graduate program focus on interdisciplinary approaches to addressing problems in environmental and public health. These pathways are distinguished from traditional disciplines in that interdisciplinary projects are encouraged through interactions with different faculty within the department and in related departments.

Metals in the Environment

Research includes how organisms are exposed to metals, how these metals cause toxicity, and investigating the concentration, speciation, and isotopic composition of contaminant metals and metalloids.

Microbiology

Microbiology provides research training on molecular genetic analysis of both non-pathogenic and pathogenic microbes. Students study host-pathogen interactions, ecology and evolution of pathogenic microorganisms, adaptation of pathogenic and non-pathogenic microorganisms to environmental stresses, and mechanisms of microbial biotransformation of pollutants and toxic metals.

Cellular and Organismal Toxicology

This pathway provides training in the biochemical, molecular, cellular and physiological processes that are impacted by exposures to such contaminants as toxic metals. Research includes exposure pathways and toxicity of contaminants and pathogens within humans, with emphasis on the molecular and cellular mechanisms underlying toxicity.

Program Requirements

The microbiology and environmental toxicology student's curriculum (courses METX) is tailored to the individual, creating a graduate experience that combines essential background material with course work at the frontiers of science. The student, in conjunction with a faculty committee, chooses classes to complement the Ph.D. or master's thesis work that each student is performing. Students are encouraged to explore new areas and bring this expertise back to their thesis research.

Requirements for Ph.D. Students in the Microbiology and Environmental Toxicology Department

1. *Coursework.* Take and pass, with a grade of at least a B, two courses from the following: METX 201, 202, 203, 210, 240 and at least two additional approved graduate-level courses within Microbiology and Environmental Toxicology or another department. Students must enroll in METX 292 each quarter. Additional coursework may be required, depending on the background of the student.
2. *Literature review.* Under direction of the student's adviser, write a literature review of the current state of the field of the proposed dissertation research. The written review will be handed into the student's adviser at the end of the summer of the first year.
3. *Departmental seminar.* Give a 25-minute departmental seminar each academic year presenting the student's proposed research. Give a one-hour departmental seminar during the spring quarter of the second year presenting the student's proposed research.

4. *Ph.D. qualifying exam (part I—microbiology and environmental toxicology internal)*. Part I of the qualifying examination consists of two portions: preparation and defense of an independent research proposal, and knowledge of material presented in the microbiology and environmental toxicology core courses taken by the student. The student must complete part I no later than spring quarter of the second year.
5. *Ph.D. qualifying exam (part II)*. Present and defend a dissertation research proposal to the student's Ph.D. qualifying exam (QE) committee. The student must complete part II no later than spring quarter of the third year.
6. *Advancement to candidacy*. The student advances to candidacy after completing all coursework, completing the literature review, giving a second year seminar and passing the Ph. D. qualifying examination parts I and II.
7. *Dissertation defense*. The student must submit their doctoral dissertation to the dissertation committee for tentative approval at least one month before presenting a formal, public doctoral research seminar.

Requirements for Master's Students in Microbiology and Environmental Toxicology

1. *Coursework*. Take and pass, with a grade of at least a B, two courses from the following: METX 201, 202, 203, 204, 210, 240 and at least two additional approved graduate-level courses within Microbiology and Environmental Toxicology or another department. Students must enroll in METX 292 each quarter. Additional coursework may be required, depending on the background of the student.
2. *Literature review*. Under direction of the student's adviser, write a literature review of the current state of the field of the proposed master's research.
3. *Departmental seminar*. Give a 25-minute departmental seminar each academic year presenting the student's proposed research. Give a departmental seminar during the spring quarter of the second year presenting the student's master's research to date.
4. *Master's comprehensive exam*. The comprehensive examination tests knowledge of the material presented in the microbiology and environmental toxicology core courses taken by the student, as well as general knowledge related to the student's master's research. In general, this oral exam is taken in the fall quarter of the second year.
5. *Thesis*. Students are required to submit a thesis for fulfillment of the degree requirements. The thesis should be submitted to the student's Master's reading committee by the second week of the final quarter of work, generally, spring of the second year.

Lower-Division Courses

80E. Aquatic Toxicology. F

An introduction to the sources, cycling, and impacts of toxicants in aquatic systems, including acid rain, ground water, fresh water rivers and lakes, estuaries, and the ocean. Emphasis is on the properties of toxic chemicals that influence their biogeochemical cycles and factors

that influence their toxicity to aquatic organisms and humans. (General Education Code(s): T2-Natural Sciences.) *A. Flegal*

Upper-Division Courses

101. Sources and Fates of Pollutants. F

Presents in-depth important principles of environmental toxicology related to the introduction, transport, and fate of toxicants in aquatic and terrestrial environments, including environmental chemistry and biogeochemical cycles as well as exposure to pathways and uptake by organisms. Additional emphasis placed on susceptibility and effects of toxicants across organ systems, toxicokinetic and biomarkers of exposure, and effects at the ecosystem level. Students cannot receive credit for this course and course 201. *A. Flegal*

102. Cellular and Organismal Toxicology. W

Emphases of biochemical, cellular, and organ system basis of intoxication, including dose-response relationships, biotransformation of toxicants, biochemical mechanisms underlying toxicity, factors influencing toxic action, and biomarkers of exposure. Emphasizes effects of various classes of toxins, including heavy metals and persistent synthetic organics, with a focus on susceptible biochemical/cellular processes of the central nervous, immune, hepatic, and renal target organ systems. Designed for advanced undergraduates. Students cannot receive credit for this course and course 202. (Also offered as Biology: Molecular Cell & Dev 122. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20A and 20B or equivalent; Biology 100, Biochemistry, and 110, Cell Biology, are recommended. Enrollment restricted to juniors and seniors. *D. Smith*

125. Practicing Safe Science (2 credits). W

Introduces research safety principles and practices. Instructors and guest experts discuss research hazards and control measures. Students explore the safe use of research methods and materials via hands-on and outside exercises. Issues include compliance with hazardous waste and other environmental safety regulations. *J. Schoonover*

138. Biology of Disease. W

Primary objective is to provide an understanding of disease processes in humans. Integrates normal physiology and pathophysiology with the molecular and physiologic bases of diseases. Major emphasis on the physiological, molecular, and biochemical basis of diseases, with particular emphasis on the neuromuscular, cardiovascular, respiratory, renal, immune, and central nervous systems. Also addresses environmental risk factors in the etiology of diseases. Overviews provided, but covers selective topics considered most important in depth. (Also offered as Biology: Molecular Cell & Dev 118. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20A and 20B or equivalent and Biology 110. Biology 130 is recommended. Offered in alternate academic years. *M. Camps*

140. Molecular Biology of Prokaryotes. *

Focuses on several aspects of prokaryotic molecular biology. Covers transcriptional regulation, translational regulation, DNA replication and segregation, protein secretion, transport of small molecules, control of metabolism, stress response, bacterial differentiation, signal transduction, biofilm formation, and motility. Strong focus on experimental techniques and approaches used in prokaryotic molecular biology. Focus on model bacteria such as *Escherichia coli* and *Bacillus subtilis*. Students cannot receive credit for this course and course 240. Prerequisite(s): Biology 119. *The Staff*

144. Groundwater Contamination. *

Analyses of contemporary problems in groundwater contamination, based on current scientific understanding of contaminant transport in aquifers. Topics include both theoretical concepts and case studies. To be offered in alternate academic years. Prerequisite(s): Earth Science 110B. Offered in alternate academic years. *A. Flegal*

145. Medical Geology. S

An interdisciplinary analysis of natural geochemical processes that impact human health and of anthropogenic processes that exacerbate those impacts. Prerequisite(s): Chemistry 1A, 1B, 1C, 1M, and 1N. *A. Flegal*

150. Introduction to Research and Experimental Design. *

Lecture-based course for advanced undergraduates actively engaged in undergraduate research (e.g., independent study or senior thesis). Emphasizes basic lab skills, including laboratory safety and handling of laboratory equipment; experimental design; scientific record keeping; and literature searching, review, and management. *K. Ottemann, The Staff*

151. Scientific Writing and Presentation. *

For advanced undergraduates who are actively engaged in undergraduate research (e.g., independent study or senior thesis). Emphasizes the collection, reduction, analysis, management, and interpretation of scientific data; the presentation of scientific data in written and oral formats; and further development of critical thinking. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *The Staff*

160. Coastal Environmental Toxicology and Policy (3 credits). *

Interdisciplinary analysis of the scientific basis and policy development to regulate and manage environmental pollutants in coastal waters. Focuses on case studies involving aspects of environmental toxicology and policy including environmental monitoring and regulatory programs; ecosystem restoration; and regulating the environmental impacts of coastal development. Enrollment restricted to sophomores, juniors, seniors, and graduate students. *M. Connor, A. Flegal, G. Griggs*

195. Senior Thesis. F,W,S

An individually supervised course, with emphasis on independent research culminating in a senior thesis. May be repeated for credit. *The Staff*

198. Independent Study. F,W,S

Provides for individual programs of study (a) by means other than the usual supervision in person or (b) when the student is doing all or most of the course work off campus. With permission of the department, two or three courses may be taken concurrently, or the course repeated for credit. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Reading, discussion, written reports, and laboratory research on selected topics. May be repeated for credit. *The Staff*

Graduate Courses

200. Interdisciplinary Approaches in Environmental Toxicology. F

Introduction to interdisciplinary, case-based approaches to problem-solving. Course demonstrates how important, current problems in environmental and human health have been addressed and solved. Assigned problems that integrate the different organization levels (environmental,

molecular/cellular, organismal/public health) inherent to environmental and human health are presented. Students work in collaborative teams to analyze each problem and create a proposal for a research plan/solution. Enrollment restricted to graduate students. *The Staff, F. Yildiz*

201. Sources and Fates of Pollutants. F

Presents in-depth important principles of environmental toxicology related to the introduction, transport, and fate of toxicants in aquatic and terrestrial environments including environmental chemistry and biogeochemical cycles as well as exposure pathways and uptake by organisms. Additional emphasis will be placed on the susceptibility and effects of toxicants across organ systems, toxicokinetics and biomarkers of exposure, and effects at the ecosystem level. Students cannot receive credit for this course and course 101. Enrollment restricted to graduate students; qualified undergraduate science majors may enroll with permission of instructor. *A. Flegal*

202. Cellular and Organismal Toxicology. *

Emphasizes biochemical, cellular, and organ system basis of intoxication, including dose-response relationships, biotransformation of toxicants, biochemical mechanisms underlying toxicity, factors influencing toxic action, and biomarkers of exposure. Emphasizes effects of various classes of toxins, including heavy metals and persistent synthetic organics, with a focus on susceptible biochemical/cellular processes of the central nervous, immune, hepatic, and renal target organ systems. Students cannot receive credit for this course and Environmental Toxicology 102 or Biology 122. (Also offered as Biology: Molecular Cell & Dev 202. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *D. Smith*

203. Cellular and Molecular Toxicology. *

Presents in-depth cellular and molecular principles of environmental toxicology. These include modes of action and cellular and molecular targets of toxicants, as well as mechanisms of cellular and molecular responses to toxicants and their detoxification. State-of-the-art biological methodologies and approaches to identify and study cellular targets of toxicants. Designed to provide students with a broad and deep understanding of the biological aspects of toxicology at both cellular and molecular levels, and the skills to approach emerging challenges in the field. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's permission. *The Staff*

205. Scientific Skills, Ethics, and Writing. *

Course provides fundamental training of graduate students in the scientific method, experimental design, ethics in science, grant proposal and scientific writing, data presentation, and scientific speaking. Students are evaluated on class participation, performance, and a written NIH/NSF style research proposal. Enrollment restricted to graduate students. *The Staff*

210. Molecular and Cellular Basis of Bacterial Pathogenesis. S

Focuses on the molecular basis of bacterial pathogenesis with specific emphasis on gene expression, regulation, and ecology and evolution. Advanced undergraduates with extensive background in microbiology and biology may enroll with permission of instructor. Enrollment restricted to graduate students. Advanced undergraduates with extensive background in microbiology and biology may enroll with permission of instructor. *F. Yildiz*

215. Seminar in Advanced Prokaryotic Molecular Biology (2 credits). *

Seminar focuses on aspects of prokaryotic molecular biology. Specific topics include transcriptional regulation, translational regulations, DNA replication, secretion of proteins, transport of small molecules, bacterial differentiation, signal transduction, biofilm formation, and motility. Discussions focus on model bacteria such as *Escherichia coli* and *Bacillus subtilis*. Enrollment restricted to graduate students. *F. Yildiz, K. Ottemann, C. Saltikov*

240. Molecular Biology of Prokaryotes. *

Focuses on several aspects of prokaryotic molecular biology. Covers transcriptional regulation, translational regulation, DNA replication and segregation, protein secretion, transport of small molecules, control of metabolism, stress response, bacterial differentiation, signal transduction, biofilm formation, and motility. Strong focus on experimental techniques and approaches used in prokaryotic molecular biology. Focus on model bacteria such as *Escherichia coli* and *Bacillus subtilis*. Students cannot receive credit for this course and course 140. *K. Ottemann*

250. Environmental Microbiology (2 credits). S

How microbes interact with their environments. Topics include anaerobic metabolism; biotransformation of toxic metals and organic pollutants; geomicrobiology; life in extreme environments; water quality. Advanced undergraduates with extensive background in microbiology and biology may enroll with permission of instructor. Enrollment restricted to graduate students. (General Education Code(s): T2-Natural Sciences.) *C. Saltikov*

281A. Topics in Environmental Toxicology.

Selected topics in environmental toxicology. Topics vary from year to year. Enrollment restricted to graduate students; qualified upper-division science majors may enroll with instructor's permission. May be repeated for credit. *The Staff*

281C. Topics in Environmental Microbiology (2 credits). F,W,S

Seminar and discussion focusing on mechanism of microbial transformation of metals. Participants present results from their research projects in a seminar format. Relevant journal articles presented and discussed. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's permission. *C. Saltikov*

281F. Topics in Aquatic Toxicology. F,W,S

Analyses of the sources and fates of aquatic pollutants. Discussions on processes at the air-water interface, within the water column, and in aquatic sediments. Topics vary from year to year. Enrollment restricted to graduate students; qualified upper-division science majors may enroll with instructor's permission. May be repeated for credit. *A. Flegal*

281M. Topics in Molecular Toxicology (2 credits). F,W,S

Seminar and discussion on the mechanisms of toxicity in DNA alkylating agents. Participants present results from their research, and relevant journal articles are discussed. Enrollment restricted to graduate students. Undergraduates may enroll with instructor's permission. Enrollment limited to 5. May be repeated for credit. *M. Camps*

281O. Topics in Bacterial Pathogenesis (2 credits). F,W,S

Intensive seminar focusing on mechanisms of bacterial pathogenesis of the ulcer-causing bacterium *Helicobacter pylori*. Participants are required to present results from their own research and relevant journal articles. (Also

offered as Biology: Molecular Cell and Dev 280O. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. Enrollment limited to 20. May be repeated for credit. *K. Ottemann*

281S. Cellular and Organismal Responses to Toxicants. F,W,S

Intensive research seminar on the concepts, theory, and techniques in deriving physiologically based pharmacokinetic models of toxin exposure, metabolism, and efficacy of therapeutic treatment in mammalian models of human metal toxicity. Enrollment restricted to graduate students; qualified undergraduates may enroll with permission of instructor. May be repeated for credit. *D. Smith*

281Y. Biofilms: Processes and Regulation (2 credits). F,W,S

Intensive seminar series focusing on the most current work on genes and the processes that regulate biofilm development dynamics as well as on the recent developments on visualization of biofilms. Presentation and discussion based. Enrollment restricted to graduate students. Qualified undergraduate students may enroll with instructor's permission. May be repeated for credit. *F. Yildiz*

282. Current Approaches to Molecular Pathogenesis (2 credits). *

Graduate level seminar focusing on the mechanisms by which bacterial pathogens cause disease. Specific topics include basic concepts of virulence and virulence factors, virulence factor regulation, toxins, and interactions of pathogens with mammalian cells and organs. Discussions focus on several key pathogens, including *Helicobacter pylori*, *Vibrio cholerae*, *Salmonella typhimurium*, and *Listeria monocytogenes*. May be repeated for credit. *K. Ottemann*

290. Proseminar. F,W,S

Special topics offered from time to time by faculty, visiting professors, or staff members. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's permission. May be repeated for credit. *The Staff*

290A. Epidemiology and Risk Assessment. *

Approaches different techniques of biological monitoring and the exposure and effect of biomarkers related to occupational and environmental exposure to chemicals. Available methods for risk assessment and identification of protective exposure limits also considered. (Formerly *Biological Impact of Chemical Exposures*.) *The Staff*

292. Introductory Graduate Seminar (no credit). F,W,S

Weekly seminars by academic and research faculty on their areas of special interest. Students write weekly abstracts on articles covered by the seminars. Enrollment restricted to graduate students; qualified undergraduates may enroll with instructor's permission. *The Staff*

297. Independent Study. F,W,S

Independent study for graduate students who have not yet settled on a research area for the thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Molecular, Cell, and Developmental Biology

See Biological Sciences, page 149.

Music

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(831) 459-2292
music@ucsc.edu
http://music.ucsc.edu

Faculty and Professional Interests

Professor

LINDA C. BURMAN-HALL
Baroque music and performance practices; historic keyboard repertoire (harpsichord, organ, and fortepiano); Indonesian music cultures; ethnomusicology

DAVID H. COPE, Emeritus

SHERWOOD DUDLEY, Emeritus

EDWARD F. HOUGHTON, Emeritus

DAVID EVAN JONES
Composition and analysis, chamber opera, Balkan music, language and music, timbre and orchestration

ANATOLE LEIKIN
Classical and romantic music history, theory, and performance practices, piano and fortepiano, Russian music

FREDRIC LIEBERMAN
Ethnomusicology; composition; the music industry and legal/ethical issues; American vernacular musics; musics of east, Southeast, and south Asia; organology

LETA E. MILLER
Twentieth-century American music, modern and baroque flute, 16th-century chanson and madrigal, music and science, 18th- and 20th-century flute literature and performance styles, music of C.P.E. Bach and Lou Harrison

GORDON MUMMA, Emeritus

PAUL NAUERT
Theory, composition; rhythm and meter; music cognition; mathematical and computer models of the compositional process

NICOLE A. PAIEMENT
Conducting; world premiere performance and recordings; contemporary chamber opera; interdisciplinary art; Founder and Artistic Director, Ensemble Parallèle

JOHN M. SCHECHTER
Cultural musicology; Ibero-American musics of South America; Quechua music culture; American Indian music and thought; music theory; music and ritual; music and discourse; transculturative music-making; Stravinsky; Founder, UCSC Latin American Ensembles (dir. 1986-2000)

Associate Professor

AMY C. BEAL
American music, 20th-century music, experimental and improvisatory performance practices, postwar and Cold War culture, German new music festivals and radio stations, piano performance, contemporary music ensemble

KARLTON E. HESTER
Premeditated, electroacoustic, and spontaneous composition; flutes, saxophones, and interdisciplinary performance; improvisational and Afrocentric music theory, analysis and history

HI KYUNG KIM
Composition; theory; contemporary music; analysis; orchestration; Korean music; world music composition; Founder and Artistic Director, Pacific Rim Music Festival

NINA TREADWELL
Renaissance through early baroque music history and performance practices, early plucked-string instruments (theorbo, renaissance, and baroque guitar; renaissance lute), 16th- and 17th-century Italian theatrical music, gender studies, women and music, literary and critical theory

Assistant Professor

BENJAMIN L. CARSON
Theory and composition, music, perception, empiricism and subjectivity, Schoenberg, popular music, improvisation

TANYA H. MERCHANT
Ethnomusicology, musics of Central Asia and the former Soviet Union, music and gender, Baroque music, nationalism, globalization, and the institutionalization of music

DARD NEUMAN, Kamil and Talat Hasan Endowed Chair in Classical Indian Music
Ethnomusicology; Hindustani music; colonialism, nationalism, technology and performance; sitar

Lecturer

KAREN L. ANDRIE
Cello

ERIKA ARULANANTHAM
Group piano, musicianship

NATHANIEL A. BERMAN
Concert choir

MARK BRANDENBURG
Clarinets

PAUL D. CONTOS
Saxophone

MARY JANE COPE
Piano, fortepiano

WILLIAM D. COULTER
Classical guitar

PETER Q. ELSEA
Electronic music and music technology

MARIA V. EZEROVA
Piano, musicianship

BARRY L. GREEN
String bass

ROBERT KLEVAN
Wind ensemble, large jazz ensemble

MURRAY LOW
Jazz theory

PATRICE L. MAGINNIS
Voice

ROY T. MALAN
Violin, viola

GEORGE E. MARSH
Percussion: trap set

PATRICIA L. MITCHELL
Oboe

OWEN M. MIYOSHI
Trumpet

DIANA I. NIEVES-MIRANDA
Latin American ensembles

JANE A. ORZEL
Bassoon

MESUT ÖZGEN
Classical guitar, classical guitar ensemble

STAN E. POPLIN
String bass, jazz ensembles

JOHN T. SACKETT
Music theory

WAYNE J. SOLOMON
Trombone

BRIAN J. STAUFENBIEL
Voice, university opera theater

UNDANG SUMARNA
West Javanese gamelan

SUSAN C. VOLLMER
Horn

WILLIAM K. WINANT
Orchestral percussion, percussion ensemble

GREER ELLISON Wolfson
Flute



Distinguished Adjunct Professor

ALI AKBAR KHAN
North Indian classical music

Program Description

The UCSC music curriculum is distinctive in developing musicians who integrate scholarship with performance. Although this rigorous program primarily addresses Western art music, it also incorporates the study of world music cultures in both their art and vernacular traditions. A major in music establishes a substantial foundation for further academic or performance studies. Two undergraduate majors are offered: the bachelor of music, which especially develops the student's attainment in performance, and the bachelor of arts, which cultivates greater breadth in the student's academic achievement. Three minors in music are also offered: one in Western art music, one in electronic music, and one in jazz. The electronic music and jazz minors are open to music majors, as well as to students pursuing other majors.

The music program provides courses for both general education and the music major/minor curriculum. Students from all disciplines are encouraged to enroll in music courses, including performance groups and private instruction.

The Music Center includes a 400-seat recital hall that has recording facilities, specially equipped classrooms, individual practice and teaching studios, a student computer lab, rehearsal space for ensembles, a gamelan studio, and studios for electronic and computer music. McHenry Library has a separate music section and listening rooms that have individual audio and video facilities. Recording and media equipment is available from the Instructional Media Center.

Letter Grade Requirement

All upper-division courses applied toward the music majors must be taken for a letter grade, except Music 120 and ensembles, which may be taken Pass/No Pass.

Requirements for the Bachelor of Arts

The course requirements for the B.A. in music include courses 30A/L-B/M-C/N, 100A-B-C, 101A-B-C-D; either course 180A or 180B; another course selected from either 120, 124, 130, or the 180A or 180B course

not already taken; and 197. Basic keyboard skills are required as a component of the music theory curriculum. Many students will need to take Music 60, *Group Instruction in Piano*, concurrently with the Music 30 sequence to achieve the appropriate level of skill. In addition, music majors are required to enroll in a minimum of six quarters of evaluated instrumental or choral ensembles, as well as a minimum of six quarters of evaluated individual instrumental or vocal lessons. Students who demonstrate insufficient potential when auditioning for individual instruction may have limited access to lessons, and they may be denied entry into the major. It is strongly recommended that these ensembles and lessons be taken every quarter from the beginning of the core curriculum (course 30 sequence). Music majors in the B.A. program must successfully complete the proficiency audition (see below).

Although a foreign language is not required for completion of the B.A. in music, students planning graduate work are strongly advised to study a language pertinent to their research area at least equivalent to level 3 at UCSC or be able to pass the level 4 entrance examination.

Students are encouraged to prepare a senior project, which may take one of three forms: a full senior recital, a full senior thesis, or a partial recital with a related shorter thesis. To be considered for highest honors in the major, B.A. students must complete, on an excellent level, a senior project.

Music B.A. Sample Planners

The following are two recommended academic plans for students to complete during their first two years as preparation for the music major. Plan One is a guideline for students who are committed to the major early in their academic career; Plan Two is for students who are considering the major. Four-year plans may be found in the Music Student Handbook, available at the Music Department office or on the Music Department web site at http://music.ucsc.edu/undergrad/handbook_ug_current.pdf.

Students should check with the department office for the most up-to-date course schedules and program-planning advice since courses are not necessarily taught in the same quarters each academic year.

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Mus 11A (recomm) Mus 30A/L lessons ensemble (group piano, Mus 60, may be required; see courses 30A-B-C)	Mus 30B/M lessons ensemble	Mus 30C/N lessons ensemble
2nd (soph)	Mus 100A lessons ensemble	Mus 100B lessons ensemble	Mus 100C lessons ensemble

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	Mus 11A (recomm) lessons ensemble	Mus 13 (recomm) lessons ensemble	Mus 14 (recomm) lessons ensemble
2nd (soph)	Mus 30A/L lessons ensemble (group piano, Mus 60, may be required; see courses 30A-B-C)	Mus 30B/M (recomm) lessons ensemble	Mus 30C/N lessons ensemble

General Examinations

All students majoring in the B.A. program are required to take the following examinations, which are discussed in greater detail in the Music Student Handbook.

Core Curriculum Placement Examination (a sample of the exam can be viewed at <http://music.ucsc.edu/undergrad/>). Students are tested in the areas of theory, music literature, and ear training. Success on this exam (or a score of approximately 85 percent or higher on the final exam of Music 14) is a prerequisite to course 30A/L. Students should also take the exam to place out of course 13 or to place into course 14. The exam is given during fall quarter on the same day as the music orientation meeting. Transfer students who demonstrate acceptable competency on the placement examination may be recommended for advanced placement based on a further examination (including testing in keyboard and sight-singing skills).

Advisory audition. Students are required to take an advisory audition on their major instrument or in voice at the conclusion of course 30A/L.

Proficiency audition. Students are required to demonstrate at least an upper-intermediate level of proficiency on their major instrument or in voice before enrolling in course 100B.

Senior exit seminar. Students in the B.A. program are required to take the exit seminar (course 197), which encompasses material from all segments of the required curriculum.

Requirements for the Bachelor of Music

The bachelor of music degree (B.M.) is designed for those who intend to pursue a career in performance. Acceptance to the program is by audition during fall quarter. These auditions are open to registered UCSC students only, although prospective students may submit a tape to the Music Department and ask to receive an informal opinion about their chances for acceptance into the major.

B.M. students major in an instrument or in voice. For the audition, students should prepare three pieces or movements of a contrasting nature from at least two different stylistic periods. (Two contrasting movements from the same sonata or concerto may count as two of the three required pieces.) Prospective students' optional tapes should also meet these specifications to receive an unofficial evaluation from the Music Department.

The requirements for the B.M. include courses 30A/L-B/M-C/N, 100A-B-C, 101A-B-C-D, 180A or 180B, and 196B. In addition, students are required to enroll in a minimum of 12 quarters of evaluated instrumental or vocal ensembles, as well as a minimum of 11 quarters of evaluated instrumental or vocal lessons. Transfer students must enroll in lessons and ensembles every quarter in residence. A senior recital (course 196B) is required in the final quarter. The music core-curriculum placement examination (see above), or passing course 14 with a final examination score of approximately 85 percent or higher, is a prerequisite to course 30A/L. Basic keyboard skills are required as a component of the music theory curriculum; some students will need to take course 60, *Group Instruction in Piano*, concurrently with the course 30 sequence to achieve the appropriate level of skill. B.M. students take a jury examination in their major instrument or in voice at least twice a year and perform one piece in the regular UCSC student recital series at least once a year. In addition to these requirements, voice majors are required to take French 1, German 1, and Italian 1. For students who wish to concentrate in jazz, the following changes for the B.M. requirements apply: students will

take Music 111B instead of 180A or B; Music 174 (*Jazz Improvisation*) is required and may replace one quarter of ensembles; Music 175 (*Jazz Theory*) is required.

The B.M. program differs from the B.A. program in requiring more credits in performance and slightly fewer in theoretical disciplines. B.M. students are not required to take course 120, 124, or 130. The senior exit requirement for B.M. students is a senior recital. To receive highest honors, B.M. students must also complete, on an excellent level, the *Senior Exit Seminar* (Music 197).

B.M. Four-Year Sample Study Planner for Students Concentrating in an Instrument

Note: It is typical of B.M. programs at all institutions to spread general education requirements throughout a student's four years to allow for early specialization.

Students should check with the department office for the most up-to-date course schedules and program planning advice, since courses are not necessarily taught in the same quarters each academic year. Numbers of quarter credits are in parentheses.

Year	Fall	Winter	Spring
1st (frsh)	lessons (3) ensemble (2) gen ed/coll core (5) gen ed (5)	lessons (3) ensemble (2) gen ed (5) gen ed (5)	lessons (3) ensemble (2) Mus 14 (5) gen ed (5)
2nd (soph)	lessons (3) ensemble (2) Mus 30A (5) Mus 30L (2) Mus 60 (2)* gen ed (5)	lessons (3) ensemble (2) Mus 30B (5) Mus 30M (2) Mus 60 (2)* gen ed (5)	lessons (3) ensemble (2) Mus 30C (5) Mus 30N (2) Mus 60 (2)* gen ed (5)
3rd (jr)	lessons (3) ensemble (2) Mus 100A (5) gen ed/ elective (2-5)	lessons (3) ensemble (2) Mus 100B (5) Mus 101A (5)	lessons (3) ensemble (2) Mus 100C (5) Mus 101B (5)
4th (sr)	lessons (3) ensemble (2) Mus 101C (5) gen ed (5)	lessons (3) ensemble (2) Mus 101D (5) gen ed/elec- tive (5)	Mus 196B (5) ensemble (2) 180A or B(5)

*Mus 60 (*Group Instruction in Piano*) is not a course requirement for the major but should be taken if the student needs preparation for the keyboard proficiency examination. The course is geared to the Music 30A-B-C sequence. (Current music majors frequently take 17–20 credits in this configuration of courses.)

Voice majors need to work closely with an adviser to schedule general education courses because of the added language requirements; a Summer Session may be necessary. It is recommended that voice majors take a language course each fall quarter during the first three years and that vocal repertory in that language be stressed throughout the academic year. For example, instead of enrolling in a general education course during the fall quarter of the first, sophomore, and junior years, a student concentrating in voice might enroll in Italian 1, German 1, and French 1, respectively.

Minors

Western Art Music

The minor in Western art music provides a focus for music activities and a background in both music history and theory. A student may earn a minor in music by completing the following courses:

- 1A;
- 30A/L-B/M-C/N;
- one of either 120, 130, 180A or 180B;
- one of 101A-B-C-D;

- and a combination of evaluated individual or group lessons and performing ensembles, or the three-course electronic music studio sequence (123, 124, 125), together totaling six quarters, three of which must be upper-division.

Of the examinations required for the B.A., only the core curriculum placement exam (or equivalent) is required for the minor in Western art music.

Electronic Music

The electronic music minor focuses on the study of creating music using the tools of modern technology. It is designed to complement the music major or programs in other media by providing instruction in advanced skills of audio production, sound synthesis, and computer-assisted composition. A student may obtain a minor in electronic music by completing the following:

- any course in the 11 series;
- course 13 (may be satisfied through the music core curriculum placement examination);
- course 14 (or course 30A/L placement);
- courses 80C, 123, 124, 125, and two quarters of 167;
- one of the following: course 80L or 80R (or a similar music course that has a technical focus as approved by the department), or Film 171A or Theater Arts 114;
- one of the following: Physics 80A or 160; or Computer Science 5C, 5J, 5P, or 12A; or Electrical Engineering 70, 153, or 171

Jazz

The jazz minor focuses on the study of the history, theory, and performance of jazz. In addition, students may be introduced to musical styles that have had profound influences on this uniquely American art form: folk and popular musics of Africa, Europe, and the United States and Western classical music. The jazz minor is limited to students who have sufficient performance proficiency to pass auditions for entry into the jazz ensembles. The required courses for the minor in jazz are the following:

- course 11A;
- course 14 (students not qualified to take course 14 must also take course 13 as a prerequisite);
- course 75 and 175;
- course 111B (students not qualified to take course 111B must also take course 11B; course 30B is also a prerequisite);
- course 11C, 11D, 80J, or 80Q;
- six quarters of ensembles, including at least three quarters of the jazz ensembles (courses 3 and/or 164). At least two quarters must be upper-division. All Music Department ensembles are 2-credit courses;
- course 174.

Detailed information about the music majors and minors may be obtained from the Music Department office.

Honors

Honors in the major are conferred by vote of the music faculty. B.A. or B.M. students can be awarded honors for excellent work in individual areas, including course work, senior project (thesis or recital), or *Senior Exit Seminar* (Music 197). Excellent work in any two of these areas normally results in honors in the major.

To be considered for highest honors in the major, B.A. students must complete a (non-required) senior project and B.M. students must complete the (non-required) *Senior Exit Seminar*. Honors in all three areas—coursework, senior project, and *Senior Exit Seminar*—normally results in highest honors in the major.

Transfer Students

The Music Department encourages transfer students to take the core curriculum placement examination and seek academic counseling before transfer (a sample of the exam can be viewed at <http://music.usc.edu/undergrad/>). Transfer students who have some background in music theory normally test either into course 14 or into 30A/L (which is only offered in the fall quarter). Students who test into course 13 or 14 take one or both of these courses in their first year to prepare for 30A/L the following fall. Transfer students who have completed all of their general education requirements and who test into course 30A/L upon transfer may be able to complete the music major in two years.

B.A. transfer students should note that upon completion of course 100A, they need to perform on a musical instrument or voice at an upper-intermediate level. Prospective students wishing to have their performance skill level assessed by faculty in preparation for entry to the program are encouraged to send a tape for faculty review.

B.M. transfer students should prepare to audition in the fall quarter after enrollment. (For audition requirements, see the Requirements for the Bachelor of Music section above.) In certain cases, some or all of the applied music requirement may be waived based on prior course work.

B.M. Sample Study Planner for Transfer Students Concentrating in an Instrument

This plan assumes that all general education requirements have been met. The music core curriculum placement examination generally places junior transfer students in Music 30A/L (which is only offered during fall quarter).

Students should check with the department office for the most up-to-date course schedules and program planning advice, since courses are not necessarily taught in the same quarters each academic year. Numbers of quarter credits are in parentheses.

Year	Fall	Winter	Spring
3rd (jr)	lessons (3)	lessons (3)	lessons (3)
	ensemble (2)	ensemble (2)	ensemble (2)
	Mus 30A (5)	Mus 30B (5)	Mus 30C (5)
	Mus 30L (2)	Mus 30M (2)	Mus 30N (2)
	Mus 60 (2)*	Mus 60 (2)*	Mus 60 (2)*
		Mus 101A (5)	Mus 101B (5)
4th (sr)	lessons (3)	lessons (3)	Mus 196B (5)
	ensemble (2)	ensemble (2)	ensemble (2)
	Mus 100A (5)	Mus 100B (5)	Mus 100C (5)
	Mus 101C (5)	Mus 101D (5)	Mus 180A or B (5)

*Music 60 (*Group Instruction in Piano*) is not a course requirement for the major but should be taken if the student needs preparation for the keyboard proficiency examination. The course is geared to the Music 30A-B-C sequence. (Current music majors frequently take 17–20 credits in this configuration of courses.)

A transfer student concentrating in voice could enroll in Italian 1 and German 1 in the fall and winter quarters, respectively, of the junior year, and in French 1 in the spring quarter of the senior year. Such a transfer student would complete any desired electives prior to arrival at UCSC and/or in Summer Session. However,

transfer students should try to satisfy as many of the language requirements as possible before entering the program.

Individual Instruction

Lessons in the instruments listed below are available on a fee basis and by audition with the instructor. Depending on whether a student is pursuing a particular music undergraduate degree program (B.A. or B.M.), or a music minor, concurrent enrollment in an appropriate ensemble is required for a stipulated number of quarters. Consult the Undergraduate Music Student Handbook for details.

Authorization from the performance instructor is a requirement for entry into the music majors. Students who demonstrate insufficient potential when auditioning for individual instruction may have limited access to lessons, and they may be denied entry into the major.

Courses 61, 62, and 161 carry partial course credit. Each quarter of enrollment in course 61 is equivalent to 2 credits; each quarter of enrollment in course 62 or 161 is equivalent to 3 credits. Course 162, open to advanced students only, carries 5 credits.

Class instruction for partial credit (courses 60 and 63) is available on some instruments but may not be used to fulfill the individual lesson requirements for the major.

Bass: B. Green, S. Poplin

Bassoon: J. Orzel

Cello: K. Andrie

Clarinet: M. Brandenburg

Class Piano: E. Arulanantham

Flute: G. Ellison Wolfson

Guitar, classical: W. Coulter, M. Özgen

Harpichord: L. Burman-Hall

Horn: S. Vollmer

Oboe: P. Mitchell

Percussion: G. Marsh, W. Winant

Piano, classical: M. J. Cope, M. Ezerova, A. Leikin

Saxophone: P. Contos

Trombone and tuba: W. Solomon

Trumpet: O. Miyoshi

Violin and viola: R. Malan

Voice: P. Maginnis, B. Staufenbiel

Performance Groups

The participants in some groups are selected by auditions open to the entire university community. Students receive two course credits for each quarter of enrollment in any of the ensembles.

University Orchestra: N. Paiement

University Concert Choir: N. Berman

Women's Choral: Staff

Chamber Singers: N. Paiement

University Opera Theater: B. Staufenbiel

Opera Workshop: P. Maginnis, B. Staufenbiel

Early Music Consort: L. Burman-Hall, L. Miller, N. Treadwell

Chamber Music: Staff

Large Jazz Ensemble: R. Klevan

Small Jazz Ensembles: S. Poplin

Latin American Ensembles: D. Nieves

Contemporary Music Ensemble: A. Beal

West Javanese Gamelan: U. Sumarna

Balinese Gamelan: L. Burman-Hall

Wind Ensemble: R. Klevan

Classical Guitar Ensemble: Mesut Özgen

North Indian Music Workshop: D. Neuman

Eurasian Ensemble: T. Merchant

Graduate Programs

Master of Arts

The Master of Arts degree program in music has emphases in composition, ethnomusicology, or performance practice, and integrates studies in performance, composition/analysis, and research. In consultation with a faculty adviser, the student pursues a two-year course of studies culminating in a final project that combines an original composition, written thesis, or essay with a related public performance or lecture recital.

Requirements

A minimum of 60 course credits completed at UCSC is required for the degree. All M.A. students are required to complete Music 200, 201, 202, and 252 during each quarter in residence (for students entering the program fall 2007 and thereafter).

Students with an emphasis in composition also complete Music 219, 220, and one 203 course.

Students with an emphasis in ethnomusicology or performance practice also select three courses from Music 203A-H (course 206D meets the requirement for one 203 course).

The final project for the degree includes both performing and scholarly components, which vary according to the degree emphasis.

Students with a composition emphasis submit a thesis composition together with an essay that addresses historical, technical, and/or interpretive issues of the music (course 299); and they complete a full-length recital (course 298) of their compositional work.

Students with an ethnomusicology emphasis complete a thesis (course 299) and a short performance or lecture-recital related to the thesis (course 298).

Students with a performance practice emphasis complete a full-length recital (course 298) and an accompanying short essay that addresses historical, technical, and/or interpretive aspects of the music performed in the recital. Students in this emphasis whose main area is conducting, complete a full-length recital (course 298) and one of the following: a shorter lecture-recital, a short analytical or contextual essay on a different topic, or collaboration with a graduate student composer or faculty composer on a premiere public performance. Students are encouraged to create a program involving corollary studies such as computer studies, area cultural studies, linguistics, anthropology, theater arts, and visual arts.

Current skill in reading and comprehension of a relevant foreign language must be demonstrated upon enrollment by attainment of level 3 on the UCSC language placement examination or, during the first year of enrollment, by satisfactory completion of level 3 of the language at UCSC, or by submission of an official transcript documenting successful completion of one year of university-level foreign language. With the approval of the primary adviser, students whose emphasis is algorithmic composition may complete three quarters/one year of university-level instruction in computer programming in lieu of fulfillment of the foreign language requirement. Knowledge of languages not offered at UCSC must be demonstrated as determined by the Music Graduate Committee.

Prior to the start of classes each fall quarter, each incoming M.A. student is required to complete a three-hour diagnostic exam which is intended to identify areas in which supplementary coursework may be needed, in addition to the courses listed above.

Doctorate of Musical Arts

The Doctorate of Musical Arts (D.M.A.) degree program in music composition has tracks in computer-assisted composition and world music composition. The track in computer-assisted composition includes algorithmic techniques for the generation of musical materials and structures to be realized in the creation of instrumental, vocal, and digitally synthesized music. The track in world music composition addresses a variety of compositional approaches influenced by indigenous world musics, with a focus upon those musics taught by faculty composers, ethnomusicologists, and applied instructors. The D.M.A. program seeks to develop accomplished, active, and articulate composers who have a broad awareness of the diverse styles, cultural influences, media, venues, and technical means available to them in the 21st century.

Requirements

For students entering with the bachelor's degree, a minimum of 102 credits in course work at UCSC will be required. All students must be in residence for a minimum of nine quarters. Students must enroll in a minimum of twelve credits each quarter until they advance to candidacy. After advancing to candidacy, students remaining in residence must take a minimum of two five-credit courses each quarter.

For students entering with a master's degree from another institution, a minimum of 72 credits in course work at UCSC will be required. All students must be in residence for a minimum of six quarters. Students must enroll in a minimum of twelve credits each quarter until they advance to candidacy. After advancing to candidacy, students remaining in residence must take a minimum of two five-credit courses each quarter.

Required courses include Music 200, 201, and 202 (students entering with a master's degree from another institution may petition to waive one or more of these courses by submitting documentation for equivalent courses completed elsewhere). Students in the computer-assisted composition track complete Music 206B, one 203 course, and two quarters of 267 or another 206 course. Students in the world music composition track complete Music 206A, 203H, and 203G or another 206 course. All students are required to complete Music 219, 220, 252 each quarter in residence (for those entering fall 2007 and thereafter), 297, 298, and five quarters enrollment in Music 299.

Current skill in reading and comprehension of a relevant foreign language must be demonstrated upon enrollment by attainment of level 3 on the UCSC language placement examination or, during the first year of enrollment, by satisfactory completion of level 3 of the language at UCSC, or by submission of an official transcript documenting successful completion of one year of university-level foreign language. With the approval of the primary adviser, students whose emphasis is algorithmic composition may complete three quarters/one year of university-level instruction in computer programming in lieu of fulfillment of the foreign language requirement. Knowledge of languages not offered at UCSC must be demonstrated as determined by the Music Graduate Committee.

Prior to the start of classes in fall quarter, each incoming D.M.A. student is required to complete a three-hour diagnostic exam which is intended to identify areas in which supplementary coursework may be needed, in addition to the courses listed above.

Students who entered the D.M.A. program with a bachelor's degree may apply for the M.A. degree after

completion of a minimum of five quarters in residence and the courses listed above with the exceptions of Music 299, and the qualifying recital (course 298).

Pre-qualifying Reviews

Before the end of the first year of study, all D.M.A. students must present a half recital of their compositions from that year, and submit the scores and recital recording as a portfolio, which faculty will use to assess their progress in the program. Typically, the half recital is satisfied by a combination of (1) participation in a concert of graduate-student compositions sponsored each April by Porter College and the Music Department, and (2) participation in a public reading of graduate-student final projects from course 220 at the end of spring quarter.

The Qualifying Recital

All students admitted to the D.M.A. program must present a full recital of their work at the end of their second year of study. The D.M.A. qualifying recital will be evaluated by the student's primary adviser and by a second faculty member (generally a second composer) selected by the student in consultation with the primary adviser.

Dissertation Prospectus

The dissertation prospectus must be submitted by the beginning of spring term one year before the scheduled qualifying examination. The prospectus must include a proposal describing the scope and nature of the dissertation composition and the accompanying essay. In addition to defining the parameters of the dissertation itself, the dissertation prospectus will suggest to the student's Qualifying Examination Committee those areas of study that should be emphasized in the student's qualifying examination.

Qualifying Examination

Advancement to candidacy is contingent upon the passing of a written examination and an oral examination normally administered at the end of year three for students entering with a bachelor's degree, and year one or two for students entering with a master's degree from another institution. For the written portion of the examination, the Qualifying Examination Committee provides questions on the three topics assigned as areas of emphasis. The oral examination is administered by the student's Qualifying Examination Committee and may concern any aspect of the assigned topics with an emphasis on those issues addressed in the written portion of the examination. Advancement to candidacy is granted upon notice that the student has passed the written and oral examinations.

Dissertation

D.M.A. students must complete a dissertation consisting of a substantial musical composition, accompanied by an essay. One to two years of work beyond the qualifying examinations should be sufficient for the completion of the dissertation, except in cases where extended fieldwork is required.

Final Examination

The final examination will be a public oral defense of the dissertation. After an oral presentation by the candidate, the candidate will be questioned by the Dissertation Committee.

Doctor of Philosophy in Music

The Doctor of Philosophy (Ph.D.) degree in music has an emphasis in cross-cultural studies, and aims to provide doctoral students with an integrative framework

for music scholarship, emphasizing how musicology and ethnomusicology interact and complement one another.

In addition to cultural approaches to world musics, the new program also encourages the integration of scholarly research with musical performance, emphasizing how performance serves both rhetorical and symbolic ends within various cultural settings. To this end the concept of "performance practice" plays a significant role in this program, given that the concept of historically or culturally informed performances is applicable to music from the earliest times to the present day in all geographical and cultural regions, and can encompass research activities as diverse as fieldwork, historical editing, and recording, as well as publishing of books and articles on the traditions of composition and performance.

Requirements

Students entering the Ph.D. program with a bachelor's degree are required to complete the following courses: Music 200, 201, 202, three courses from Music 253, three courses from Music 254, three courses from Music 203 (Music 206D or a 254 course may each substitute for one 203 course), Music 252 during each quarter of residence, and Music 299.

Students entering the Ph.D. program with a master's degree are required to complete the courses listed above with the exception of 200, 201, and 202.

Students entering the Ph.D. program are expected to have reading knowledge of a foreign language equivalent to at least one year of coursework. In addition, students must acquire reading knowledge, equivalent to one year of coursework, of a second foreign language relevant to their area of interest during their first year of enrollment, or to demonstrate equivalent knowledge as determined by the Music Graduate Committee.

Prior to the start of classes in fall quarter, each incoming Ph.D. student is required to complete a three-hour diagnostic exam which is intended to identify areas in which supplementary coursework may be needed, in addition to the courses listed above.

Ph.D. students entering the program with a bachelor's degree are required to submit a research paper by the beginning of the fourth quarter in residence, which will be revised that quarter under the supervision of the student's faculty adviser, and will be evaluated at the end of the quarter by the adviser and an additional faculty member. Students whose paper is assessed as unsatisfactory will not be allowed to continue in the Ph.D. program.

Students may devise a program of study that includes additional music courses, and courses from other disciplines, suited to their special areas of concentration.

Students who entered the Ph.D. program with a bachelor's degree may apply for the M.A. degree after completion of a minimum of five quarters in residence, and the courses listed above with the exception of Music 299.

Pre-qualifying reviews

At the end of the first year of study, all students accepted into the Ph.D. program will submit a brief report on work completed during that year. This report will inform a consideration by the music faculty of the student's status in the graduate program. Faculty will offer comments and suggestions to be communicated to the student either directly or through the student's adviser. However, if progress is minimal, faculty reserve the right to terminate a student's enrollment in the program.

Qualifying Examinations

Advancement to candidacy is contingent upon passing both written and oral examinations. The written qualifying exam will be administered at the conclusion of the student's second year in residence and will test knowledge absorbed through the two years of coursework as well as material in the student's field of concentration. The oral examination will focus on the student's developed expertise in her/his chosen specialization. Students must be registered in the quarter they take their qualifying examination.

The written exam will test the student's knowledge of an array of contextual topics related to her/his dissertation area.

Advancement to candidacy will be granted upon notice of having passed the oral and written examinations, acceptance of the Dissertation Reading Committee form, and satisfactory completion of coursework and foreign language requirements.

Dissertation

To satisfy requirements for the degree, a student must complete a dissertation and present a related formal lecture or lecture-recital. The dissertation must embody substantial and original scholarly work based on a clearly distinguishable contemporary or historical music-cultural tradition, in any music-culture(s) of the world in which the UCSC program offers expertise. The public lecture or performance must demonstrate the student's grasp of the pertinent music-cultural performance tradition or music-cultural and/or music-historical concepts.

Final Examination

The final examination will be an oral defense of the dissertation open to the university faculty. Successful completion of this exam will be determined by a majority vote of the Dissertation Reading Committee.

Additional information about the program, including application and admission, is available from the Division of Graduate Studies and on the department web site: <http://music.ucsc.edu/>.

Lower-Division Courses

1A. Women's Chorale (2 credits). *

Study of vocal and choral techniques in the context of ensemble rehearsals, often culminating in public performance. Repertoire to include varied works for treble choir, both a cappella and with instrumental accompaniment. Familiarity with basic music notation recommended. Some additional rehearsal time, both individually and with the group is required. Students are billed a materials fee. Admission by audition with conductor prior to first class meeting. See enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. (General Education Code(s): A.) *N. Paiement*

1C. University Concert Choir (2 credits). F,W,S

A study of selected works for mixed chorus, with emphasis on masterworks for chorus and orchestra, culminating in one or more public concerts. Familiarity with basic music notation recommended. Admission by audition with conductor prior to first class meeting. See enrollment conditions section of the quarterly *Schedule of Classes*. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.) *N. Berman*

2. University Orchestra (2 credits). F,W,S

A study of selected works for orchestra, culminating in one or more public concerts. Admission by audition with conductor prior to first class meeting. See enrollment

conditions section of the quarterly *Schedule of Classes*. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.) *N. Paiement*

3. Large Jazz Ensemble (2 credits). F,W,S

Instruction in performance in large jazz ensembles with written arrangements. Prepares a specific repertoire for public performance. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Students are billed a materials fee. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *R. Klevan*

4A. Latin American Ensemble: "Voces" (2 credits). F,W

Instruction in diverse musical traditions, and their culturally-grounded performance contexts, of Native American, Ibero-American, and African American music cultures of Latin America, including texted music in Spanish and Quechua or other regional languages. The class forms an ensemble that prepares varying cultural and national repertoires for public performance. Some Spanish language ability is recommended. Attend first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *D. Nieves-Miranda*

4B. Latin American Ensemble: "Taki Ñan" (2 credits). F,W

Development of Latin American, Native American, Ibero-American, African American, and/or Nueva Canción (New Song) repertoire in a small ensemble setting. Three quarters of course 4A or previous enrollment in course 4B required prior to enrolling in this course. Admission by audition with instructor at first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment limited to 10. May be repeated for credit. (General Education Code(s): A.) *D. Nieves-Miranda*

5A. West Javanese Gamelan Ensemble: Beginning (2 credits). F,W,S

Instruction in practice and performance of gamelan music from Java or Sunda. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. (General Education Code(s): A.) *U. Sumarna*

5B. West Javanese Gamelan Ensemble: Intermediate (2 credits). F,W,S

Instruction in practice and performance of gamelan music from Java or Sunda. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. (General Education Code(s): A.) *U. Sumarna*

5C. West Javanese Gamelan Ensemble: Advanced (2 credits). F,W,S

Instruction in practice and performance of gamelan music from Java or Sunda. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. (General Education Code(s): A.) *U. Sumarna*

6. Classical Guitar Ensemble (2 credits). F,W

Study of selected repertoire and instruction in performance for classical guitar ensemble. Ensembles for guitar and other instruments will prepare works for public performances both on and off campus. All students en-

rolled in individual guitar lessons are expected to enroll. Students of other instruments or voice may also audition. Some additional rehearsal time, individually and with the group, is required. Admission by audition with instructor prior to first class meeting. May be repeated for credit. (General Education Code(s): A.) *M. Özgen*

8. Balinese Gamelan Ensemble (2 credits). W,S
Instruction in practice and performance of gamelan music from Bali and Indonesia, including ritual and new music. Preparation of several works for public presentation. Attend first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. (General Education Code(s): A.) *L. Burman-Hall*

9. Wind Ensemble (2 credits). F,W,S
A study of selected advanced-level works for wind ensemble, culminating in one or more public concerts. Admission by audition with conductor prior to first class meeting. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.) *R. Klevan*

10. Eurasian Ensemble (2 credits). F,W
Performing ensemble focusing on the vernacular and art musics of the Eurasian continent, with emphasis on Central Asia. Admission by instructor determination at first class meeting. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *T. Merchant*

11A. Introduction to Western Art Music. F
A study of selected masterworks in relation to the periods which they represent. Emphasis upon the listening experience and awareness of musical style and structure. Illustrated lectures and directed listening. (General Education Code(s): IH, A.) *A. Leikin, L. Miller, N. Treadwell*

11B. Introduction to Jazz. W
Designed to provide students with thorough and comprehensive background in history and roots of jazz as a musical style from its African roots to the present. Essential jazz styles and traditions are discussed through lectures, required listening, readings, lecture demonstrations, and film presentations. (General Education Code(s): IH, A, E.) *K. Hester*

11C. Introduction to American Popular Music. *
Survey of American popular music, from the beginnings of mass media to the late-twentieth century and beyond. Areas of focus will include early African-American styles (the blues, gospel and ragtime), vaudeville songs, a variety of immigrant traditions and folk movements, rock and roll, soul, R & B, hip-hop, and others. Musical experience helpful but not required. (General Education Code(s): IH, A.) *B. Carson, F. Lieberman*

11D. Introduction to World Music. F
Covers topics reflecting distinctive features of selected world music cultures. Introduces content, scope, and method of ethnomusicology. Focuses on understanding the musical styles, performance practices, and cultural functions of these musical traditions. Incorporates live class performance of selected music. (General Education Code(s): IH, A, E.) *J. Schechter*

13. Beginning Theory and Musicianship I. F,W
Fundamentals of music and notation. Major, minor scales, intervals, triads, and inversions, root-position 7th chords, and the beginning harmonic analysis. Emphasis on the development of the ear and coordination. Exercises of pulse, rhythm, pitch, and coordination. Dictation and sight singing. Enrollment restricted to first-year

students and sophomores; juniors and seniors admitted by permission of instructor. Enrollment limited to 60. *J. Sackett, H. Kim*

14. Beginning Theory and Musicianship II. W,S
Continuation of course 13. Triads and 7th chords and their inversions. Introduces Church modes, melodic and harmonic analysis, four-part harmony, and keyboard harmony. Sight-singing, ear training, and dictation. Knowledge of musical notation and scales required. Students who wish to take this course and have not taken course 13 or the placement exam should consult the instructor. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment priority to first-year students, sophomores, and juniors. Prerequisite(s): course 13 or music core curriculum placement exam. Enrollment limited to 25. *J. Sackett, L. Burman-Hall, H. Kim*

30A. Theory, Literature, and Musicianship I. F
Integrated musicianship, theory, and analysis. Species counterpoint and fundamentals of tonal harmony. Analysis of literature from the Middle Ages and Renaissance. Ear-training, taught in smaller sections, emphasizes recognition of triad and dominant-seventh inversions, dictation of diatonic melodies, and aural analysis of simple diatonic interval and chord progressions. Most of the ear-training materials consist of homophonic and polyphonic examples from music literature performed live in class. Concurrent enrollment in course 30L required. Prerequisite: admission by core curriculum placement examination or by passing course 14 with a final examination score of approximately 85 percent or higher. Enrollment limited to 60. *P. Nauert, A. Leikin*

30B. Theory, Literature, and Musicianship I. W
Integrated musicianship, theory, and analysis. Diatonic harmony and fundamentals of chromatic harmony and musical form, with an emphasis on early 18th-century styles. Ear-training, taught in smaller sections, emphasizes recognition of triad and seventh-chord qualities and inversions, dictation of moderately complex melodies and multi-voice chorales, and aural analysis of chord progressions including secondary functions. Most of the ear-training materials consist of homophonic and polyphonic examples from music literature performed live in class. Concurrent enrollment in course 30M required. Prerequisite(s): course 30A; instructor determination at first class meeting. Enrollment limited to 60. *P. Nauert, A. Leikin*

30C. Theory, Literature, and Musicianship I. S
Integrated musicianship, theory, and analysis. Chromatic harmony and large forms, with emphasis on late 18th- and early 19th-century styles. Ear-training, taught in smaller sections, emphasizes melodic and multi-voice dictation, as well as aural analysis of chord progressions, with materials including digressions, modulations, and advanced chromatic idioms. Most of the ear-training materials consist of homophonic and polyphonic examples from music literature performed live in class. Concurrent enrollment in course 30N required. Prerequisite(s): course 30B; instructor determination at first class meeting. Enrollment limited to 60. *P. Nauert, A. Leikin*

30L. Theory, Literature, and Musicianship I Laboratory (2 credits). F
Keyboard (score-reading, figured-bass, progressions, chorales) and musicianship (sight-singing, intervals, chords, rhythm) laboratory sequence illustrating topics covered in course 30A. Two 1-hour laboratory sessions per week. Concurrent enrollment in course 30A required; concur-

rent enrollment in course 60 also required for students without adequate prior keyboard training. Enrollment limited to 6. *The Staff*

30M. Theory, Literature, and Musicianship I Laboratory (2 credits). W
Keyboard (score-reading, figured-bass, progressions, chorales) and musicianship (sight-singing, single chords and progressions, rhythm) laboratory sequence illustrating topics covered in course 30B. Two 1-hour laboratory sessions per week. Prerequisite(s): course 30L; instructor determination at first meeting of course 30B. Concurrent enrollment in course 30B required; concurrent enrollment in course 60 also required for students without adequate prior keyboard training. Enrollment limited to 6. *The Staff*

30N. Theory, Literature, and Musicianship I Laboratory (2 credits). S
Keyboard (score-reading, figured-bass, progressions, chorales) and musicianship (sight-singing, atonal melody, rhythm) laboratory sequence illustrating topics covered in course 30C. Two 1-hour laboratory sessions per week. Prerequisite(s): course 30M; instructor determination at first meeting of course 30C. Concurrent enrollment in course 30C required; concurrent enrollment in course 60 also required for students without adequate prior keyboard training. Enrollment limited to 6. *The Staff*

42. Student-Directed Seminar. F,W,S
Seminars taught by upper-division students under faculty supervision. (See course 192.) Students submit petition to sponsoring agency. *The Staff*

51. Vocal Repertoire Class (2 credits). F,W,S
The study and performance of vocal repertoire from 1400 to the present, including solo song, oratorio, opera, ensemble music. Emphasis is given to the development of effective performance skills, culminating in public performance. Attend first class meeting; concurrent enrollment in individual voice lessons with instructor of this course is required. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *B. Stausfenbiel, P. Maginnis*

54. North Indian Music Workshop (2 credits). F,W,S
A course covering the music of North India taught using the oral traditions of Indian music. For beginners as well as more experienced students, this course is well suited for instrumentalists and vocalists. Interview; instructor determination at first class meeting. May be repeated for credit. (General Education Code(s): A.) *D. Neuman*

60. Group Instruction in Piano (2 credits). F,W,S
Elementary instruction in piano technique, including group and individual performance experience. A minimum of six hours per week of individual practice is required. Curriculum is coordinated with keyboard requirements of courses 30L-M-N. Concurrent enrollment in courses 30L-M-N is required. Students are billed a course fee. Prerequisite(s): Instructor determination at first class meeting. Enrollment limited to 8. May be repeated for credit. *E. Arulanantham*

61. Individual Lessons: Half Hour (2 credits). F,W,S
One-half hour of individual instrumental or vocal instruction. Repertory, technique, and performance practice. A minimum of six hours per week of individual practice is required. Concurrent enrollment in an ensemble in the lesson instrument or voice is required. Students are billed a course fee. Admission by audition with the instructor

prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment priority given to music majors and minors. May be repeated for credit. *The Staff*

62. Individual Lessons: One Hour (3 credits). F,W,S

One hour of individual instrumental or vocal instruction. Repertory, technique, and performance practice. A minimum of nine hours per week of individual practice is required. Concurrent enrollment in an ensemble in the lesson instrument or voice is required. Students are billed a course fee. Admission by audition with the instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment priority given to music majors and minors. May be repeated for credit. *The Staff*

63. Group Instrumental and Vocal Lessons (2 credits). F,W,S

Elementary group instruction in instrumental (excluding piano) or vocal techniques, including group and individual performance experience. A minimum of six hours per week of individual practice is required. Students are billed a course fee. Admission by audition with the instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment limited to 6. May be repeated for credit. *The Staff*

74. Beginning Jazz Improvisation. F

Introduction to the basics of jazz improvisation, including theory, harmony, rhythm, improvisation techniques, aesthetics and idiomatic devices. Exposure to jazz repertoire through in-class performances of swing, blues, modal and Latin styles. Admission by audition with instructor at first class meeting. Enrollment limited to 20. May be repeated for credit. *K. Hester*

75. Jazz Theory I. F

Studies in the modes, scales, chord alternations and extensions, chord voicings, chord progressions, and forms that underlie jazz improvisation, composition, and arranging in a variety of styles. Prerequisite(s): course 14. Enrollment limited to 30. (General Education Code(s): A.) *K. Hester, M. Low*

80A. Music of the Silk Road. *

Exploration of the commonalities between music cultures found along ancient trade routes through Asia. (General Education Code(s): T4-Humanities and Arts, A, E.) *T. Merchant*

80C. History, Literature, and Technology of Electronic Music. F

This survey of electronic music from previous centuries to the present studies the works and aesthetics of important composers, acoustics, musical perception, the effects of technological innovation on cultural evolution, and the development of synthesizers and computer music. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, A.) *The Staff*

80F. Music in Latin American Culture: Regional Traditions. S

In-depth study of select music cultures of Mexico, Central America, and Caribbean, Brazil, Chile, Argentina, Colombia, and Peru. Characteristic regional genres, ensembles, instruments, and music rituals. Case studies by ethnomusicologists with expertise in specific regional musics. Also Latin American Nueva Canción, women's musics, and overarching themes in Latin American music, as a whole. Offered on a rotational basis with other non-Western courses in the 80 series. (General Education Code(s): T4-Humanities and Arts, A, E.) *J. Schechter*

80G. American Musical Theater. *

Surveys American musicals from operetta through rock musicals with a historical approach focusing on selected examples from the literature. Music reading or musical experience helpful but not required. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A.) *F. Lieberman*

80H. The Hollywood Musical. *

Introductory study of the Hollywood music film, exploring the theory of film sound, the musical genre, and representative works from the 1920s to the present. Students expected to view about two films each week, read assigned section of texts, and contribute to class discussions. (General Education Code(s): T4-Humanities and Arts, A.) *F. Lieberman*

80I. Music of Modern Israel. W

Historical, musicological, and anthropological study of the many (and often conflicting) worlds brought together by Israeli popular and art music: Jewish and Arabic traditions, Western ideals, and modern beats. Enrollment limited to 40. (General Education Code(s): T4-Humanities and Arts, A, E.) *A. Tchamni*

80J. American Folk Music. *

Surveys American folk music, both instrumental and vocal, by region and period. Approach is primarily through listening. Previous musical experience helpful, but not required. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A.) *F. Lieberman*

80K. American Indian Music and Thought. *

Hemispheric first peoples music and thought: American Indian history, culture and music areas, song genres, view of the Sacred and relationship to the land, scholarship overview, musical thought, powwow complex, instruments, short literature, books by Young Bear and Alexie, music-ritual, and selected modern American Indian performers/ensembles. (Formerly *Music in American Indian Life and Thought*.) Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A, E.) *J. Schechter*

80L. Artificial Intelligence and Music. *

An introduction to basic concepts in music and artificial intelligence, and to algorithmic composition (composition by a set of explicit instructions, often using the computer). Other topics include basic introductions to related concepts in linguistics, mathematics, neural nets, pattern matching, genetic algorithms, fuzzy logic, and interactive systems. Previous experience in one or more of these topics is helpful but not required. Students produce a project based on one of the models presented in class. Offered in alternate academic years. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, A.) *The Staff*

80N. Music of the Grateful Dead. S

In-depth exploration of the music of the Grateful Dead. Contextual study of the sociology and history of the late 1960s psychedelic movement supplies background for study of the music as the band evolved through time. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A.) *F. Lieberman*

80O. Music, Politics, and Protest. *

Examination of relationship between music, politics, and protest in the U.S. in the 20th century, with focus on how music commented upon and reflected different eras in American cultural and political life. (General Education Code(s): T4-Humanities and Arts, A.) *D. Neuman*

80P. History of Jewish Music. F

Survey of the diverse and rich musical traditions of Jewish music in the diaspora from biblical times to the present. Examines the historical, social, and anthropological aspects of the different communities from sacred music through art and popular songs. Enrollment limited to 40. (General Education Code(s): T4-Humanities and Arts, A, E.) *A. Tchamni*

80Q. A Survey of African Music. S

Traces the various stylistic musical areas throughout the African continent and explores the development of traditional African music from antiquity into the 20th century. Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A, E.) *K. Hester*

80R. Music and the World Wide Web. *

A survey of musical applications of the World Wide Web and the technologies they employ: tools for musical research, playback, composition, performance, and publishing. Historical perspectives and artistic ethics also discussed. Students prepare a creative project using software tools, techniques, sound sources available on the web, and learn how to publish the results on the web. Enrollment limited to 44. Offered in alternate academic years. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, A.) *The Staff*

80S. Women in Music. F

An exploration of the sociological position of women as composers and performers in Western and non-Western musics, with a focus on both ethnographic and historical sources. (Also offered as Feminist Studies 80S. Students cannot receive credit for both courses.) Offered in alternate academic years. (General Education Code(s): T4-Humanities and Arts, A.) *T. Merchant*

80V. The Music of the Beatles. *

The most significant group in the history of popular music, the Beatles spanned the gamut of styles from hard-edged R & B to sophisticated art-rock. This course explores their work in detail, in its own terms, and in the historical/cultural/technological contexts. Students cannot receive credit for both this course and course 180V in the same quarter. Course 11C is recommended but not required as preparation. (General Education Code(s): T4-Humanities and Arts, A.) *F. Lieberman*

80X. Music of India. *

A survey course in Hindustani (North Indian) and Karnatak (South Indian) music covering the Raga (modal system) and Tala (metric system) as they have developed in the two traditions. Consideration is given to the historical development of the music, from Vedic chanting to the modern Raga system; social functions of the music throughout history; and instrumental and vocal forms with an emphasis on listening. (General Education Code(s): T4-Humanities and Arts, A, E.) *D. Neuman*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Admission requires approval of department. *The Staff*

99. Tutorial. F,W,S

A program of directed study arranged with a department faculty member. Students submit petition to sponsoring agency. *The Staff*

99F. Tutorial (2 credits). F,W,S

A program of directed study arranged with a department faculty member. Class time is proportionally less than a five-credit course. Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

100A. Theory, Literature, and Musicianship II. F

Tonal counterpoint and advanced tonal analysis. Techniques of 18th-century counterpoint and compositional practice. Advanced concepts in harmony, form, and the structure of melody in tonal music. Prerequisite(s): courses 30C and 30N and Piano Proficiency Exam. Enrollment limited to 20. *B. Carson, P. Nauert, D. Jones, J. Sackett*

100B. Theory, Literature, and Musicianship II. W

Harmony and form in 19th- and early 20th-century music. Further techniques for the analysis of advanced tonal, chromatic, and post-tonal harmony. Study of larger forms, chromaticism, principles of development, and style elements unique to late romanticism and early modernism. Prerequisite(s): course 100A. Enrollment limited to 20. *B. Carson, P. Nauert, D. Jones, J. Sackett*

100C. Theory, Literature, and Musicianship II. S

Theories and practices of 20th-century music. Survey of compositional principles in 20th-century music, with an emphasis on departures from tradition. Techniques of post-tonal, dodecaphonic, and serial composition; survey of post-war movements in composition and improvisation. Prerequisite(s): course 100B. Enrollment limited to 20. *B. Carson, P. Nauert, D. Jones, J. Sackett*

101A. History of Western Art Music. W

First quarter of a four-quarter detailed chronological study of Western art music from antiquity to the present. Coordinated lectures, readings, listening assignments, and analysis of representative works: Antiquity, Middle Ages, Renaissance. Prerequisite(s): course 30A. *L. Miller, N. Treadwell*

101B. History of Western Art Music. S

Second quarter of a four-quarter detailed chronological study of Western art music from antiquity to the present. Coordinated lectures, readings, listening assignments, and analysis of representative works: Baroque. Prerequisite(s): course 30B. *L. Miller, L. Burman-Hall, N. Treadwell*

101C. History of Western Art Music. F

Third quarter of a four-quarter detailed chronological study of Western art music from antiquity to the present. Coordinated lectures, readings, listening assignments, and analysis of representative works: Classical and Romantic. Prerequisite(s): course 30C. *A. Leikin, A. Beal*

101D. History of Western Art Music. W

Fourth quarter of a four-quarter detailed chronological study of Western art music from antiquity to the present. Coordinated lectures, readings, listening assignments, and analysis of representative works: twentieth century. Prerequisite(s): course 30C. *A. Beal*

102. University Orchestra (2 credits). F,W,S

A study of selected works for orchestra, culminating in one or more public concerts. Admission by audition with conductor prior to first class meeting; see the enrollment conditions section of the quarterly *Schedule of Classes*. Students are billed a materials fee. Enrollment restricted to juniors and seniors. May be repeated for credit. (General Education Code(s): A.) *N. Paiement*

103. University Concert Choir (2 credits). F,W,S

A study of selected works for orchestra, culminating in one or more public concerts. Prerequisite(s): admission by audition with conductor prior to first class meeting. See the enrollment conditions section of the quarterly

Schedule of Classes. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.) *N. Berman*

111B. Seminar in Jazz Analysis. W

Analytic exploration of the evolution of "jazz" in America. The process involves independent listening, analysis, transcription, weekly seminar discussions, and oral presentation to students in course 111B. Prerequisite(s): course 30B and course 111B. Enrollment limited to 20. *K. Hester*

120. Seminar in Music Composition. F

Instruction in individual composition offered in the context of a group; composition in traditional large and small forms. Prerequisite(s): course 30C. Enrollment limited to 20. *P. Nauert, D. Jones, H. Kim*

123. Electronic Sound Synthesis. W

Introduction to electronic music studio techniques, relevant electroacoustical studies, and procedures of electronic music composition. Practical experience in the UCSC electronic music studio with an analog synthesizer; mixing, equalization, multitrack recording equipment, and other sound processing. Application form available at department office during last two weeks of the previous quarter. Preference given to music majors, students in the film/video major, and those with substantial musical experience. Prerequisite(s): instructor determination via application; course 80C; course 14 or course 30A placement. Enrollment limited to 25. *P. Elsea*

124. Intermediate Electronic Sound Synthesis. S

Composition with the use of small computers in the electronic music studio. Techniques covered include hybrid synthesis, digital synthesis, and MIDI-controlled systems. No programming is involved, but basic computer literacy is helpful. Prerequisite(s): course 123. Enrollment limited to 25. *P. Elsea*

125. Advanced Electronic Sound Synthesis. F

Continuing study in the electronic music studio, with concentration on compositional development. Includes advanced applications of skills developed in courses 123 and 124, expansion of background knowledge and relevant electroacoustical studies. Prerequisite(s): course 124. Enrollment limited to 25. *P. Elsea*

130. Orchestration. S

A study of the nature of each instrument of the orchestra. Scoring for various small instrumental combinations, culminating in a transcription for full orchestra. Prerequisite(s): course 30C. Enrollment limited to 20. *H. Kim*

159A. Opera Workshop (2 credits). F,W

A workshop for singers, accompanists, and directors, the course develops a wide variety of skills related to opera through scenework. Attention will be given to movement, acting, coaching, and operatic stage-directing technique. Instruction culminates in studio productions of scenes from operas and musicals. Admission by permission of vocal instructor, or by audition with instructor prior to first class meeting. Students are billed a materials fee. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *B. Staufenbiel*

159B. Opera Workshop (3 credits). F,W

A workshop for singers, accompanists, and directors, the course develops a wide variety of skills related to opera through scenework. Attention will be given to movement, acting, coaching, and operatic stage-directing technique. Instruction culminates in studio productions of scenes from operas and musicals. Admission by permission of

vocal instructor, or by audition with instructor prior to first class meeting. Students are billed a materials fee. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *B. Staufenbiel*

160. University Opera Theater. S

A production workshop, culminating in one or more staged performances of an entire opera or selected scenes from the operatic repertory. Admission by audition with instructor prior to first class meeting; auditions usually take place in fall quarter. See the enrollment conditions section of the quarterly *Schedule of Classes*. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.) *B. Staufenbiel*

161. Individual Lessons: One Hour (3 credits). F,W,S

One hour of individual instrumental or vocal instruction. Repertory, technique, and performance practice. A minimum of nine hours per week of individual practice is required. Concurrent enrollment in an ensemble in the lesson instrument or voice is required. Students are billed a course fee. Admission by audition with the instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Enrollment priority given to music majors and minors. May be repeated for credit. *The Staff*

162. Advanced Individual Lessons: One Hour. F,W,S

One hour of individual instruction for advanced students. Study of repertory, technique, and performance practice. A minimum of 18 hours per week of individual practice and at least one 30-minute recital are required. May be taken three times for credit. Concurrent enrollment in an ensemble in the lesson instrument or voice is required. Students are billed a course fee. Admission by juried audition. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *The Staff*

163. Early Music Consort (2 credits). F,W

A study of selected works for varied early music instrumental and vocal resources, culminating in one or more public concerts. Individual lessons are recommended in conjunction with consort work. Recommended for students who have instrumental or vocal competence and music literacy. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *L. Miller, L. Burman-Hall, N. Treadwell*

164. Jazz Ensembles (2 credits). F,W,S

Instruction in combo performance and techniques of the jazz idiom. The class forms several ensembles that prepare a specific repertory for public performance. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *S. Poplin*

165. Chamber Music Workshop (2 credits). F,W,S

A study of selected works for various small combinations of instruments, culminating in one or more public concerts. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *The Staff*

166. Chamber Singers (2 credits). F,W,S

The study of selected works for small vocal ensemble from the fifteenth through twentieth centuries, with performances on and off campus throughout the academic

year. Students must have demonstrated vocal and music reading skills. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): A.) *N. Paiement*

167. Workshop in Electronic Music (2 credits). F,W,S

Continuing studio work in electronic music. Students carry out individual projects, meeting in weekly seminar to share problems and discoveries. Relevant advanced topics are covered, including new developments in the art. Prerequisite(s): course 124. Enrollment limited to 20. May be repeated for credit. *P. Elsea*

168. Contemporary Music Ensemble (2 credits). W,S

A study of selected works for various small combinations of instruments and voice, culminating in one or more public concerts. Admission by audition with instructor prior to first class meeting. See the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *L. Miller, A. Beal, H. Kim*

174. Intermediate Jazz Improvisation. S

Develops basic skills through a range of advanced bop, quasi-modal and post-bebop styles—including selected free jazz and "avant-garde" repertoire. Prerequisite(s): course 74; audition with instructor at first class meeting. Enrollment limited to 20. May be repeated for credit. *K. Hester*

175. Jazz Theory II. W

Through transcription, analysis, and performance of "jazz" standards, composition, arranging, improvisation, and spontaneous creation explored. Students write a series of improvisations, short compositions, and arrangements throughout the course. Prerequisite(s): courses 75, 100A, and 100B. Enrollment limited to 30. *K. Hester, M. Low*

180A. Studies in World Musics: Asia and the Pacific. W

In-depth ethnomusicological studies of selected music cultures of East Asia, Southeast Asia, and the Pacific. Emphasizes comparison of historical, theoretical, contextual, and cultural features. Includes basic ethnomusicological points of reference, as regards organology, music ritual, notation and transcription, and aspects of field research. Prerequisite(s): course 30B. Concurrent enrollment in a non-Western performing ensemble is strongly recommended. Enrollment restricted to music majors and graduate students. Anthropology majors may enroll with permission of instructor. Enrollment limited to 30. (General Education Code(s): A, E.) *L. Burman-Hall, T. Merchant*

180B. Studies in World Musics: Africa and the Americas. *

In-depth ethnomusicological studies of selected music cultures of sub-Saharan Africa and South and North America, including Native America. Emphasizes comparison of historical, theoretical, contextual, and cultural features. Includes basic ethnomusicological points of reference, as regards organology, music ritual, notation and transcription, and aspects of field research. Prerequisite(s): course 30B; concurrent enrollment in a non-Western performing ensemble is strongly recommended. Enrollment restricted to music majors and graduate students. Anthropology majors may enroll with permission of instructor. Enrollment limited to 30. (General Education Code(s): A, E.) *J. Schechter*

180V. Seminar in the Music of the Beatles. *

Detailed study of the Beatles' music. While course 80V introduces the Beatles to general students, this course is designed for music majors, music minors, students able to read music, or non-majors with strong knowledge of the Beatles' repertoire. Interview only; instructor determination at or before first class meeting. Prerequisite(s): course 11C or equivalent experience; basic knowledge of Beatles repertoire. Students cannot receive credit for both this course and course 80V in the same quarter. Enrollment limited to 30. *F. Lieberman*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Upper-division standing and a proposal supported by a music faculty member willing to supervise required. *The Staff*

195A. Senior Thesis. F,W,S

Preparation of senior thesis over one or two quarters. If taken as a multiple-term course, the grade and evaluation submitted for the final quarter applies to the previous quarter. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Thesis. F,W,S

Preparation of senior thesis over one or two quarters. If taken as a multiple-term course, the grade and evaluation submitted for the final quarter applies to the previous quarter. Students submit petition to sponsoring agency. *The Staff*

196A. Senior Recital Preparation (without individual lessons). F,W,S

Prerequisite(s): juried audition or approved composition portfolio. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

196B. Senior Recital Preparation (with individual lessons). F,W,S

Students are billed a course fee. Prerequisite(s): juried audition. May be repeated for credit. *The Staff*

197. Senior Exit Seminar (2 credits). S

Designed for music majors in their final quarter. Focuses on music in social context while seeking to integrate knowledge from previous music courses in preparation of a series of analytical projects. *A. Leikin, L. Miller, A. Beal, D. Neuman*

199. Tutorial. F,W,S

A program of directed study arranged with a department faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

A program of directed study arranged with a department faculty member. Class time is proportionally less than a five-credit course. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200. Introduction to Research Methods. F

Practical introduction to graduate study in music focusing on research methods, music sources and bibliography, techniques of scholarly writing, and critical readings in the discipline. Culminates in a public oral presentation on the model of a professional conference paper. *L. Miller, A. Beal, N. Treadwell*

201. Pretonal and Tonal Analysis. W

Study and analysis of pre-tonal and tonal music from the Greeks through the 18th century. Course combines a his-

tory of theory with analyses that utilize contemporaneous theoretical concepts. Enrollment restricted to graduate students. Offered in alternate academic years. *L. Miller*

202. Tonal and Posttonal Analysis. *

Encompasses various forms of linear analysis, set theory, and selected topics in current analytical practice. Offered in alternate academic years. *B. Carson, P. Nauert, D. Jones, D. Cope, H. Kim*

203. Special Topics in Performance Practice.

Investigation of primary and secondary sources of information about the culturally and historically accurate performance of music in various times and places. Undergraduates who have completed the appropriate course 101 courses may enroll in 203 courses by interview with the instructor. *The Staff*

203A. Performance Practice in the Middle Ages. *

A study of performance practices in medieval music from Gregorian chant to the 14th century. History of instruments and notation. Rhythmic interpretations of chant and a study of improvised practices in organum. Editing and performance of representative works. Offered on a rotational basis with other courses in the 203 series. *L. Miller*

203B. Performance Practice in the Renaissance. *

A study of performance practices in Renaissance music, including concepts of mode, musica ficta, ornamentation, text underlay, tempo, and articulation. Basic principles of white notation and a brief history of instruments. Transcription, editing, and performance of a Renaissance work. Offered on a rotational basis with other courses in the 203 series. *L. Miller, N. Treadwell*

203C. Performance Practice in the Baroque. *

An examination of historically informed performance practice techniques in Baroque music, with attention to aspects of ornamentation, articulation, figured bass realization, dance choreography, rhythm and tempo, and organology. In-class performances and editing of source materials are included. Offered on a rotational basis with other courses in the 203 series. *L. Miller, L. Burman-Hall*

203D. Performance Practice in the Classic Period. F

Issues in performance practice focusing on selected topics and styles from the time of C.P.E. Bach through Haydn. Development of selected genres and ensembles, sources and editing, and interpretation and improvisation. Offered on a rotational basis with other courses in the 203 series. *L. Burman-Hall*

203E. Performance Practice in the Romantic Period. *

Interpretation of music from Beethoven to Scriabin through examinations of both the musical texts (form, genre, harmony, texture, orchestration, etc.) and the period performance practices. Topics range from interpretative analyses of selected compositions to critical assessments of modern as well as documented 19th- and early 20th-century performances. Offered on a rotational basis with other courses in the 203 series. *A. Leikin*

203F. Performance Practice in the 20th Century. *

Projects in analysis, notational studies, extended instrumental techniques, and the aesthetics and performance practices associated with composers from Debussy to the present. Reading and listening focuses

on the writings and performances of the composers themselves and upon interpretive writings by informed performers of 20th-century music. Offered on a rotational basis with other courses in the 203 series. May be repeated for credit. *B. Carson, D. Jones, A. Beal*

203G. Concepts, Issues, and the Practice of Ethnomusicology. F

Ethnomusicological field methodology; vocal and instrumental performance practices as related to the ethnomusicological endeavor. Specific topics: philosophical paradigms, historical overview, and definitional issues of ethnomusicology; field research concepts and procedures; studies in instrumental and vocal performance practices of diverse cultures; selected writings of Charles Seeger; transcription and analysis issues; studies in micromusics. Offered on a rotational basis with other courses in the 203 series. *J. Schechter*

203H. Area Studies in Performance Practice. W

Intensive examination of the vocal and instrumental performance practices of living musical traditions of Indonesia, Latin America, or other regions. Topics may incorporate soloistic and ensemble traditions, secular and sacred traditions. Research rubrics include tuning, tone quality, performance posture and rhetoric, and improvisational and fixed patterns, as dictated by regional norms. May be repeated for credit in a different area. Offered on a rotational basis with other courses in the 203 series. May be repeated for credit. *J. Schechter, L. Burman-Hall, H. Kim, D. Neuman*

206A. World Music Composition. W

Studies in the history, structure, and cultural function of music from cultures as diverse as Global African, central European, Korean, Latin American, Indonesian, and Indian traditions. Examines ways in which composers such as Bartok, Anthony Braxton, Chou Wen-Chung, Lou Harrison, and Takemitsu sought and integrated such influences. Students choose to write critical and analytic essays on musics exhibiting diverse cultural influences, or to compose music that takes a vernacular or non-European music as a model for a compositional/improvisational approach. Enrollment restricted to graduate students. Enrollment limited to 12. *D. Jones, K. Hester, H. Kim*

206B. Computer-Assisted Composition. *

Study of techniques of algorithmic and computer-assisted composition in a variety of contemporary idioms. Topics may include stochastic methods, generative grammars, search strategies, and the construction of abstract compositional designs and spaces. Final project for course involves students formulating and algorithmically implementing their own theoretical assumptions and compositional strategies. *D. Cope*

206D. Music Perception and Cognition. S

Investigations in the psychology of musical listening and awareness. Topics include time and rhythm perception, auditory scene analysis, pattern recognition, and theories of linguistics applied to harmony, melody, and form in the music of diverse cultures. Explores applications of the cognitive sciences to music transcription, analysis, composition, interpretation, and performance practice. Students apply existing knowledge in the cognitive sciences to a developing creative or analytical project, or develop and conduct new experiments. Enrollment restricted to graduate students. Enrollment limited to 16. May be repeated for credit. *B. Carson*

219. Techniques in Composition. F

Short compositional exercises incorporating diverse contemporary techniques with emphasis on problem-solving and development of compositional skills. Exercises focus on particular strategies for organizing and coordinating aspects of pitch, rhythm, timbre, and other musical dimensions, depending on interests of instructor and students. (Formerly course 219A.) Enrollment restricted to graduate students. May be repeated for credit. *B. Carson, P. Nauert, H. Kim*

220. Graduate Seminar in Music Composition. S

Instruction in individual composition offered in the context of a group; composition in large forms of the 20th century with emphasis on techniques since 1950. May be taken by upper-division undergraduates for credit. Interview with instructor at first class meeting. Prerequisite(s): course 219. Enrollment limited to 16. May be repeated for credit. *P. Nauert, D. Jones, H. Kim*

228. Techniques of Modernity and Aesthetic Formations. *

Explores the transformations and aesthetic possibilities of the digital age through a study of perceptual shifts of the past, from orality to literacy, gift to commodity, pre-colonial to colonial, "pre-modern" to "modern," and the technological revolutions that accompanied these shifts. (Also offered as Digital Arts and New Media 228. Students cannot receive credit for both courses.) Enrollment restricted to graduate students; upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 18. *D. Neuman*

252. Current Issues Colloquium (2 credits). F,W,S

An interactive colloquium featuring presentations by faculty, graduate students, and visiting scholars on research projects in composition, musicology / ethnomusicology, and performance practice, followed by focused discussion. Enrollment restricted to graduate students. Undergraduate students may enroll with permission of instructor. May be repeated for credit. *L. Burman-Hall*

253A. Pitch, Melody, and Tuning Systems. *

Focuses on pitch systems from Western and non-Western cultures, and on scholarly perspectives about them throughout the 20th and 21st centuries. Enrollment restricted to graduate students. Enrollment limited to 20. *T. Merchant*

253C. Music and Discourse. *

Addresses both song and musical performance as modes of discourse. For song: musical and textual phrase and verse structures and their interrelationships. For musical performances: musical performance as rhetoric and emblem. Enrollment restricted to graduate students. Enrollment limited to 5. *J. Schechter*

253D. Issues in the Ethnography of Music. F

Explores ethnography—the description of culture—as it relates to musicology and ethnomusicology, particularly where "culture" and cultural production are historically dynamic and geographically porous. Examines music with sensitivity to such complexities of context, and the disciplinary points of reference from which cultural difference is calculated. Considers the ideological imprint of methodology on cultural analysis: how to study an unfamiliar music in a way that transcends the measure of "difference from the familiar," and, conversely, how to conduct an "objective" study of a familiar music. Enrollment restricted to graduate students. Enrollment limited to 10. *J. Schechter, D. Neuman*

254C. Performance Theory and Practice. *

"Performance" can describe activities in the arts, humanities, and social sciences. Recognizing the mappings of this concept, this course examines selected performances and performative behavior through theoretical and critical lenses. Emphasis is on investigating the act and practice of musical performance in multicultural context, and on analyzing scholarly writing as performative discourse. Enrollment restricted to graduate students. Enrollment limited to 10. *N. Treadwell*

254E. Asian Resonances in 20th-Century American and European Music. *

Explores the influence of Asian musics on Western composers from Debussy to Britten to American experimentalists such as Harrison, Cage, Riley, and Rudyard. Questions of cultural appropriation and originality are addressed through specific examples and critical readings. Enrollment restricted to graduate students. Enrollment limited to 10. *L. Miller*

254I. Empirical Approaches to Art Information. *

Reading and practice in empirical methods, as applied to the study of music, visual art, multimedia production, and performance arts. Topics include semiotics, critiques of empiricism, cultural determinants and contingents of perception, the psychophysics of information, sensory perception (visual and auditory), memory, pattern recognition, and awareness. Students apply existing knowledge in the cognitive sciences to a developing creative project, or develop and conduct new experiments. (Formerly course 251I.) (Also offered as Digital Arts and New Media 254I. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 17. May be repeated for credit. *B. Carson*

254L. John Cage: Innovation, Collaboration, and Performance Technologies. W

In-depth examination of John Cage's interdisciplinary work, his pioneering activity in live electronic technology, and his influence in current multimedia creativity. Approximately one-half of the seminary is devoted to student research and creative projects and reflect Cage's legacy. (Also offered as Digital Arts and New Media 254L. Students cannot receive credit for both courses.) Enrollment restricted to juniors, seniors, and graduate students. Upper-division undergraduates may enroll with permission of instructor. Enrollment limited to 12. *A. Beal*

261. Graduate Applied Instruction (3 credits). F,W,S

One hour of individual instrumental or vocal instruction for graduate students. Repertory, technique, and performance practice. A minimum of nine hours per week of individual practice is required. Students are billed a course fee. Admission by audition with the instructor prior to first class meeting; see the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *The Staff*

265. Graduate Ensemble Participation (2 credits). F,W,S

Participation by graduate students in ensembles. Enrollment limit appropriate to the size of each ensemble. Admission by audition with the instructor prior to first class meeting; see the enrollment conditions section of the quarterly *Schedule of Classes*. May be repeated for credit. *The Staff*

*Not offered in 2008–10

267. Workshop in Computer Music and Visualization (2 credits). F,W,S

Graduate-level techniques and procedures of computer music composition and visualization. Practical experience in the UCSC electronic music studio with computer composition systems and software, including visualization and interactive performance systems. Extensive exploration of music and interactive graphic programs such as Max/MSP/Jitter. Enrollment by permission of instructor; appropriate graduate experience required. Enrollment restricted to graduate students. Also offered as Digital Arts and New Media 267. Students cannot receive credit for both courses. (Also offered as Digital Arts and New Media 267. Students cannot receive credit for both courses.) Enrollment limited to 12. May be repeated for credit. *P. Elsea*

295. Directed Reading. F,W,S

Directed reading which does not involve a term paper. May be repeated once for credit. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Independent study, creative work, or research for graduate students who have not yet begun work on their thesis. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

298. Graduate Recital. F,W,S

A public performance in the student's primary area of interest, related to the thesis or dissertation project, under the supervision of a faculty member. Students submit petition to sponsoring agency. Enrollment restricted to graduate students. *The Staff*

299. Thesis Research. F,W,S

A thesis consisting of a substantive and original creative or scholarly work, related to the graduate recital, under the supervision of a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Natural History

See Environmental Studies, page 260.

Natural Sciences

See Physical and Biological Sciences, page 384.

Neuroscience and Behavior

See Biological Sciences, page 135.

Oakes College

College Office
(831) 459-2558
<http://oakes.ucsc.edu>

For college description and list of faculty, see page 89.

*Lower-Division Courses***10. Academic Success (2 credits). F**

Provides opportunity to assess and revise methods of and purposes in studying. Critical, effective approaches to reading, writing, participating in lectures and sections, taking exams, balancing competing responsibilities, and utilizing campus resources explored. Enrollment by permission of college adviser. *T. Aguirre*

15. Bridge Academic Success Class (2 credits). F

Assists first-year Educational Opportunity Program (EOP) Bridge students to successfully transition to the university and to maximize their academic success. Students identify their academic strengths and challenges, and use academic tools and strategies to become effective learners. Enrollment restricted to Bridge students only. *The Staff*

30. Thesis Writing and Editing (2 credits). S

Substantial writing and revision for a piece of writing relevant to a student's field. Focuses on academic research, documentation, editing, and revision. Enrollment restricted to junior and senior college members. Enrollment by permission of instructor. Enrollment limited to 20. May be repeated for credit. *M. Baker, R. King*

42. Student-Directed Seminar.

Seminars taught by upper-division Oakes students under faculty supervision. (See course 192.) *The Staff*

60. Oakes Literary Journal: Further Reflections on a Diverse Society (2 credits). W

For publication in an Oakes College literary journal, students significantly refine an essay from the fall quarter Oakes College core course. Course work includes consideration of a substantive text that engages core course themes and promotes the focus of the essay. Prerequisite(s): course 80A or 80B. Enrollment restricted to first-year students. Enrollment limited to 20. May be repeated for credit. *M. Baker, R. King*

70. Diverse Voices in Contemporary American Women's Poetry. S

Examines the work of contemporary American women poets representing a range of socioeconomic, sexual, cultural, and ideological identities. Discussion focuses on analysis and interpretation of poems. Produce a portfolio of creative response work and analytical essays. Enrollment restricted to first-year students and sophomores. Enrollment limited to 20. *L. Knisely*

75. Oakes Student Development and Leadership Theory (2 credits). S

Overview of theories, methods, applications, skills, and special topics focusing on college student development and leadership. Uses a variety of learning modes including lecture, discussion, case studies, small group interaction, and presentations. Interview only: see Oakes coordinator for residential education during spring enrollment period. Enrollment restricted to Oakes College members. Enrollment limited to 30. May be repeated for credit. *The Staff*

77. Exploring Opportunities for Social Justice Fieldwork (3 credits). W,S

Designed to promote social justice and diversity through community service experiences. Students are required to complete a 25-hour service project to be determined by individual course plans. Students will engage in/reflect upon social justice through community service, readings, and discussions. Prerequisite: Oakes 80 College Core Course. Enrollment limited to 20. *R. Goodman*

80A. Introduction to University Discourse: Values and Change in a Diverse Society. F

Explores rhetorical principles and conventions of university discourse providing intensive practice in analytical writing, critical reading, and speaking. Examines historical and contemporary aspects of multiculturalism in the U.S. Explores how social inequality based on ethnicity, race, class, and gender occurs among all levels of society. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C1, E.) *K. Lau*

80B. Rhetoric and Inquiry: Values and Change in a Diverse Society. F

Explores intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Examines historical and contemporary aspects of multiculturalism in the U.S. Explores how social inequality based on ethnicity, race, class, and gender occurs among all levels of society. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 22. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2, E.) *K. Lau*

80H. Rainbow Theater Cultural Studies. S

Introduction to multicultural theater and multicultural plays that aims to bring cultural awareness to all students interested in theater discipline. Students are required to read and critically analyze contemporary plays of color with emphasis on race and culture in contemporary American society. Enrollment limited to 40. (General Education Code(s): T4-Humanities and Arts, E.) *D. Williams*

93. Field Study. F,W,S

Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. To be used primarily by lower-division students doing part-time off-campus study. Prerequisite(s): approval of student's adviser, certification of adequate preparation, approval of provost. May be repeated for credit. *The Staff*

94F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty instructor. Students submit petition to sponsoring agency. *The Staff*

95. Directed Reading. F,W,S

Directed reading on selected topics in literature. Students submit petition to sponsoring agency. *The Staff*

99. Tutorial. F,W,S

Individual study for lower-division students directed by a fellow of Oakes. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Independent Study (2 credits). F,W,S

Independent study on various topics to be arranged between student and instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Upper-Division Courses***112. Re/Presenting Identity. W**

Examines culturally relevant texts that describe identity formation and representation in contemporary America. Investigates the work of authors who represent a wide range of cultural, racial, sexual, socioeconomic, and gender identities. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements.

Enrollment restricted to junior and senior college members. Enrollment limited to 20. (General Education Code(s): W.) *L. Knisely*

150. Gays and Lesbians in the United States. W
Examines the diverse social and cultural contexts in which gay and lesbian identities are constructed and expressed. Provides an overview of current themes in gay and lesbian history: the sex-gender system, sexuality and sexual identity, the coming-out experience, gay and lesbian subcultures, sexual roles, politics, legal recognition of relationships, religion, mental and physical health in the gay/lesbian community, and gay activism. Enrollment restricted to junior and senior Oakes College members. Enrollment limited to 30. *K. Simonton*

175. Imagining the Filipino Diaspora. S
Examines the relationship between gender, sexuality, and the nation in Filipino American and Philippine cultural production, including performance, film, and the Internet. Contextualizes Filipino American/Philippine cultural production within a broader framework of the Filipino diaspora. Enrollment restricted to juniors and seniors. Enrollment limited to 20. (General Education Code(s): E.) *The Staff*

192. Directed Student Teaching. F,W,S
Teaching a lower-division seminar under faculty supervision. (See course 42.) Prerequisite(s): upper-division standing in Oakes; a proposal supported by a faculty member willing to supervise. *The Staff*

193. Field Study. F,W,S
Supervised off-campus study conducted under the immediate and direct guidance of a faculty supervisor. To be used primarily by upper-division students doing part-time off-campus study. Prerequisite(s): approval of student's adviser, certification of adequate preparation, approval of provost. If taking two or more such courses in any one quarter, must obtain approval of academic adviser. *The Staff*

195. Senior Thesis. F,W,S
Senior thesis related to college-sponsored individual majors. Students submit petition to sponsoring agency. Sponsoring faculty must be member of individual major committee. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S
College-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. Prerequisite(s): approval of the student's adviser, certification of adequate preparation, and approval by provost. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S
Individual study for junior and senior members of Oakes College directed by a fellow of Oakes. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Independent Study (2 credits). F,W,S
Independent study on various topics to be arranged between student and instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Ocean Sciences

A312 Earth and Marine Sciences Building
(831) 459-4730
<http://oceansci.ucsc.edu/>

Faculty and Professional Interests

Professor

KENNETH W. BRULAND
Chemical oceanography, biogeochemistry of trace metals and radionuclides, aquatic chemistry, geochemistry

MARGARET L. (PEGGY) DELANEY
Paleoceanography, marine geochemistry

ROBERT E. GARRISON (Emeritus)

ANDREW M. MOORE
Physical oceanography; numerical ocean modeling; air-interaction; ocean prediction

A. CHRISTINA RAVELO
Stable isotope geochemistry and chemical oceanography, paleoclimatology

MARY W. SILVER
Biological oceanography, marine plankton, midwater ecology

JONATHAN P. ZEHR
Aquatic microbial ecology, biological oceanography

Associate Professor

CHRISTOPHER A. EDWARDS
Physical oceanography, numerical modeling of coastal- and basin-scale dynamics

RAPHAEL M. KUDELA
Ecological modeling and remote sensing, satellite oceanography, phytoplankton ecology and harmful algal blooms

MATTHEW D. MCCARTHY
Organic geochemistry, marine organic geochemistry, global biogeochemical cycles

Assistant Professor

SHARON E. STAMMERJOHN
Polar oceanography and climate; interdisciplinary approaches to understanding environmental and ecosystem response to climate variability

Adjunct Professor

RONALD J. SCHUSTERMAN
Psychobiology and sociobiology of marine mammals, animal cognition and communication

Associate Adjunct Professor

STEVEN H. HADDOCK
Ecology of bioluminescence and gelatinous zooplankton from blue-water and deep-sea environments

JEFFREY D. PADUAN
Coastal ocean dynamics: surface currents, wave heights, wind and tidal forcing from high-frequency radar data

RANDALL S. WELLS
Behavioral ecology and conservation biology of small cetaceans

Assistant Adjunct Professor

MICHAEL BECK
Marine conservation, regional biodiversity planning, habitat restoration, marine proprietary rights

JOHN CARLOS GARZA
Population and ecological genetics of marine organisms

SEAN A. HAYES
Behavior, ecology, genetics, and population dynamics with a particular interest in salmon and pinnipeds

ALEXANDRA WORDEN
Mechanisms and controls of microbial population dynamics with an emphasis on carbon cycling in marine ecosystems

Lecturer

JOEL GOLDMAN
Phytoplankton ecology, microbial food chain dynamics

THOMAS GUILDERSON
Paleoceanography, tracer chemistry, carbon cycle, climate change

BALDO MARINOVIC
Plankton biology, Euphausiid (krill) population biology, zooplankton ecology, pelagic food web dynamics, climate change potential impacts on zooplankton and fisheries

CARRIE POMEROY
Marine policy and fisheries management



Professor

GIACOMO BERNARDI (Biological Sciences)
Fish biology, phylogenetics, evolution

MARK CARR (Biological Sciences)
Marine ecology, applied marine ecology

DANIEL P. COSTA (Biological Sciences)
Physiological ecology of marine mammals and birds

PHILLIP CREWS (Chemistry)
Marine natural products chemistry, bioorganic chemistry, organic structural analysis by NMR, natural products of marine macro- and microorganisms

ANDREW T. FISHER (Earth Sciences)
Hydrogeology, crustal studies, coupled flows, modeling

A. RUSSELL FLEGAL (Environmental Toxicology)
Anthropogenic perturbations of biogeochemical cycles, applications of isotopic tracers in anthropology and archaeology

LAUREL R. FOX (Biological Sciences)
Terrestrial population and community ecology, plant-animal interactions

JAMES B. GILL (Earth Sciences)
Igneous petrology, geochemistry of island arcs

LYNDA J. GOFF (Biological Sciences)
Algal symbiosis, host-parasite relationships, molecular evolution

GARY B. GRIGGS (Earth Sciences)
Coastal processes, hazards and engineering

BURNEY J. LEBOEUF (Emeritus, Biological Sciences)

MARC S. MANGEL (Applied Mathematics and Statistics)
Mathematical modeling of biological phenomena, especially the evolutionary ecology of growth, aging, and longevity; quantitative issues in fishery management; mathematical and computational aspects of disease

A. TODD NEWBERRY (Emeritus, Biological Sciences)

CHARLES L. (LEO) ORTIZ (Biological Sciences)
Physiology of marine mammals, physiological integration, physiology of secretion

DONALD C. POTTS (Biological Sciences)

Coral reef ecology, genetics, evolution, and geological history; marine biodiversity; tropical biology, global change, and remote sensing

PETER RAIMONDI (Biological Sciences)

Marine ecology, evolutionary ecology, experimental design, applied ecology

ELI A. SILVER (Earth Sciences)

Marine geology and geophysics, active tectonics, remote sensing

LISA SLOAN (Earth Sciences)

Paleoclimatology, climate change, Earth system science, surficial processes

DONALD R. SMITH (Environmental Toxicology)

Neurotoxicity, cellular and organismal responses to environmental toxins

LINCOLN TAIZ (Biological Sciences)

Plant development, light regulation of stomatal opening

TERRIE M. WILLIAMS (Biological Sciences)

Vertebrate locomotor and thermoregulatory physiology; marine biodiversity; comparative vertebrate energetics, exercise physiology

JAMES C. ZACHOS (Earth Sciences)

Paleoceanography, marine stratigraphy, geochemistry
Associate Professor

DON CROLL (Biological Sciences)

Foraging ecology of marine birds and mammals, island conservation/ecology

GRANT H. POGSON (Biological Sciences)

Molecular population genetics, ecological genetics, marine invertebrates and fishes

Program Description

The Ocean Sciences Department includes faculty and students involved in oceanography and other marine sciences and sponsors undergraduate and graduate courses in these disciplines. Through faculty sponsors, students have access to a wide variety of research facilities and equipment, including on-campus analytical chemistry, geology, and molecular biology laboratories for marine research; computing and imaging facilities; an onshore marine laboratory two miles from campus (Long Marine Laboratory), with aquariums and holding tanks that are supplied with running sea water; and a unique field station on Año Nuevo Island (19 miles north of Santa Cruz), especially suited for studies on pinnipeds and marine birds. The department supports collaborative studies utilizing the innovative technologies of the nearby Monterey Bay Aquarium Research Institute, the Naval Postgraduate School, Stanford University's Hopkins Marine Station, CSU Moss Landing Laboratory, and others. Students may also work at other University of California facilities, including the Bodega Marine Laboratories and Scripps Institute of Oceanography.

In addition to research and instructional activities along the California coast, interests of the core faculty and their students include biological, chemical, and physical oceanography; plus sediment, marine, organic, and trace metal biogeochemistry; marine plankton, phytoplankton ecology, paleoceanography, aquatic microbial ecology, ecological modeling, and remote sensing (satellite oceanography); numeric modeling of coastal and basin-scale dynamics; and midwater ecology, climatology, and many more.

Ocean sciences affiliated faculty in other departments represent a deep resource of research interests and methodologies including those pertaining to coral reef

and kelp forest ecology, plate tectonics and continental margins, marine mammal behavior and physiology, and natural products from marine organisms. Student research projects have included participation in major scientific expeditions to various marine environments ranging from polar regions to the tropics.

Undergraduate Programs

Although offering a range of undergraduate courses, the Ocean Sciences Department presently offers only graduate degrees. The undergraduate major in marine biology, sponsored by the Biological Sciences Departments, includes required and elective courses in ocean sciences; and there is an ocean sciences concentration in Earth sciences for undergraduates. Students interested in ocean sciences should major in a discipline such as biology, marine biology, chemistry, Earth sciences, physics, or mathematics and take ocean sciences-related electives. Students with a bachelor's degree in one of these disciplines or equivalent course work may apply directly for admission to the graduate program through the Division of Graduate Studies.

Graduate Programs

The graduate programs in ocean sciences are designed to prepare students for careers in research, teaching, and other environmentally related endeavors. The fundamental requirement for admission to the program is substantial evidence of superior scholarship and aptitude for original research. Preparation for admission to the graduate program in Ocean Sciences (master's or Ph.D.) should comprise an undergraduate degree in the discipline of one of the program specialty areas (e.g., biology or marine biology, geology or earth sciences, chemistry, or physical science), or an equivalent background. If a student does not have a degree in one of these areas, the student must show their sponsor that they have taken the classes necessary to do their research. This preparation should normally include courses (prerequisites) in calculus, statistics, physics, chemistry, general biology or ecology, and geology for all majors (see below for the number of courses).

1 year of a calculus series

1 year of chemistry with labs

1 year of physics with labs

1 course in earth sciences or geologic principles

1 course in biology

1 course in statistics or biostatistics for all majors

Ocean Sciences Ph.D. Degree Program

The program leading to a doctorate in ocean sciences is designed with a core training in oceanography for all students, supplemented and focused by advanced training in oceanography and in the traditional disciplines (biology, chemistry, Earth sciences, and physics) as chosen by the student and her or his advisers. The core training is provided through core courses in ocean sciences; a subset of which is taken by all students in the first two years and reinforced by the student's seminars throughout the program. In addition to core courses in ocean sciences, preparation includes upper-division/graduate courses in ocean sciences and in the specialty discipline, graduate seminars, independent research credits, participation in departmental student seminar series, and a minimum requirement of two quarters as a teaching assistant. There is no formal language requirement.

The results of a scheduling meeting in the first quarter of enrollment are used to map out the course program in the first year. The course program is

determined by a faculty advisory committee in consultation with the student; and courses are drawn from ocean sciences and other science departments (e.g., biology, chemistry, earth sciences, physics). No later than fall quarter of their second year, students must take a departmental oral exam that tests knowledge of ocean sciences and general expertise in their parent discipline. An oral and a written qualifying examination are required, generally in the second or third year of graduate study. A dissertation based on original research is required, and the final examination is a public oral defense of the dissertation. Students are encouraged to prepare their dissertation, or certain chapters of it, in a form suitable for publication.

Sample Pathways

The pathways within the ocean sciences Ph.D. program are differentiated from related degrees in the traditional disciplines by their focus on global-scale problems and interactions, a focus on the ocean, and their inherently interdisciplinary approach. Interdisciplinary projects across and between pathways are encouraged, as are interactions with faculty in related departments.

- *Biological Oceanography*

This area involves the interactions of organisms with their chemical and physical environments. It includes research on the physiology and ecology of organisms, but differs from marine biology in the focus on the oceanographic setting of the organism in relationship to, for example, biogeochemical cycling and the effects of ocean currents on distributions of organisms. The focus is mainly on small oceanic life-forms (plankton and bacteria, molecular ecology) and their roles in the biogeochemical cycles of marine systems.

- *Chemical Oceanography*

Chemical interactions of trace metals and radionuclides in the sea are the focus of this group. Research includes development of analytical techniques and measurement of trace species in seawater and investigation of the effects and interactions of trace elements on biological processes using analytical and isotopic approaches.

- *Geological Oceanography*

Paleoceanography, paleoclimatology, and sediment geochemistry are the focus in this pathway. Research areas include the history of global geochemical cycles and composition of the ocean on various timescales, the fate and diagenesis of materials in sediments and their contribution to the paleoceanographic record, understanding ocean and climate history by the use of records of stable isotopes and trace elements, and paleoclimate modeling.

- *Physical Oceanography*

The physics and dynamics of the ocean and atmosphere are the main aspects of this program. Research includes observational, computational, theoretical, and experimental physical oceanography, geophysical fluid dynamics, ocean acoustics, dynamical meteorology, climate, and global change.

Requirements for Ph.D. Students in the Ocean Sciences Department

To introduce students to the breadth and depth of the field of ocean sciences, students will be required to complete the following.

1. Four core courses. These courses are expected to be completed in the first year of the program (and prior to taking the departmental exam) in the sequence listed below:

- fall course 200, *Physical Oceanography*
 course 280, *Marine Geology*
 winter course 220, *Chemical Oceanography*
 spring course 230, *Biological Oceanography*
- A minimum of three graduate-level or upper-division elective courses to provide depth in the chosen area of emphasis or supporting disciplines. These courses are chosen in consultation with the student's adviser and department graduate advising committee (a maximum of one can be a graduate-level seminar (course 290); at least two must be graduate or upper-division undergraduate lecture courses).
 - Course 296, *Teaching in Ocean Sciences*, to be taken prior to or concurrent with being a teaching assistant.
 - Teaching experience satisfied by two quarters of teaching assistant experience in Ocean Sciences or supporting departments.
 - Course 293, a 2-credit *Graduate Research Seminar*, required to be taken each spring quarter by all Ph.D. students.
 - Course 292, attendance at the *Ocean Sciences Seminar* series each quarter of enrollment.
 - A minimum of three courses in *Thesis Research* (course 299) under direction of a sponsor. Each quarter in residence a student should take 15 credits of classes; students beyond their first year will usually take 10 or 15 credits of Thesis Research each quarter.
 - Comprehensive departmental exam. This oral exam, covering material from the core courses, is usually taken at the beginning of a student's second year in the program. This exam must be completed successfully within two years of entering the program.
 - Pass the qualifying exam to advance to candidacy. This exam requires a written research proposal to be defended orally in front of the student's dissertation committee and is normally taken at the beginning of the third year of the program. This exam is expected to be completed successfully within three years of entering the program.
 - Ph.D. dissertation. The Ph.D. dissertation, demonstrating original thought and research, must be written, presented in an open seminar, and defended to the student's thesis committee. Chapters of the dissertation may be written in publication format, but must conform to university publication guidelines for submission.

Ocean Sciences Master's Degree Program

The Ocean Sciences Department offers a master of science degree in ocean sciences. The degree combines core courses and electives to provide depth and breadth in ocean sciences, with a focused thesis to provide experience in original research. Graduates from the program are excellently prepared to take research or management positions in organizations concerned with the marine environment, become educators, or enter doctoral programs in ocean sciences or related fields.

Whereas the doctoral program has an oceanographic orientation, the marine sciences master's program is even broader and has traditionally attracted many students in marine biology and ecology. As with the doctoral program, students are encouraged to select a course of study and a research program that draws on the expertise of the core ocean sciences faculty

and any of the affiliated faculty in other departments. Customized programs of study that combine related disciplines are supported in the master's program.

Course Requirements for the Ocean Sciences Master's Degree

To introduce students to the breadth and depth of the field of ocean sciences, students will be required to complete the following:

- Complete three of the four core courses (one of which must be course 200, *Physical Oceanography*). Students are expected to complete all three of these courses in the first year of the program, and they should be taken in the order listed below. All four core courses are recommended. If taken, the fourth course counts as an elective.

fall	course 200, <i>Physical Oceanography</i>
	course 280, <i>Marine Geology</i>
winter	course 220, <i>Chemical Oceanography</i>
spring	course 230, <i>Biological Oceanography</i>
- A minimum of three graduate-level or upper-division elective courses to provide depth in the chosen area of emphasis. These courses are chosen in consultation with an adviser and department graduate advising committee (only one of these can be a graduate seminar (course 290); at least two must be lecture courses).
- A minimum of three courses in *Thesis Research* (course 299) under direction of a sponsor. Each quarter a student should take 15 credits of classes. Students beyond their first year will usually take 10 or 15 credits of Thesis Research each quarter.
- Course 296, *Teaching in Ocean Sciences*, to be taken prior to or concurrent with being a teaching assistant
- Teaching experience satisfied by one quarter of teaching assistant experience
- Attendance at the *Ocean Sciences Seminar* series (course 292) each quarter of enrollment
- Complete a master's thesis, and present it at an open seminar.

Details regarding admission to graduate standing, financial aid, examinations, and the requirements for the master of science and doctor of philosophy degrees are available from the Division of Graduate Studies (http://graddiv.ucsc.edu/student_affairs/).

Lower-Division Courses

1. The Oceans. F,W,S

An interdisciplinary introduction to oceanography focusing on biological, chemical, geological, and physical processes. Covers topics such as origins and structure of planet Earth and its oceans, co-evolution of Earth and life, plate tectonics, liquid water and the hydrologic and hydrothermal cycles, salinity and elemental cycles, ocean circulation, primary production and nutrient cycles, plankton and nekton, life on the sea floor, near shore and estuarine communities, future environmental problems our oceans face. Students may also enroll in and receive credit for Earth Sciences 1. (Note: General Education credit will not be granted for this course and Biology 80D.) (General Education Code(s): IN, Q.) *The Staff, K. Bruland, C. Edwards, M. McCarthy*

80A. Life in the Sea. F,W,S

The ecology of plants and animals in oceans and coastal areas. Consideration of life in various marine habitats, including the open ocean, rocky shores, estuaries, and the sea. Includes field trips. High school biology and chemis-

try courses are recommended prior to taking this course. (General Education Code(s): T2-Natural Sciences.) *The Staff, M. Silver*

80B. Our Changing Planet. W,S

Interdisciplinary scientific perspective on Earth system, focusing on human impacts on global environment. Introduces concepts of Earth system science and explores topics such as global warming, ozone depletion, pollution, deforestation, and future climate change. Prerequisite(s): high school chemistry course recommended. (General Education Code(s): T2-Natural Sciences.) *A. Ravelo, A. Moore, S. Stammerjohn*

Upper-Division Courses

101. The Marine Environment. W

An introduction to the marine environment stressing the interaction of physical, chemical, and geological factors in the ocean. Provides the oceanographic background needed for studies in marine biology. Students taking the prerequisite math courses concurrently may enroll in the course with permission from instructor. Prerequisite(s): Chemistry 1C and Mathematics 11B or 19B. Students taking the prerequisite math courses concurrently may enroll in the course with permission from instructor. *R. Kudela, A. Moore*

102. Oceans and Climate: Past, Present, and Future. *

An introduction to Earth's environment, particularly its oceanic and climatic components. Emphasizes interactions between chemical, physical, biological, and geological processes, and fundamentals of past, present, and future global environmental change. Provides backgrounds for specialized courses in oceanic or climatic change. Prerequisite(s): Chemistry 1C. *A. Ravelo*

118. Marine Microbial Ecology. *

The study of marine bacteria and their role in the marine ecosystem. Emphasis on biochemistry and physiology in relation to metabolic activity and elemental cycles, trophic interactions, and flows of material and energy in marine food webs. Exams and term paper required. Students cannot receive credit for this course and Ocean Sciences 218. (Also offered as Biology:Ecology & Evolutionary 125. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20C or 21C, and Chemistry 1C. *J. Zehr*

120. Aquatic Chemistry: Principles and Applications. *

An integrated study of the chemical behavior of natural waters with an emphasis on both principles and applications. Topics include chemical equilibrium, kinetics, acids/bases, oxidation/reduction, complexation, solid dissolution and precipitation, and reactions on solid surfaces. Prerequisite(s): Chemistry 108B or 112C. *K. Bruland*

124. Aquatic Organic Geochemistry. S

Introduction to organic geochemistry with emphasis on aquatic environments. Explores how non-living organic matter shapes biogeochemical cycles by carrying and sequestering reduced carbon and major nutrients and examines influence of chemical structure and environmental factors on transport and fate of organic molecules. Provides an introduction to organic biomarkers. Students cannot receive credit for this course and course 224. Prerequisite(s): basic college chemistry (Chemistry 1B, 1C); at least one quarter of college level organic chemistry required (e.g., Chemistry 7). *M. McCarthy*

130. Biological Oceanography. S

Biological description of sea, with emphasis on processes and patterns. Topics include microbial dynamics, phytoplankton and zooplankton production, and ecology of marine food webs. Emphasis placed on understanding how physical, chemical, and geological environment shapes biology and ecology of oceans, including such topics as harmful algal blooms, global estimates of productivity, and effects of humans on environment. Students may not receive credit for this course and Ocean Sciences 230. (Formerly Biology 159.) (Also offered as Biology:Ecology & Evolutionary 168. Students cannot receive credit for both courses.) Prerequisite(s): previous course in ocean sciences recommended. Enrollment restricted to juniors (with instructor approval), seniors, graduate students. *R. Kudela*

156. Marine Plankton. S

Review of morphology, systematics, and natural history of major marine planktonic taxa and evaluation of local plankton forms. Two lecture/lab sessions of three and one-half hours each, and two field trips during the quarter. (Formerly Biology 156.) (Also offered as Biology:Ecology & Evolutionary 124. Students cannot receive credit for both courses.) Concurrent enrollment in course 156L is required; one of the following recommended as preparation: course 118, 142, or 242; or Biology 136, 146, or 170. Recommended for upper-division and graduate students. *M. Silver*

156L. Marine Plankton Laboratory (2 credits). S

Two lab meetings weekly. Concerned primarily with evaluation of local plankton forms. (Formerly Biology 156L.) (Also offered as Biology:Ecology & Evolutionary 124L. Students cannot receive credit for both courses.) Concurrent enrollment in course 156 is required; one of the following recommended as preparation: course 118, 140, or 240 or Biology 136, 146, or 170. *M. Silver*

157. Ecology of Reefs, Mangroves, and Seagrasses. W

Integrated treatment of coral reefs, sea grasses, and mangroves emphasizing interactions and processes through time. Major topics: biological and geological history, biogeography, evolution and ecology of dominant organisms, biodiversity, community and ecosystem ecology, geology, biogeochemistry, global change, human impacts. (Also offered as Biology:Ecology & Evolutionary 163. Students cannot receive credit for both courses.) Prerequisite(s): Biology 20A, 20B, and 20C. *D. Potts*

172. Geophysical Fluid Dynamics. *

Introduces fluid motion influenced by rotation. Topics include the Coriolis force, geostrophic flow, potential vorticity, the shallow water model, quasigeostrophic approximation, planetary waves, Ekman theory, thermal wind, models of the large-scale oceanic and atmospheric circulation, and equatorial dynamics. Taught in conjunction with course 272. Students cannot receive credit for this course and course 272. (Also offered as Earth Sciences 172. Students cannot receive credit for both courses.) Prerequisite(s): Physics 107; Mathematics 22 or 23B recommended. Offered in alternate academic years. *C. Edwards*

199. Independent Study. F,W,S

Students submit petition to sponsoring agency. *The Staff*

*Graduate Courses***200. Physical Oceanography. F**

Introduction to the physics of the ocean-atmosphere system. Structure of the ocean and atmosphere. Energy

balance and radiative transfer. Atmospheric circulation; weather and climate. Physical properties of seawater, air-sea interaction, mixing, water masses, ocean circulation, waves; CO₂ and global change. Designed for beginning graduate students in ocean sciences and upper-division science majors. Calculus and physics recommended as preparation. *C. Edwards*

211. Climate Dynamics. F

Introduction to the dynamics of the Earth climate system. Topics: climate system components; the global energy balance; radiative transfer; the hydrological cycle; general circulations of the atmosphere and ocean; El Niño; the North Atlantic Oscillation; the Pacific Decadal Oscillation. Enrollment restricted to graduate students. Undergraduates may enroll by permission of instructor. Previous courses in calculus and ocean sciences or earth sciences are recommended. *A. Moore*

213. Biogeochemical Cycles. W

Overview of biogeochemical cycles, present and past, and geochemical models. Topics include: marine, terrestrial, and global views of the carbon, nitrogen, phosphorus, silicon, sulfur, and oxygen cycles, and the evolution of these cycles and Earth's redox balance through geologic time. (Also offered as Earth Sciences 213. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Upper-division undergraduates may enroll with instructor approval. College-level chemistry and an upper-division course in at least one relevant discipline are recommended. *M. Delaney*

215. Predicting the Atmosphere, Ocean, and Climate. *

Introduction to the theory and practice of operational prediction in meteorology, oceanography, and climate. Topics: observations and estimation theory; dynamic adjustment and initialization; estimation theory; data assimilation; forecast verification; predictability; ocean state estimation; seasonal forecasting. Enrollment restricted to graduate students. Undergraduates may enroll with instructor approval. Courses 200, 264, Earth Sciences 272, or equivalents are recommended. *A. Moore*

218. Marine Microbial Ecology. *

Recent developments in the study of marine bacteria and their role in the marine ecosystem. Emphasis on biochemistry and physiology in relation to metabolic activity and elemental cycles, trophic interactions and flows of material and energy in marine food webs. Exams and research paper required. Students cannot receive credit for this course, course 118, and Biology 171. Biology 20C and Chemistry 1C recommended. *J. Zehr*

220. Chemical Oceanography. W

A chemical description of the sea; emphasis on the chemical interactions of the oceans with the biosphere, atmosphere, and lithosphere. Topics include biogeochemical cycles and the use of chemical tracers to study oceanic and coastal processes. Course designed for graduate students; available to upper-division science majors. *K. Bruland*

224. Aquatic Organic Geochemistry. S

Introduction to organic geochemistry with emphasis on aquatic environments. Explores how non-living organic matter shapes biogeochemical cycles by carrying and sequestering reduced carbon and major nutrients and examines influence of chemical structure and environmental factors on transport and fate of organic molecules. Provides an introduction to organic biomarkers. Students cannot receive credit for this course and course 124. *M. McCarthy*

230. Biological Oceanography. S

Biological description of sea, with emphasis on processes and patterns. Topics include microbial dynamics, phytoplankton and zooplankton production, and ecology of marine food webs. Emphasis placed on understanding how physical, chemical, and geological environment shapes biology and ecology of oceans, including such topics as harmful algal blooms, global estimates of productivity, and effects of humans on environment. Students may not receive credit for this course and course 130. Prerequisite(s): previous course in ocean sciences recommended. Enrollment restricted to graduate students. *R. Kudela*

264. Ocean Data Analysis. S

Introduction to ocean sciences data analysis methods. Topics: inverse methods, optimal interpolation, empirical orthogonal functions, and Monte Carlo methods applied to physical, chemical, and biological oceanographic datasets. Introduces and uses a high-level computing and visualization package Matlab. Prerequisite(s): previous course in ocean or earth sciences is recommended. Enrollment restricted to graduate students; undergraduates with permission of instructor. *C. Edwards*

272. Geophysical Fluid Dynamics. *

Introduces fluid motion influenced by rotation. Topics include the Coriolis force, geostrophic flow, potential vorticity, the shallow water model, quasigeostrophic approximation, planetary waves, Ekman theory, thermal wind, models of the large-scale oceanic and atmospheric circulation, and equatorial dynamics. Students cannot receive credit for this course and course 172. (Also offered as Earth Sciences 272. Students cannot receive credit for both courses.) Physics 227 is recommended as preparation. Enrollment restricted to graduate students. Offered in alternate academic years. *C. Edwards*

280. Marine Geology. W

Geology of the marine environment. Topics include controls on the types, origin, and distribution of marine sediments; geology of oceanic crust; evolution of continental margins and plate boundaries; introduction to paleoceanography. Students cannot receive credit for this course and Earth Sciences 102. Enrollment restricted to graduate students. *M. Delaney*

285. Past Climate Change. *

Reviews the fundamentals of climate dynamics and explores how Earth's environment is a product of the interaction of its components. Uses examples of climate change from historical and geologic records, and from predictions of the future. Recommended for junior, senior, and graduate students in the sciences. *A. Ravelo*

290. Proseminar.

Special topics in marine sciences to be offered from time to time by professors and staff members.

290A. Topics in Chemical Oceanography. S

A weekly seminar series covering recent developments in chemical oceanography. Different topics and approaches will be stressed from year to year. May be repeated for credit. *K. Bruland*

290B. Topics in Biological Oceanography. *

Explores different problems of special interest in biological oceanography. Different topics and approaches will be stressed from year to year. May be repeated for credit. *M. Silver*

290C. Topics in Marine Geochemistry. *

Selected topics in geochemistry. Discussion of theoretical models, different approaches, and recent research. Topics vary from year to year. May be repeated for credit. *M. Delaney*

290D. Topics in Marine Microbiology. *

A weekly seminar series covering topics in environmental microbiology. Topics vary from year to year, and will include research in ecology, methodology, biochemistry and physiology of bacteria. Emphasis on the role of bacteria in biogeochemical cycling from microzone to global scales, with particular focus in marine systems. May be repeated for credit. *J. Zehr*

290E. Topics in Climatic and Oceanic Change. *

Weekly seminar series covering recent developments in climatic and oceanic change. Different topics and approaches stressed from year to year. Prerequisite(s): interview with instructor prior to first class meeting. May be repeated for credit. *A. Ravelo*

290G. Topics in Physical Oceanography. *

Weekly seminar series covering topics in physical oceanography as well as biological-physical interactions in the oceans. Different topics and approaches stressed from year to year. Enrollment restricted to graduate students; undergraduates may enroll with permission of instructor. May be repeated for credit. *The Staff*

290H. Topics in Ocean Optics. F

Examines recent developments and application of bio-optics to the marine environment, including theory, instrumentation, and remote sensing. Different topics and approaches emphasized from year to year. Prerequisite(s): previous course in marine sciences recommended. Enrollment restricted to graduate students; senior undergraduates with permission of instructor. May be repeated for credit. *R. Kudela*

290J. Topics in Marine Organic Geochemistry. *

Examines recent developments in uses of organic geochemistry to trace oceanographic and biogeochemical processes. Focuses on introduction to organic biomarkers, current literature, and evolving applications. Different topics and approaches emphasized from year to year. Prerequisite(s): previous course in marine (ocean) sciences and organic chemistry are recommended. Enrollment restricted to graduate students; seniors with instructor's permission. May be repeated for credit. *M. McCarthy*

292. Seminar (no credit). F,W,S

Weekly seminar on various topics attended by faculty, graduate, and upper-division undergraduate students. *The Staff*

293. Graduate Research Seminar (2 credits). W

Weekly seminar series covering a spectrum of topics in oceanography. Designed for Ph.D. program graduate students in ocean sciences and those in biology, Earth sciences, chemistry, and physics with research interests in oceanography. Enrollment restricted to graduate students. May be repeated for credit. *M. McCarthy*

296. Teaching in Ocean Sciences (2 credits). F

For new and/or relatively inexperienced graduate students in pedagogy of ocean sciences. Role and responsibilities of teaching in ocean sciences described and developed. Includes discussions about effective teaching methods; hands-on issues for work in the laboratory; university expectations; and regulations regarding teaching, organizational strategies, time management, and working with

instructors and staff. Prerequisite(s): graduate standing or permission of instructor. Enrollment restricted to graduate students. *C. Edwards*

297. Independent Study.

Independent reading, research, and written reports not related to thesis research. Students submit petition to sponsoring agency. *The Staff*

299. Thesis Research.

Students submit petition to sponsoring agency. *The Staff*

Philosophy

Stevenson College
(831) 459-2070
<http://philosophy.ucsc.edu>

Faculty and Professional Interests

W. EMMANUEL ABRAHAM, Emeritus

DAVID C. HOY
Kant, Hegel, Nietzsche, Heidegger, Derrida, Foucault, phenomenology, poststructuralism, and contemporary European philosophy

S. PAUL KASHAP, Emeritus

CARLOS G. NOREÑA, Emeritus

RICHARD E. OTTE
Philosophy of religion, formal epistemology, philosophy of science, philosophical logic

PAUL A. ROTH
Philosophy of social science, philosophy and sociology of science, epistemology, history of analytic philosophy, philosophy of history

ELLEN KAPPY SUCKIEL
Ethics, William James, American philosophy, genetic ethics, ethics of biotechnology

RICHARD A. WASSERSTROM, Emeritus

Associate Professor

ROBERT A. GOFF, Emeritus

DANIEL GUEVARA
Kant, moral philosophy, moral psychology, environmental ethics, history of modern philosophy

Assistant Professor

JOHN F. BOWIN
Ancient philosophy, metaphysics

JONATHAN ELLIS
Philosophy of mind, epistemology, philosophy of language, Wittgenstein

ABRAHAM D. STONE
History of 20th-century philosophy (continental and analytic), 19th-century continental philosophy, philosophy of science, metaphysics, and medieval philosophy

RASMUS G. WINTHER
Philosophy of science, epistemology, metaphysics, philosophy of biology, American pragmatism, Latin American philosophy, evolutionary theory

Lecturer

JOCELYN HOY
Feminist philosophy, 19th- and 20th-century continental philosophy



Professor

KAREN M. BARAD (Feminist Studies)
Physics, feminist philosophy, philosophy of science, cultural studies of science, and feminist theory

SANDRA CHUNG (Linguistics)
Syntax, semantics, Austronesian languages

JEROME NEU (Humanities)
Philosophy of mind; emotions, culture, and insults; philosophy of law; Freud and psychoanalytic theory

Program Description

Philosophy inquires into assumptions about and theories of the most basic facets of rational thought, e.g., what to believe (epistemology), what must be (metaphysics), what to value (morality). Such questions can be studied by looking at answers that contemporary philosophers propose, by investigating the principles that other disciplines use to legitimate claims, or by learning how historically philosophers approached these issues. In this respect, "philosophy" names not only an historically defined subject matter, but also inquiry into any of the fundamental determinants of all forms of rational thought. Thus, students of philosophy can pursue a broad range of topics of the greatest historical, intellectual, and personal interest.

The department offers courses that relate these traditional philosophical questions to contemporary work in literature and the social and natural sciences. In addition, the department offers several courses that make a careful study of the classic texts in philosophy, ancient and modern. Moreover, the curriculum covers all the dominant contemporary schools of philosophy in the Anglo-American and European traditions.

The study of philosophy enables students to expand their abilities in critical thinking and reasoning as well as to improve their skills in verbal and written communication. Students may major or minor in philosophy. The department also offers a major in philosophy with a concentration in religious thought.

Philosophy prepares students for many careers as well as for most professional schools, including law. Students who wish to go to graduate school in philosophy are encouraged to study logic at both the introductory and intermediate levels and any languages that are necessary for advanced scholarship in the different historical eras of philosophy.

Major Requirements

Courses

Eleven courses are required: two at the introductory level, two in the history of philosophy sequence (91-94), and seven additional courses (including one advanced seminar). For the lower-division required courses and for some history of philosophy courses, students may petition to substitute courses taken at other institutions. These 11 courses must meet the following distribution requirements:

Introductory. Course 9 and at least one of courses 11, 22, 24, 28, or any Philosophy 80 course;

History of philosophy. Two of 91, 93, or 94, (all three strongly recommended for students who anticipate graduate work in philosophy). Taking any two from the sequence Philosophy 91, 93, and 94, will satisfy the W requirement. History of philosophy courses taken at other institutions may be substituted by petition, provided that such courses have included intensive study of primary sources;

At least seven additional courses numbered 91 and above, one of which must be an advanced seminar numbered 190. Note that the courses counted toward fulfilling the history of philosophy requirement cannot be counted among these seven additional courses. Courses 195A, 195B, and 199 also cannot be counted among these seven additional courses. All upper-division courses except those in the history of philosophy sequence must be completed at UCSC.

In order to be a philosophy major, courses must be satisfied in the following sequence. Before being eligible to enroll in any course in the history sequence (Philosophy 91-113), a student must have completed all required introductory courses, e.g., Philosophy 9 and at least one from Philosophy 11, 22, 24, 28, or any 80-sequence course. Before being eligible to enroll in any Philosophy course above Philosophy 113, prospective majors must have taken at least one of the required history of philosophy courses (e.g., either Philosophy 91, 93, or 94). Transfer students wishing to major in philosophy should consult with the Philosophy department undergraduate adviser as soon as possible.

Comprehensive Requirement

In the fourth year, students satisfy the comprehensive (exit) requirement by taking one course numbered 190. This advanced seminar meets the standards of the senior-year level of achievement in philosophy. Students who do superior work in an advanced seminar can be awarded a notation of Honors in the evaluation for that course. In addition to Honors in an advanced seminar, graduating seniors with a distinguished record of achievement in their philosophy courses may be awarded Honors or Highest Honors in the philosophy major. Graduation with Honors in Philosophy requires at least a 3.7 average in all philosophy courses taken at UCSC. Graduation with Highest Honors in Philosophy requires at least a 3.9 average in all philosophy courses taken at UCSC. Students with an average between 3.8 and 3.9 may be awarded Highest Honors by vote of the Philosophy Department.

Minor Requirements

A minor in philosophy consists of any nine of the 11 courses required for the major. At least five of these must be upper-division. There is no senior exit requirement for the minor.

Program Planning Notes

Although not as a substitute for the advanced seminar requirement, a student may be given the option of writing a senior essay (course 195A) when a faculty member thinks that the student has already done exceptional work that could be carried to a more advanced level. Normally, the senior essay is completed in one quarter; in unusual circumstances, it can be continued for a second quarter (course 195B), but only if the writing requirements for course 195A are completed successfully and on time. The senior essay, like individual studies more generally, does not count toward the 11 courses required for the major.

After undergraduates have taken the requisite introductory courses, they have a wide range of upper-division courses from which to choose. Those who are considering advanced study are encouraged to consult regularly with any member of the philosophy faculty about the courses that would best prepare them for graduate work. Preparation for graduate work ought to begin **before** senior year. The Philosophy Department sponsors workshops in the fall quarter for students contemplating graduate school in philosophy.

Philosophy Major with Concentration in Religious Thought

This program is for students who wish to use the discipline of philosophy as a basis for pursuing an interest in religious thought. It consists of an individually planned sequence of at least four courses dealing with religious thought, supplementing a core of courses in philosophy. Admittance into the program requires consultation with one of the Philosophy Department's advisers for the concentration and approval by the director of the concentration in religious thought. Students should plan on meeting with a concentration adviser at least once a year to discuss their progress.

A student enters the concentration by petitioning the Department of Philosophy and by proposing, after consultation with a concentration adviser, a sequence of upper-division courses to fulfill the religious thought concentration.

A list of the faculty advisers for the religious thought concentration can be obtained from the Philosophy Department office.

Course Requirements

Fourteen courses are required: two introductory philosophy courses; two in the history of philosophy sequence; six upper division philosophy courses; and four upper division courses in the area of religious thought.

These fourteen courses must meet the following distribution requirements:

Introductory. Course 9 and at least one of 11, 22, 24, 28, or any Philosophy 80 course.

History of Philosophy. Philosophy 91 (Ancient Greek Philosophy) and either Philosophy 93 (The Rationalists) or Philosophy 94 (The Empiricists).

Upper-Division and/or Graduate Courses. Six philosophy courses at UCSC, including one advanced seminar (190 series), and excluding Philosophy 195A, Philosophy 195B, or Philosophy 199. These courses must include three advanced courses in philosophy of religion: either Philosophy 170 (*Interpretation of Religion*) or Philosophy 171 (*Faith and Reason*), and two other upper-division or graduate courses that involve philosophy of religion. The director of the concentration in religious thought will determine which philosophy courses count as involving philosophy of religion.

Concentration in Religious Thought. Four upper-division courses in the area of religious thought from programs on campus such as anthropology, literature, history, history of art and visual culture, philosophy, psychology, and sociology. The director of the concentration in religious thought must approve these courses.

Transfer Students. Students can petition the department for credit in the major for coursework done elsewhere. In general, equivalent introductory courses in philosophy may be substituted for UCSC Philosophy introductory courses. One upper-division course taken at another four-year university may also be substituted by petition—submit a syllabus and supporting material from the class. Petitions are available at the Philosophy Department office (Cowell 5). Only courses for which the student has received a B or better grade will be accepted for the major. The requirement of three upper-division or graduate philosophy of religion courses cannot be substituted with courses taken elsewhere; they must be taken at UCSC.

Graduate Program

The Department of Philosophy conceives of philosophy as a broad and inherently cross-disciplinary enterprise.

Graduate students are able to take advantage of a wide range of courses in the history of philosophy, including ancient, early modern, Kantian, nineteenth-century, American, and early analytic philosophy. Faculty research has focused on such conceptual clusters as mind and body; consciousness, perception, and action; understanding, interpretation, and language; religion, reason, and probability; moral motivation, practical reason, and virtue ethics; the emotions, psychoanalytic theory, and the will; science and technology; and society and the law.

Both the M.A. and the Ph.D. programs encourage interaction with other fields, and the curriculum includes graduate and undergraduate courses cross-listed with departments such as Psychology, Linguistics, Anthropology, Environmental Studies, Feminist Studies, History of Consciousness, Legal Studies, and Politics. Furthermore, the programs allow for graduate-level study of phenomenology, hermeneutics, critical theory, and poststructuralism.

Graduate Program Requirements

Breadth Requirements in the First Year

During their first year, all graduate students are expected to fulfill a set of breadth requirements. These requirements are designed to provide both a common experience on which students can build their individual projects and a shared framework within which they can exchange ideas. In addition to Philosophy 201, *First Year Seminar*, students must take at least one course in the area of metaphysics and epistemology and one course in the area of value theory according to a list determined annually by the graduate committee. During their first year of study all students must pass a logic competency exam with a grade of B or better. This exam will cover material typically taught in a first course in formal logic. For further details, see the graduate program statement on the department's web page or consult with the department's graduate adviser.

Ph.D. Program

The Ph.D. program provides students with closely monitored training in philosophy. The program is designed to be completed in six years or less. Graduate work in philosophy can lead to careers both inside and outside academia. Because most doctoral students will be preparing for a career that involves teaching philosophy, they are encouraged to be teaching assistants for at least three quarters.

Courses. A minimum of 12 graduate courses. Up to two courses may be taken from the offerings of other departments, and up to two courses may be independent studies.

Language requirement. Knowledge of foreign languages will be individually determined based on the relevance of such linguistic skills to the research interests of the student. Proficiency can be demonstrated either by passing a written exam administered by the department or by successfully completing a language course approved by the graduate committee.

Qualifying examination. Near the end of the required course work, doctoral students will develop a research project. The qualifying examination, normally taken during the third year of enrollment, is centered on a qualifying essay that demonstrates the candidate's ability to do extended, dissertation-level research and analysis relevant to the proposed thesis topic and dissertation plan. The exam focuses on the student's research project and on the fields of scholarship it presupposes.

Dissertation. The final requirement for the Ph.D. degree is a dissertation representing a contribution to philosophical research.

M.A. Program

Applications to the M.A. program are welcomed from talented students with diverse academic backgrounds. The program is open not only to applicants who majored in philosophy as undergraduates, but also to applicants from other disciplines, who have a significant background in philosophy and who now want to study philosophy more intensively. The program is designed to be completed in one or two years.

Courses. A minimum of nine graduate courses. Up to two courses may be taken from the offerings of other departments, and up to two courses may be independent studies.

Languages. There is no foreign language requirement for M.A. students.

Master's paper. By the end of the second year of study and the completion of 45 credits, M.A. students will submit a master's paper, which will normally be defended orally before a committee of two faculty members.

Relationship of the M.A. and Ph.D. Programs

Students in the M.A. and Ph.D. programs will be in the same classes and work on the same course distribution requirements. Enrollment in the M.A. program confers no advantage for admission to the Ph.D. program.

Applications and Admissions

Application materials are available online at graddiv.usc.edu. Further information regarding the program may be requested from the Department of Philosophy at (831) 459-4578, fax: (831) 459-2650, elizg@usc.edu. Visit the web site at <http://philosophy.usc.edu>.

Lower-Division Courses

9. Introduction to Logic. F,W,S

A study of correct reasoning, concentrating on developing the skills necessary to distinguish logically correct from logically incorrect arguments. The emphasis is on modern symbolic logic, although the traditional theory of the syllogism is also covered. (General Education Code(s): IH, Q.) (F) *R. Otte*, (W) *S. Chung*, (S) *The Staff*

11. Introduction to Philosophy. *

An introduction to the main areas of philosophy using both classic and contemporary sources. Focuses on central and enduring problems in philosophy such as skepticism about the external world, the mind-body problem, and the nature of morality. (General Education Code(s): IH.) *The Staff*

22. Introduction to Ethical Theory. W

A consideration of ethical issues and theories focusing on the foundation of moral value and the principles governing character and behavior. Designed to extend and develop the student's abilities in philosophical reasoning about ethics. (General Education Code(s): IH.) *D. Guevara*

24. Introduction to Ethics: Contemporary Moral Issues. *

An examination of the conceptual and moral issues that arise in connection with such topics as abortion, racism and war and violence, world hunger, humans and their interactions with the nonhuman environment. The readings are drawn from recent philosophical articles on these topics. (General Education Code(s): IH.) *The Staff*

26. Existentialism and After. *

A survey of recent movements in European thought, such as phenomenology, existentialism, hermeneutics, critical theory, continental feminism, and poststructuralism, with some attention to their 19th-century precursors. Selections from major philosophical treatises are supplemented with literary works. (General Education Code(s): IH.) *The Staff*

28. Environmental Ethics. F

This course is an introduction to the moral issues raised by our interactions with nonhuman animals and with the rest of the natural environment. The course will relate traditional moral theories to contemporary literature on the ethics of nature conservation and environmental protection. The course is intended as a first course in philosophy as well as a first course in ethics; therefore, questions concerning the nature of philosophical inquiry and the ways in which philosophical inquiry is different from inquiries conducted within other disciplines will also be addressed. (General Education Code(s): IH.) *The Staff*

80E. Latin American Philosophy. S

Is there a general school of philosophy endemic to Latin America? Would it have to appeal to quintessential Western philosophical questions regarding knowledge, values, and reality? If not, why not, and would it then still count as philosophy? What difference do ethnic and national diversity, as well as strong political and social inequality, make to the development of philosophical questions and frameworks? Course explores a variety of historically situated Latin American thinkers who investigate ethnic identity, gender, and socio-political inequality and liberation, and historical memory, and who have also made important contributions to mainstream analytical and continental philosophy. (Also offered as Latin American&Latino Studies 80E. Students cannot receive credit for both courses.) (General Education Code(s): T4-Humanities and Arts, E.) *R. Winther*

80F. Philosophical Puzzles, Paradoxes, and Conundrums. *

Many philosophical problems have origins in puzzles and paradoxes. One of the most famous is Zeno's paradox of motion. Among others are paradox of the heap (Sortes paradox), Newcomb's puzzle (puzzle about rational decision making), Problem of the Many (problem about material objects), and Liar paradox (paradox for semantics). Over long history of philosophy, many such puzzles and paradoxes have been discovered; some have been solved, and others have yet to be solved. (General Education Code(s): T4-Humanities and Arts.) *The Staff*

80G. Bioethics in the 21st Century: Science, Business, and Society. F

Serves science and non-science majors interested in bioethics. Guest speakers and instructors lead discussions of major ethical questions having arisen from research in genetics, medicine, and industries supported by this knowledge. (Also offered as Biomolecular Engineering 80G. Students cannot receive credit for both courses.) (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *The Staff*

80M. Science and Society. *

Provides a philosophical perspective concerning the revolution in the understanding of science that generated the so-called "science wars." Introduces the changed philosophical understanding of science shared and presupposed in the fields of science, technology, and society. (General Education Code(s): T5-Humanities and Arts or Social Sciences.) *P. Roth*

80R. Introduction to Philosophy of Biology. *

Introduction to core philosophical issues in the biological sciences. Covers such conceptual issues as the nature of evolutionary theory; choosing the unit of selection; the relationship between evolution and development; whether all biological phenomena are reducible to genes; and the definition of adaptations, and how to identify them. (Also offered as Biology: Molecular Cell & Dev 80R. Students cannot receive credit for both courses.) (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *The Staff*

80S. The Nature of Science. *

A survey of what philosophers have said about the nature of science and scientific change. Emphasis is placed on whether science is best characterized as the gradual accumulation of truth or whether truth is irrelevant to scientific change. (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *R. Otte*

91. Ancient Greek Philosophy. F

Survey of ancient Greek philosophy of the Classical and Hellenistic periods. Begins with Socrates and the Pre-Socratics, then undertakes an intensive study of Plato and Aristotle. Course then surveys the main developments that follow: Epicureanism, Stoicism, and Scepticism. (General Education Code(s): W satisfied by taking this course and either course 93 or 94.) Prerequisite(s): course 9; courses 11 or 22 or 24 or 28 or any 80 course; and satisfaction of the Entry Level Writing and Composition requirements. *J. Bowin*

93. The Rationalists. W

A study of the historical background and the present relevance of Descartes, Spinoza, and Leibniz. (General Education Code(s): W satisfied by taking this course and either course 91 or 94.) Prerequisite(s): course 9; courses 11 or 22 or 24 or 28 or any 80 course; and satisfaction of the Entry Level Writing and Composition requirements. *A. Stone*

94. The Empiricists. S

A critical study (based on original texts) of Locke, Berkeley, and especially Hume on the nature of knowledge, perception, causation, morality, religion, and political society. (General Education Code(s): W satisfied by taking this course and either course 91 or 93.) Prerequisite(s): course 9; courses 11 or 22 or 24 or 28 or any 80 course; and satisfaction of the Entry Level Writing and Composition requirements. *D. Guevara*

99. Tutorial. F,W,S

The Staff

Upper-Division Courses

100. Vienna Circle and American Philosophy. *

Study of philosophical movement called the Vienna Circle, named so chiefly for intellectual excellence of its members, but also for external historical reasons. Course pays careful attention to intercultural aspects of ideas of the Vienna Circle: intellectual climate under which these ideas were formed, how thoughts of its members found an echo outside of Austria, and how they made a lasting influence on philosophical thinking in England and in U.S. *The Staff*

106. Kant. W,S

Intensive study of Kant's philosophy, particularly his epistemology and metaphysics developed in his Critique of Pure Reason. Prerequisite(s): course 91 or 93 or 94. Enrollment limited to 70. *A. Stone*

107. Nineteenth-Century Philosophy. F

A study of some European philosophers of the 19th century, with particular attention to Hegel, Schopenhauer, and Nietzsche. (Formerly course 108.) Prerequisite(s): course 91 or 93 or 94. *J. Hoy*

108. Phenomenology. F

French phenomenology includes primarily the work of Jean-Paul Sartre, Simone de Beauvoir, and Maurice Merleau-Ponty. Additional topics include the nature of consciousness and agency. Course includes discussion of French feminists' reactions to Simone de Beauvoir and Emmanuel Levinas. (Formerly course 109, *Phenomenology to Poststructuralism*) Prerequisite(s): course 91 or 93 or 94. *D. Hoy*

109. Poststructuralism and After. W

The three major poststructuralist philosophers are Michel Foucault, Jacques Derrida, and Gilles Deleuze. After studying their rejection of phenomenological accounts of consciousness and agency—as well as their program for studying power, bio-power, multiplicity, difference, and repetition—current critics, such as Slavoj Žižek and Judith Butler, are also read for contrast between the methods of phenomenology, genealogy, and critical theory. Prerequisite(s): course 91 or 93 or 94. *D. Hoy*

110. Heidegger. F,W,S

A close study of early and late texts by Martin Heidegger, especially *Being and Time*. Prerequisite(s): course 91 or 93 or 94. Enrollment limited to 45. *The Staff*

111. Continental Philosophy. *

Study of recent work in continental philosophy. Topics vary. Enrollment restricted to junior and senior philosophy majors. *W. Godzich*

112. American Philosophy. *

Study of classical American philosophers, specifically Emerson, Peirce, James, and Dewey, with emphasis on their views of metaphysics, epistemology, ethics, and philosophy of religion. Some attention is also paid to recent pragmatic tendencies in American philosophy. Prerequisite(s): course 91 or 93 or 94. *R. Winther*

113. The Origins of Analytic Philosophy. S

An examination of the beginnings of analytic philosophy, with primary interest in the reformulation of traditional philosophical problems by Frege, Russell, and the early Wittgenstein. Some attention is also paid to the development of Vienna Circle logical positivism (Schlick, Carnap, Waismann). Prerequisite(s): course 91 or 93 or 94. Enrollment limited to 39. May be repeated for credit. *P. Roth*

114. Probability and Confirmation. S

Studies the philosophical foundations of probability, induction, and confirmation. Different interpretations of probability studied, and solutions to various problems and paradoxes investigated. Students cannot receive credit for this course and course 214. Prerequisite(s): course 9, and course 91 or 93 or 94. *R. Otte*

115. Formal Methods in Philosophy. *

Study of formal methods commonly used in analytic philosophy. Emphasis is on developing the technical tools to enable one to read and do modern analytic philosophy. Applications of various formal tools to philosophical problems will also be discussed. Prerequisite(s): course 9, and course 91 or 93 or 94. *R. Otte*

116. Logic, Sets, and Functions. *

Introduction to basic set theory, recursive definitions, and mathematical induction. Provides a bridge between course 9 and courses 117 and 119. Strong emphasis on

proving theorems and constructing proofs, both formal proofs and proofs in the customary, informal style used by mathematicians. Prerequisite(s): course 9; and two from courses 91, 93, and 94. *J. Bowin*

117. Non-Classical Logic. *

Investigation of non-classical logic. Several propositional non-classical logics, such as various modal logics, multi-valued logics, and relevance logics studied. Meta-theoretic results, including soundness and completeness, investigated for each logic studied. Prerequisite(s): course 9, and course 91 or 93 or 94. Enrollment limited to 40. *The Staff*

119. Intermediate Logic. *

Detailed treatment of the semantics of first order logic and formal computability. Completeness, undecidability of first order logic and Lowenheim-Skolem results also proven. Nature and formal limits of computability and introduction to incompleteness also investigated. Students cannot receive credit for this course and course 219. Prerequisite(s): course 9, and course 91 or 93 or 94. *R. Otte*

120. Philosophical Writing. *

Training in philosophical thinking and its expression in written form. Prerequisite(s): course 91 or 93 or 94; and satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to philosophy majors. Enrollment limited to 54. (General Education Code(s): W.) *The Staff*

121. Knowledge and Rationality. F

An investigation of modern theories of knowledge, justification, and rationality. One course in philosophy is strongly recommended prior to taking this course. Prerequisite(s): course 91, 93, or 94. *P. Roth*

122. Topics in Metaphysics. S

Topics vary each quarter, and may focus on one or more sub-fields of metaphysics, e.g., philosophy of time, philosophy of persistence, etc.; or the course may be taught as a general survey of metaphysics. Prerequisite(s): course 9; and course 91 or 93 or 94. *A. Stone*

123. Philosophy of Language. *

Current theories of the nature and preconditions of language, the nature of meaning, and the nature of truth. Prerequisite(s): course 91 or 93 or 94; or consent of instructor. Enrollment limited to 82. *J. Ellis*

125. Philosophy of Science. S

An examination of various topics that arise in thinking about science. Different philosophical problems, such as realism, instrumentalism, confirmation, explanation, space and time, and rational decision making are extensively discussed and criticized. Prerequisite(s): course 91 or 93 or 94. *The Staff*

127. Philosophy of Biology. S

Can developmental processes be reduced to gene expression? Does the history of life exhibit trends (e.g. increasing complexity)? How are we to understand key concepts such as "fitness," "species," "adaptation," and "gene?" Is there such a thing as human nature? Course surveys these and other core philosophical topics in the biological sciences. Prerequisite(s): course 91 or 93 or 94; satisfaction of Entry Level Writing and Composition requirements. Enrollment limited to 39. (General Education Code(s): W.) *The Staff*

133. Philosophy of Mind. *

Focuses on philosophical questions, both historical and contemporary, concerning the relation between body

and mind. Particular attention is given to whether consciousness can be totally explained in physical terms. Prerequisite(s): course 91, 93, or 94. *J. Ellis*

135. Philosophy of Psychology. *

Looks at philosophical issues raised by current research on the nature of perception, cognition, and consciousness in psychology and cognitive science. Can there be a science of the mind? Could machines be conscious? Do animals have minds? How did the mind evolve? These and a host of related questions form the subject matter of this course. Students cannot receive credit for this course and course 235. Prerequisite(s): course 91 or 93 or 94, or by consent of instructor. Enrollment restricted to sophomores, juniors, and seniors. *The Staff*

138. Wittgenstein. *

Focuses on the writings of the Austrian philosopher Ludwig Wittgenstein. Wittgenstein's work is typically divided into three time periods: early, middle, and late. Prerequisite(s): course 91 or 93 or 94. Enrollment restricted to junior and senior philosophy majors. *J. Ellis*

139. Freud. *

The development of Freud's concept of mind. Extensive reading tracing the origins and development of Freud's theories and concepts (e.g., abreaction, psychic energy, defense, wish-fulfillment, unconscious fantasy, dreams, symptoms, transference, cure, sexuality) and emphasizing the underlying model of the mind and mental functioning. (Also offered as Psychology 163. Students cannot receive credit for both courses.) Prerequisite(s): course 91 or 93 or 94. Offered in alternate academic years. *J. Neu*

140. History of Ethics. *

A careful study of any one or a number of select primary texts in the history of moral philosophy, with some emphasis on the relation to contemporary issues. Prerequisite(s): course 91 or 93 or 94. *The Staff*

141. Epistemology and Cognition. *

Epistemology is preoccupied with skepticism, the view that knowledge is unobtainable. Recently, there has been skepticism voiced about the status of epistemology itself; philosophers conversant in cognitive science suggest that epistemology is beset with dubious presuppositions. We survey epistemology, cognitive science, and their interface. Students cannot receive credit for this course and course 241. Prerequisite(s): course 91 or 93 or 94. Enrollment restricted to junior and senior philosophy majors. *The Staff*

142. Advanced Ethics. F

An examination of central issues in ethical theory including the nature of and justification for the moral point of view, the place of reason in ethics, the status of moral principles, and the nature of moral experience. Prerequisite(s): course 22, 24, or 28, and course 91, 93, or 94. *D. Guevara*

144. Social and Political Philosophy. *

A study of selected classical and contemporary writings dealing with topics such as the nature and legitimacy of the liberal state, the limits of political obligation, and theories of distributive justice and rights. (Also offered as Legal Studies 144. Students cannot receive credit for both courses.) Prerequisite(s): course 91 or 93 or 94. Offered in alternate academic years. *The Staff*

145. Brave New World: Ethical Issues in Genetics. *

Study of ethical issues involved in recent and upcoming advances in genetic research and technology such as genetic engineering, cloning, human embryo research,

genetic experimentation, use of an individual's genetic information, and the manipulation of human evolution. Also discusses fundamental issues such as the moral responsibility of scientists, our obligations to future generations, and the notion of human perfectibility. Prerequisite(s): course 91 or 93 or 94. *E. Suckiel*

146. Philosophy of Law. W

Exploration of selected problems in jurisprudence: "legal reasoning" and social policy, rules and individual cases, the mental element in the law, punishment and responsibility, causation and fault, liberty and paternalism, etc. (Also offered as Legal Studies 146. Students cannot receive credit for both courses.) Prerequisite(s): course 91 or 93 or 94. *J. Neu*

147. Topics in Feminist Philosophy. W

Topics in feminist philosophy, which may include: the nature of feminist philosophy, feminist approaches to philosophical issues, social and political philosophy, theories of knowledge, ethics, aesthetics, and science, technology, and medicine studies. Presupposes some familiarity with philosophy or feminist scholarship. (Also offered as Feminist Studies 168. Students cannot receive credit for both courses.) Prerequisite(s): course 91 or 93 or 94. *J. Hoy*

148. The Holocaust and Philosophy. *

By using the historiography of the Holocaust as a case study, examines the epistemology and ontology of historical knowledge, i.e., how the past is known, and what about it there is to know. Prerequisite(s): course 91 or 93 or 94. Enrollment restricted to juniors and seniors. *P. Roth*

150. Moral Aspects of Decision Making. F

How should you act when any course of action would contradict the rules of morality? This situation is "the question of dirty hands." It is connected to the doctrine of double effect: the claim that although willing evil as a means to some good result is always wrong, it is permissible to cause evil as a side effect while aiming at a good result. Practical issues (such as democracy's combat against terrorism) and theoretical issues (such as the difference between action and omission, and the connection between goodwill and good—or bad—results) are discussed. Prerequisite(s): course 91 or 93 or 94; or consent of instructor. *The Staff*

151. Modern Theories of Justice. S

Questions of social and distributive justice are as ancient as Aristotle; yet, modern philosophy, with its developing notions of democracy and quality, has added much sophistication and subtlety to these questions, especially since the publication of John Rawls' *A Theory of Justice* (1971). Issues discussed include: personal relations, concept of community, the notion of the State, and global justice. Prerequisite(s): course 91 or 93 or 94; or consent of instructor. *The Staff*

152. Aesthetics. *

Problems about form, meaning, and interpretation in art, as found in major aesthetic theories from the philosophical tradition, and also in a variety of encounters between recent philosophy and the arts. One course in philosophy is strongly recommended prior to taking this course. Prerequisite(s): course 91 or 93 or 94. (General Education Code(s): A.) *The Staff*

153. Philosophy of Race. F

Topics include conceptual-analytical and political-social issues. Selected topics may include: the ontology of race; race as real or constructed; scientific understandings of race; race and identity; and color-blind versus

color-sensitive theories of justice and political policy. Prerequisite(s): course 91 or 93 or 94; or consent of instructor. *C. Koopman*

154. Philosophy in Literature. *

Story, drama, and poetry considered as sources of philosophical perspective or as particular challenges to philosophical interpretation. Also, discussion of literary and imaginative elements in philosophical writing. One course in philosophy is strongly recommended prior to taking this course. Prerequisite(s): course 91 or 93 or 94. *The Staff*

170. The Interpretation of Religion. *

A study of different philosophical responses to religious belief and practice, from the classical "proofs" of religion, to skeptical critiques of religious experience, to conceptual issues in the interpretation of religious texts. Prerequisite(s): course 91 or 93 or 94. *The Staff*

171. Faith and Reason. W

Recent work in analytic philosophy of religion, concentrating on traditional theism. Topics include arguments for and against the existence of God, religious experience, miracles, the relation of faith and reason, and problems such as freedom and divine foreknowledge. Prerequisite(s): course 9, and course 91 or 93 or 94. *R. Otte*

190. Advanced Seminar.

190A. Topics in Ancient Greek Philosophy. F

Topics will vary each quarter and will focus on a major ancient Greek philosophical figure or work. Prerequisite(s): two from courses 91, 93, and 94; or consent of instructor. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 12. May be repeated for credit. *J. Bowin*

190B. Nietzsche. W

Intensive reading of not only Nietzsche's own texts, but important contemporary interpretive works on Nietzsche. Mainly covers nihilism and the aestheticization of existence, will-to-power, genealogy and interpretation, and Nietzsche's use or misuse for feminism. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. *J. Hoy*

190C. Advanced Topics in Contemporary Ethics. *

Examines one or more leading ethical theories, such as Kantianism, Virtue Theory, Consequentialism, and Humean ethical theory. Examines different foundational ethical principles and arguments for those principles, contrasting accounts of moral action and moral motivation, as well as epistemological and motivational role of emotions in ethical theory. Students cannot receive credit for this course and course 290C. Prerequisite(s): course 140 or 142; and two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 22. May be repeated for credit. *The Staff*

190D. Kant's Moral Theory.

A careful study of Kant's moral theory, with an emphasis on the *Groundwork for the Metaphysics of Morals*, the *Critique of Practical Reason*, and the *Metaphysics of Morals*. Recent secondary sources are considered as well. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. *D. Guevara*

190E. Kierkegaard. *

Close study and discussion of major works by Soren Kierkegaard. Assessment of his influences on

20th-century philosophy, literature, psychology, and religious thought. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. *The Staff*

190F. Topics in Philosophy of Biology. *

Philosophy of biology is one of the fastest-growing areas of philosophy of science. Course gives advanced seniors an overview of many diverse topics currently under discussion in modern philosophy and biology and provides a foundation for further research, regardless of previous experience with the biological sciences. Students cannot receive credit for this course and course 290F. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to juniors and seniors. Enrollment limited to 15. May be repeated for credit. *R. Winther*

190G. Wittgenstein. S

Focuses on the writings of the Austrian philosopher Ludwig Wittgenstein. Wittgenstein's work is typically divided into three periods: early, middle, and late. Topics covered include writings from one or more periods. Students cannot receive credit for this course and course 290G. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 22. *J. Ellis*

190H. Environmental Ethics. *

What is our proper moral stance toward the natural environment? This question encompasses our ethical relations to individual non-human animals, to other species of living beings, and toward the biotic community as a whole. It leads us to consider the broader question: What makes anything at all worthy of our moral respect or even our moral consideration? How are we to understand the very idea of the environment, the distinction between the human world, and the natural world, and the relationships between them. Students cannot receive credit for this course and course 290H. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 15. *The Staff*

190I. Studies in Religious Philosophy. S

Philosophy authorship and self-understanding from Plato and Augustine, Montaigne and Descartes, and Kierkegaard and Wittgenstein to recent Continental figures including Levinas, Foucault, Derrida, Lyotard, and Agamben. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to juniors and seniors. Enrollment limited to 10. *The Staff*

190J. Advanced Topics in the History of Ethics. *

A careful study of any one of the main moral theories in the history of philosophy, with some emphasis on the relation to contemporary moral philosophy. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. *D. Guevara*

190K. Philosophical Matters of Scientific Practice. *

Considers the relevance of philosophical matters to the practice of science. Using quantum physics as a case study, explores historical and contemporary perspectives on issues such as those raised by the Schrödinger cat paradox, Bell's inequalities, and quantum erasers. Students cannot receive credit for this course and course 290K. Prerequisite(s): two from courses 91, 93, and 94. Enrollment limited to 22. *K. Barad*

190L. The Emotions. W

Analysis of particular emotions (e.g., jealousy, boredom, regret) and exploration of general theoretical issues (e.g., expression, control) with emphasis on moral psychology. Satisfies seminar requirement. Admission by interview with instructor. Prerequisite(s): two from courses 91, 93, and 94; satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to juniors and seniors. Enrollment limited to 23. (General Education Code(s): W.) *J. Neu*

190M. William James. W

Intensive study of James's philosophy, including his philosophical psychology and pragmatic method. Covers James's epistemology, metaphysics, ethics, and philosophy of religion. Prerequisite(s): two from courses 91, 93, and 94; and satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. (General Education Code(s): W.) *E. Suckiel*

190N. Philosophy of Religion. S

An examination of recent work in philosophy of religion. The approach may vary between an analytic and continental approach in different years. Topics might include the rationality of belief in God, religious epistemology, hermeneutics, and religious experience. Prerequisite(s): course 9, and course 91 or 93 or 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. *R. Otte*

190O. Topics in Epistemology. *

An examination of recent work in epistemology. May focus on topics such as perception, naturalized epistemology, probabilistic epistemology, theories of justification, *a priori* knowledge, and memory. (Formerly Epistemology.) Prerequisite(s): course 9; and two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. *R. Otte*

190P. Major Figures in Contemporary Philosophy. F

Focuses on philosophical writings and significance of a single figure in contemporary (20th- and 21st-century) philosophy. May include, but not be limited to, Russell, Whitehead, Wittgenstein, Husserl, Carnap, Murdoch, Quine, Irigaray, Derrida, and Davidson. Students cannot receive credit for this course and course 290P. Prerequisite(s): two from courses 91, 93, or 94. Enrollment restricted to senior philosophy majors. Enrollment limited to 22. May be repeated for credit. *P. Roth*

190Q. Philosophy of Mathematics. *

Introduction to problems of contemporary analytic philosophy of mathematics. Do mathematical objects exist? Are mathematical statements true? How can we know? Examines the historical background to contemporary debates and the positions which have been taken within them. Students cannot receive credit for this course and course 290Q. Prerequisite(s): course 9; and two from courses 91, 93, and 94; and Mathematics 19A or 20A, or AP score of 4 on the BC exam, or Mathematics Placement Exam score of 40. Enrollment limited to 15. *A. Stone*

190S. Philosophy of Science. *

An examination of a topic in current philosophy of science. The material for the course is chosen from topics such as realism and instrumentalism, scientific explanation, space and time, the confirmation of theories, laws of nature, and scientific abstraction. Prerequisite(s): course 9, and course 91 or 93 or 94;

satisfaction of Entry Level Writing and Composition requirements; enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): W.) *The Staff*

190T. Advanced Feminist Philosophy. *

Focuses on issues in epistemology and ontology: the construction of knowledge and objectivity, rationality and emotions, subjectivity and personal identity, and the body and sexuality. (Also offered as Feminist Studies 194J. Students cannot receive credit for both courses.) Prerequisite(s): course 147 or Feminist Studies 100; and two from courses 91, 93, and 94. Enrollment limited to 20. *J. Hoy*

190W. History of Consciousness. *

Historical study of philosophical theories of consciousness and self-consciousness. Problems include the relation of self and other, consciousness and body, and self-consciousness and ethical agency. Readings will be selected from some of the following: Kant, Hegel, Nietzsche, and Heidegger, followed by phenomenologists, poststructuralists, and analytic philosophy. Prerequisite(s): two from courses 91, 93, or 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 10. *D. Hoy*

190X. The Good Life. *

Study of alternative conceptions of the elements of a good life, including topics such as courage, loyalty, devotion to ideals, personal flourishing, commitment to a community or tradition, spiritual enlightenment, integrity, compassion, and intellectual understanding. Also covered are fundamental questions such as the meaning of life, the relationship of "living right" to "living well," and the role of feelings in the justification of action. Prerequisite(s): two from courses 91, 93, and 94. Enrollment restricted to junior and senior philosophy majors. Enrollment limited to 20. *E. Suckiel*

190Y. Insults and Intentions. *

The schoolyard wisdom about "sticks and stones" does not take one very far: insults not only take the form of words, and even words have effects. What kind of injury is an insult? Is it infliction determined by the insulter or the insulted? What does it reveal of the character of each and of the character of society and its conventions? What is its role in social and legal life (from play to jokes to ritual to war and from blasphemy to defamation to hate speech)? Philosophical, anthropological, psychoanalytic, and legal approaches to the questions are emphasized. Students cannot receive credit for this course and course 290Y. (Formerly Insults and Intentions.) Prerequisite(s): two from courses 91, 93, and 94; and satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to juniors and seniors. Enrollment limited to 22. (General Education Code(s): W.) *J. Neu*

195A. Senior Essay. F,W,S

Preparation of senior essay (approximately 25 pages) during one quarter. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Essay. F,W,S

Under exceptional circumstances, a second senior essay continuing the work of the first essay is permitted but only when the first senior essay has been completed. Students submit petition to sponsoring agency. *The Staff*

199. Tutorial. F,W,S

The Staff

199F. Independent Study (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Graduate Courses**201. First Quarter Seminar. F**

First quarter required course for philosophy graduate students. Introduces the work of the philosophy faculty members to the new graduate students. Helps new students form a cohort. Each week different faculty members will visit the class and discuss materials of their own as well as materials or topics that they study. Enrollment restricted to graduate philosophy majors. *P. Roth*

202. Topics in Ancient Greek Philosophy. *

Topics will vary each quarter and will focus on some major ancient Greek philosophical figure or work. Enrollment restricted to graduate philosophy majors. Enrollment limited to 20. *J. Bowin*

214. Probability and Confirmation. S

Studies the philosophical foundations of probability, induction, and confirmation. Different interpretations of probability studied, and solutions to various problems and paradoxes investigated. Students cannot receive credit for this course and course 114. Enrollment restricted to graduate students. *R. Otte*

219. Intermediate Logic. *

Natural deduction and semantics of first order predicate logic. Metatheory, including completeness theorems for propositional and predicate logic. Students cannot receive credit for this course and course 119. (Formerly course 217.) Prerequisite(s): course 9. Enrollment restricted to graduate students. Enrollment limited to 40. *The Staff*

222. Metaphysics. S

Advanced introduction to topics in 20th century and contemporary analytic metaphysics. Divided into five main parts dealing, respectively, with issues about the nature of existence, properties, time, change and persistence, and material constitution. Students cannot receive credit for this course and course 122. Enrollment restricted to graduate philosophy majors. Enrollment limited to 10. *A. Stone*

223. Recent European Philosophy. W

Seminar on recent developments in European philosophy, with particular attention to German theorists such as Nietzsche, Heidegger, Gadamer, Horkheimer, Adorno, or Habermas. Theorists such as Sartre, Merleau-Ponty, Derrida, Foucault, Bourdieu, Levinas, Laclau, or Vattimo may be read as well. (Also offered as History of Consciousness 223. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *D. Hoy*

224. Philosophy of Language. *

Advanced introduction to issues in the philosophy of language—primarily concerning the nature of reference, meaning, and truth. Works from such 20th-century figures as Russell, Wittgenstein, Kripke, Lewis, and Putnam discussed. Topics include what it is for a sign or a bit of language to be meaningful, or for it to identify or represent something; what it is for a statement to be truthful; what it is to be a language; and how reference works when attributed to beliefs. Cannot receive credit for this course and course 123. Enrollment restricted to graduate philosophy majors. Enrollment limited to 10. *The Staff*

231. Metaphysics and Epistemology. *

Focuses on topic or topics in metaphysics and/or epistemology. May focus on topics such as perception, naturalized epistemology, probabilistic epistemology, theories

of justification, a priori knowledge, and memory. Topics might include one or more of causation, possible worlds, identity, necessity, time, realism, universals, and existence. Enrollment restricted to graduate philosophy students. Enrollment limited to 22. *P. Roth*

232. Advanced Topics in Value Theory. *

Considers topics central to philosophical questions about value: ethics, normativity, practical reason, relativism, skepticism, responsibility, motivation, emotion, and so forth. In some instances, the investigation will proceed through influential historical figures, ancient to modern. Enrollment restricted to graduate philosophy majors. Enrollment limited to 20. *D. Guevara*

233. Seminar in Philosophy of Mind. *

Focuses on topics in the philosophy of mind. Topics may include consciousness, mental content, the mind-body problem, and mental causation. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *J. Ellis*

235. Philosophy of Psychology. *

Looks at philosophical issues raised by current research on the nature of perception, cognition, and consciousness in psychology and cognitive science. Can there be a science of the mind? Could machines be conscious? Do animals have minds? How did the mind evolve? These and a host of related questions form the subject matter of this course. Students cannot receive credit for this course and course 135. Prerequisite(s): One course in philosophy, psychology, or linguistics. Enrollment restricted to graduate students. *The Staff*

237. Making Up the Mind. *

How does the mind come to be a thing which science can study? Readings focus on how diagnostic categories, for example, multiple personality disorder, attain scientific cachet and what issues surround the "medicalization" of the mind. Enrollment restricted to graduate students. *P. Roth*

239. Philosophy of Religion. *

Investigation of various topics in philosophy of religion. Enrollment restricted to graduate philosophy majors. May be repeated for credit. *R. Otte*

240. The History of Ethics. *

Compares and contrasts two famous ethical works: Aristotle's *Nicomachean Ethics* and Kant's *Groundwork for the Metaphysics of Morals*. Traditionally, Aristotle and Kant are thought to offer opposing views of good action and good agents. Closely compares their ethical principles and arguments for these principles in order to understand each philosopher in his own terms, as well as to determine whether this traditional characterization is accurate. Students cannot receive credit for this course and course 140. Enrollment restricted to graduate philosophy majors. *The Staff*

241. Epistemology and Cognition. *

Epistemology is preoccupied with skepticism, the view that knowledge is unobtainable. Recently, there has been skepticism voiced about the status of epistemology itself; philosophers conversant in cognitive science suggest that epistemology is beset with dubious presuppositions. We survey epistemology, cognitive science, and their interface. Students cannot receive credit for this course and course 141. Enrollment restricted to graduate philosophy majors. *The Staff*

245. Brave New World: Ethical Issues in Genetics. *

Ethical issues in genetic research and technology, including genetic engineering, cloning, stem cell research, uses of genetic information, and manipulation of human evolution. Also considers the moral responsibility of scientists, obligations to future generations, and the concept of human perfectibility. Students cannot receive credit for this course and course 145. Enrollment restricted to philosophy graduate students. *E. Suckiel*

247. Stem Cell Research: Scientific, Ethical, Social, and Legal Issues. *

Scientific, ethical, social, and legal dimensions of human embryonic stem-cell research, including the moral status of the embryo; the concept of respect for life; ethical constraints on oocyte procurement; creation of embryonic chimeras; federal policies; and political realities. (Also offered as Biology: Molecular Cell & Dev 288. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *E. Suckiel*

252. Poststructuralism. *

French poststructuralism, with particular attention to the main philosophical texts of Jacques Derrida and Michel Foucault. Other representative theorists as well as critics of poststructuralism are studied as time permits. (Also offered as History of Consciousness 252. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *D. Hoy*

254. Politics of Temporality. *

Temporality is the way humans experience time. Examines how continental philosophers have described temporality and how they have explained the relation of temporality to objective clock-time. Phenomenologists such as Husserl, Heidegger, Sartre, and Merleau-Ponty discussed in light of their differences with Kant, Hegel, and Bergson regarding the relation of temporality and subjectivity. Examine Hegel, Benjamin, and Derrida on the relation of temporality and historicity. Enrollment restricted to graduate students. Enrollment limited to 22. *D. Hoy*

256. History of Consciousness. F

Examination of contemporary theories of consciousness in both analytic and continental traditions. Among those who deflate modern philosophy's preoccupation with consciousness are not only Dennett, Davidson, and Rorty, but also Heidegger, Foucault, and Derrida. Among those who argue for irreducibility of subjectivity are not only Searle, Nagel, and Chalmers, but also Sartre, Merleau-Ponty, and Levinas. Discussion of parallel readings from both philosophical perspectives. (Also offered as History of Consciousness 224. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. Enrollment limited to 25. *D. Hoy*

280. Graduate Colloquia Course (2 credits). F,W,S

This colloquia series sponsors speakers each quarter. Students must attend all colloquia and are encouraged to form discussion groups after each lecture. Enrollment restricted to philosophy graduate students. *P. Roth*

290C. Advanced Topics in Contemporary Ethics. *

Examines one or more leading ethical theories, such as Kantianism, Virtue Theory, Consequentialism, and Humean ethical theory. Examines different foundational ethical principles and arguments for those principles, contrasting accounts of moral action and moral motivation, as well as epistemological and motivational role of

emotions in ethical theory. Students cannot receive credit for this course and course 190C. Enrollment restricted to graduate philosophy majors. Enrollment limited to 22. *J. Tannenbaum*

290F. Topics in Philosophy of Biology. W

Philosophy of biology is one of the fastest-growing areas of philosophy of science. Course is designed to give seniors and graduate students an overview of many of the diverse topics currently under discussion in modern philosophy of biology and provide a foundation for further research, regardless of previous experience with the biological sciences. Students cannot receive credit for both this course and course 190F. Enrollment restricted to graduate students. Enrollment limited to 8. May be repeated for credit. *R. Winther*

290G. Wittgenstein. S

Focuses on the writings of the Austrian philosopher Ludwig Wittgenstein. Wittgenstein's work is typically divided into three periods: early, middle, and late. Topics covered include writings from one or more periods. Students cannot receive credit for this course and course 190G. Enrollment restricted to graduate students. *J. Ellis*

290H. Environmental Ethics. *

What is our proper moral stance toward the natural environment? This question encompasses our ethical relations to individual non-human animals, to other species of living beings, and toward the biotic community as a whole. It leads us to consider the broader question: What makes anything at all worthy of our moral respect or even our moral consideration? How are we to understand the very idea of the environment, the distinction between the human world, and the natural world, and the relationships between them. Students cannot receive credit for this course and course 190H. Enrollment restricted to graduate students. Enrollment limited to 10. *The Staff*

290J. Advanced Topics in the History of Ethics. *

Careful study of any one of the main moral theories in the history of philosophy, with some emphasis on the relation to contemporary moral philosophy. Students cannot receive credit for this course and course 190J. Enrollment restricted to graduate students. Enrollment limited to 10. *D. Guevara*

290K. Philosophical Matters of Scientific Practice. *

Considers the relevance of philosophical matters to the practice of science. Using quantum physics as a case study, explores historical and contemporary perspectives on issues such as those raised by the Schrödinger cat paradox, Bell's inequalities, and quantum erasers. Students cannot receive credit for this course and course 190K. Enrollment restricted to graduate students. Enrollment limited to 22. *K. Barad*

290M. Advanced Graduate Seminar: William James. W

Intensive study of James's philosophy, including his philosophical psychology and pragmatic method. Covers James's epistemology, metaphysics, ethics, and philosophy of religion. Recent critical analyses of the issues raised in James's philosophy will also be highlighted. Enrollment restricted to graduate students. Enrollment limited to 20. *E. Suckiel*

290P. Major Figures in Contemporary Philosophy. F

Focuses on philosophical writings and significance of a single figure in contemporary (20th- and 21st-century) philosophy. May include, but not be limited to, Russell, Whitehead, Wittgenstein, Husserl, Carnap, Murdoch,

Quine, Irigaray, Derrida, and Davidson. Students cannot receive credit for this course and course 190P. Enrollment restricted to graduate students majoring in philosophy. Enrollment limited to 22. May be repeated for credit. *P. Roth*

290Q. Philosophy of Mathematics. *

Introduction to the problems of contemporary analytic philosophy of mathematics. Do mathematical objects exist? Are mathematical statements true? How can we know? We will examine the historical background to contemporary debates and the positions which have been taken within them. Students cannot receive credit for both this course and course 190Q. Enrollment restricted to graduate students. Enrollment limited to 8. *A. Stone*

290W. History of Consciousness. *

Historical study of philosophical theories of consciousness and self-consciousness. Problems include the relation of self and other, consciousness and body, and self-consciousness and ethical agency. Readings are from Kant, Hegel, Nietzsche, and Heidegger, followed by phenomenologists, poststructuralists, and analytic philosophy. Students cannot receive credit for this course and course 190W. Enrollment restricted to graduate students. Enrollment limited to 10. *D. Hoy*

290X. The Good Life. *

Proposed elements of a good life, e.g., courage, loyalty, devotion to ideals, personal flourishing, integrity, compassion, and intellectual understanding. Also discusses fundamental questions such as the meaning of life, the relationship of "living right" to "living well." Students cannot receive credit for this course and course 190X. Enrollment restricted to graduate philosophy majors. Enrollment limited to 20. *E. Suckiel*

290Y. On Insults. *

What is the role of insult in social and legal life (from play to jokes to ritual to war and from blasphemy to defamation to hate speech)? Emphasizes philosophical, anthropological, psychoanalytic, and legal approaches to the issues. Enrollment restricted to graduate students and by permission of instructor. Students cannot receive credit for this course and course 190Y. (Formerly course 236.) Enrollment limited to 20. *J. Neuf*

294. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. May be repeated for credit. *The Staff*

295. Directed Reading. F,W,S

Directed reading which does not involve a term paper. May be repeated for credit. *The Staff*

295F. Readings in Philosophy (2 credits). F,W,S

Focuses on selected philosophical areas and/or specific philosophers. Students meet with the instructor to discuss readings and deepen their knowledge on a particular subject. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

296. Special Student Seminar. F,W,S

A seminar for graduate students arranged between students and a faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

297F. Independent Study (2 credits). F,W,S

Students submit petition to course sponsoring agency. Enrollment restricted to graduate students. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Enrollment restricted to students who have advanced to candidacy. May be repeated for credit. *The Staff*

Physical and Biological Sciences

204 Natural Sciences 2 Annex

(831) 459-2931

<http://pbsci.ucsc.edu>

Program Description

A broad range of majors is offered through the physical and biological sciences. The intellectual rigor of these majors ensures that our graduates are well prepared for further studies in graduate and professional schools, as well as careers in scientific research, environmental research, medicine, law, engineering, technology, and business.

The Division of Physical and Biological Sciences' interdisciplinary framework provides students with the opportunity to attend classes and pursue research that ranges from the study of atoms to the examination of distant galaxies. From abstract number theory to the development of new chemical compounds, from evolution to plate tectonics, we provide students not only with the skills to explore and discover the world but also to define and improve it.

Departments and programs affiliated with the Division of Physical and Biological Sciences include the Departments of Astronomy and Astrophysics; Chemistry and Biochemistry; Earth and Planetary Sciences; Ecology and Evolutionary Biology; Microbiology and Environmental Toxicology; Mathematics; Molecular, Cell, and Developmental Biology; Ocean Sciences; Physics; and the Science Communication Program.

Physical Education

East Field House

(831) 459-2531

<http://www.ucsc.edu/opers>

Faculty and Professional Interests

Executive Director

RYAN ANDREWS

Faculty

RENA V. COCHLIN

International folk dance, Mexican dance, modern dance, ballet, yoga, pilates

Physical Education Instructor

RYAN ANDREWS

Weight training, wellness and physical conditioning

JOHN BARDOS

Racquetball

COURTNEY BLACKBURN

Tai chi ch'uan, fencing

CHELSEA GEORGE

Racquetball

LILLIAN HALLOCK

Weight training, physical conditioning

TODD M. HAMMONDS

Weight training

ROBERT W. HANSEN

Racquetball, tennis, basketball

GABRIELLE KILBURN

Boating

JULIE KIMBALL

Yoga, swimming

RUSSELL KINGON

Sailing, rowing

DANIELLE LEWIS

Weight training, wellness

JOAN R. MCCALLUM

Swimming, lifeguard training, water safety

CYNTHIA MORI

Weight training, physical conditioning, wellness

KIM MUSCH

Swimming, lifeguard training, water safety

LISA K. NORRIS

Jazz dance, ballet

MICHAEL RONEARE

Soccer

YOSHIHITO SHIBATA

Aikido

CECILIA SHIN

Scuba

Program Description

Physical education offers students an opportunity to learn and improve skills in a variety of areas while gaining knowledge about the relationship between fitness and wellness. With this information, participants will be better prepared to make important choices leading to healthy lifestyles.

Physical education courses at UCSC, which are elective and without academic credit, are offered in a wide variety of activities. The courses consist of instruction, practice, and full participation consistent with each student's ability. While many of the courses are for students at the beginning level, some are designed for the more advanced student. Most courses involve class meetings of one hour's length, twice a week; but some consist of one and one-half hours twice a week or a single two-hour meeting per week. Students may enroll in as many courses as they desire and are permitted to repeat any course.

Students desiring more activity are encouraged to participate in a sports or recreation club; the intramural, recreation, or wellness programs; or an intercollegiate athletic team.

Lower-Division Courses

5A. Aquatics: Swimming Level I (no credit). F,W,S

Coeducational. Water exploration and primary skills development. Course is designed to teach only

"non-swimmers" how to swim. The following is taught: Red Cross swimming instruction in overcoming fears, water adjustment, floating, breath holding, and rhythmic breathing. Skills to be learned are: water entries, sculling, treading, elementary backstroke, freestyle, methods of water safety, and survival techniques. Prerequisite(s): instructor determines skill level at first class meeting. Enrollment limited to 15. *J. Kimball*

5B. Aquatics: Swimming Level II (no credit). F,W,S

Coeducational. Stroke readiness and development. Course is for those who have completed Swimming Level I or who can swim freestyle and demonstrate elementary backstroke. Skills to be learned are underwater swimming, turns, improvement of freestyle and elementary backstroke, beginning side stroke, backstroke, breast-stroke, diving, personal safety skills, and basic rescue techniques. Prerequisite(s): instructor determines skill level at first class meeting; pass Swimming Level I course or demonstrate equivalent skills. Students pay a course fee. Enrollment limited to 20. *J. Kimball, J. McCallum*

5C. Aquatics: Swimming Level III (no credit). F

Coeducational. Stroke refinement and skill proficiency. Course teaches refinement of basic strokes and introduces butterfly, plus backstroke, surface diving, turns, endurance swimming, and survival techniques. Prerequisite(s): instructor determines skill level at first class meeting; pass in Swimming Level II course or possess equivalent skills in freestyle, sidestroke, elementary backstroke, and breast-stroke. Enrollment limited to 30. *J. McCallum*

5D. Aquatics: Swimming Level IV (no credit). W,S

Coeducational. Advanced skills. Designed to perfect the techniques and skills of all basic strokes plus butterfly, surface dives, survival swimming, basic diving, endurance swimming, and personal and rescue skills. Prerequisite(s): pass in Swimming Level III course or possess equivalent swimming skill requirements in freestyle, backstroke, sidestroke, or competitive swimming; instructor determines skill level. Enrollment limited to 30. *J. McCallum*

5E. Aquatics: Lifeguard Training (LT) (no credit). F,S

Red Cross certified lifeguard training. Provides the necessary minimum skills training to qualify as a non-surf lifeguard. Certification includes CPR Pro, AED, PDT, D2, ADMIN, and Title 22 First Aid. Candidates must successfully pass final skill tests and written final exam with 80 percent score. Students are billed for a course fee. Prerequisite(s): must have ability to swim 500 yards in ten minutes, tread water for one minute, strong swimming skills in free, back, breast, side, and elementary backstroke; must purchase Red Cross LT text book. Enrollment limited to 10. *J. McCallum, K. Musch*

5F. Water Safety Instructor (WSI) (no credit). S

Coeducational. A Red Cross course designed to certify students who complete all required work as swimming instructors. Instruction in teaching techniques, stroke analysis, skilled swimming, class organization, pool safety, and pool maintenance. Practice teaching assignments outside of class with practical and written final exams. Screening test given at first class meeting. Prerequisite(s): must be 17 years old, possess valid ARC Instructor Candidate Training card (ICT), and ARC swimmers-level skills. (Emergency Water Safety (EWS), or Lifeguard Training (LT) certificate is highly recommended). Students pay a course fee. Enrollment limited to 10. *J. McCallum, K. Musch*

5G. Aquatics: Swimming/Conditioning (no credit). F,W,S

Open to all students who wish to explore swimming as a conditioning and fitness exercise. Students should know three competitive strokes, and should be able to swim fifteen minutes without stopping. Short health and fitness lectures precede some classes. Prerequisite(s): instructor determination at first class meeting. Enrollment limited to 40. *The Staff, J. McCallum, K. Musch*

5H. Aquatics: Competitive Swimming (no credit). W

Emphasis on competitive swimming and conditioning techniques. For students who want instruction at the competitive level of swimming. Three hours per week. Prerequisite(s): instructor determination at first class meeting. Enrollment limited to 50. *K. Musch*

5R. Aquatics: Basic Scuba Diving (no credit). F,W,S

Coeducational. Sections geared toward the successful completion of NAUI Scuba Diver Certification. The course is divided into three parts: lecture, pool lab, and open water experience. Four open water training dives are offered. Emphasis is on training for open water scuba diving, using the beach as a base of operation. Students pay a course fee. Prerequisite(s): pass swimming skills tests and medical clearance. It is strongly recommended that students enroll in course 5S. Enrollment limited to 24. *C. Shin*

5S. Aquatics: Boat Scuba Diving (no credit). S

Coeducational. A minimum of two days of boat diving is offered. Emphasis is on training for open water scuba diving using a boat as the base of operation. There is a charge for the boat charter which varies from quarter to quarter. Prerequisite(s): basic SCUBA certification and receive medical clearance. Enrollment limited to 20. *C. Shin*

5T. Aquatics: Advanced Scuba Diving (no credit). F,S

Coeducational. Sections are offered to facilitate the development of the basic scuba diver's open water techniques. A minimum of six open water experiences is offered. Course is geared toward successful completion of NAUI Advanced Scuba Diver Certification. Students pay a course fee. Prerequisite(s): course 5R or pass swimming skills test and medical clearance. Enrollment limited to 25. *C. Shin*

5U. Aquatics: Scuba Instruction (no credit). F,W,S

Coeducational. A course designed for the experienced scuba student who wishes to assist with the scuba instruction program at UCSC. Topics covered include teaching techniques, skin and scuba techniques, rescue techniques, and safety procedures. Specialty labs also offered in conjunction with course which cover a variety of diving skills. Students pay a course fee. Students are required to enroll in one lab section per quarter. Supervised teaching experience is also provided. Prerequisite(s): Basic Scuba Certification and special prerequisite checking by instructor. Enrollment limited to 30. *C. Shin*

9B. Boating: Beginning Dinghy Sailing (no credit). S

Coeducational. Introductory course in practical boating safety using 15-foot sailboats. Includes introduction to rigging, nomenclature, seamanship, proper boat-handling techniques, and general boating and aquatic safety. Satisfactory completion meets prerequisites for intermediate-level dinghy course. Students pay a course

fee. Prerequisite(s): swimming ability. (Formerly *Boating: Basic Sailing*) Enrollment limited to 18. *G. Kilburn, R. Kingon*

9C. Boating: Intermediate Dinghy Sailing (no credit). F,W,S

Coeducational. Course includes a review of basic sailing with an emphasis on the further development and refinement of small-boat sailing techniques. Fifteen-foot sailboats are used with two students per boat. Students pay a course fee. (Formerly *Boating: Intermediate Sailing*) Prerequisite(s): course 9B or equivalent skills. Enrollment limited to 16. *G. Kilburn, R. Kingon*

9D. Boating: Advanced Dinghy Sailing (no credit). F,S

Coeducational. For students interested in high-performance sailing using Flying Juniors and Coronado 15s. Includes special techniques used in racing conditions. Students pay a course fee. (Formerly *Boating: Advanced Sailing*) Prerequisite(s): course 9C or equivalent skills. Enrollment limited to 12. *G. Kilburn, R. Kingon*

9E. Boating: Competitive Sailing (no credit). F

Coeducational. Instruction and coaching at the advanced sailing level in racing dinghies and keelboats. Emphasis on the physical and mental requirements for racing sailboats and the technical aspects of sail racing. Students will be involved in intercollegiate competition. Prerequisite(s): advanced sailing ability. *R. Kingon*

9H. Boating: Basic Rowing (no credit). F,W,S

Coeducational. Course designed to cover types of rowing boats, nomenclature, fundamental skills, and specific safety and rescue aspects related to the activity. Students will row singly as well as in groups using 15-foot to 22-foot rowing dories. (Formerly course 9J.) Students pay a course fee. Prerequisite(s): swimming ability. Enrollment limited to 12. *G. Kilburn, R. Kingon*

9J. Boating: Intermediate Rowing (no credit). S

Coeducational intermediate course designed to cover more advanced rowing techniques and the skills needed for safe open water rowing. Students pay a course fee. Prerequisite(s): basic rowing or permission of instructor. (Formerly course 9H.) Enrollment limited to 11. *G. Kilburn, R. Kingon*

9K. Boating: Ocean Kayaking (no credit). F,W,S

Co-educational course that teaches novice kayakers the skills to safely use UCSC kayaks in the Monterey Bay. Topics include: basic paddling strokes and maneuvers; self and assisted deep-water rescues; beach launching; landing through surf; and marine hazards and navigation. Students pay a course fee. Enrollment limited to 12. *D. Johnston, R. Kingon*

9S. Boating: Intermediate Keelboat Sailing (no credit). F,W,S

Coeducational. Combines hands-on rigging and docking practice in the harbor and sailing practice on Monterey Bay with instruction in sail-trimming, de-powering, powering-up, person-overboard recovery techniques, boating safety, weather, ocean conditions, sailing theory, rigging, navigation, and the maritime rules of the road. Twenty-seven foot, ultralight, displacement keelboats are used. Students pay a course fee. Prerequisite: course 9C. Enrollment limited to 16. *R. Kingon*

9T. Boating: Advanced Keelboat Sailing (no credit). F,S

Coeducational. Further development and refinement of boat-handling techniques, including advanced maneuver-

ing, anchoring, and racing with an introduction to the use of spinnakers. Students pay a course fee. Prerequisite(s): course 9S. Enrollment limited to 12. *R. Kingon*

15B. Court Sports: Basketball (no credit). F,W,S
Coeducational. Instruction in fundamentals, offensive and defensive strategies, rules, and conditioning designed primarily for beginning and intermediate level players. Enrollment limited to 20. *The Staff, R. Hansen*

15H. Court Sports: Racquetball (no credit). F,W,S
Coeducational. The beginning section provides an introduction to the basic knowledge and skills involved in this indoor racquet sport. The advanced beginning section continues the development of the basic skills emphasizing increased shot variety and advanced strategy. The intermediate section offers the opportunity for further skill development and introduces more advanced offensive skills. Enrollment limited to 18. *J. Bardos, C. George*

15N. Court Sports: Tennis (no credit). F,W,S
Coeducational. The beginning section introduces the basics of forehand, backhand, and serve. Advanced beginning section reviews these basics and introduces the volley, overhead, and lob. The intermediate section reviews all stroke mechanics and covers basic singles and doubles strategy. The advanced section includes use of spins, practice principles, detailed stroke analysis, and advanced play situations. Competitive Tennis is a year-long program for members of the intercollegiate tennis teams. Students pay a course fee. Enrollment limited to 24. *The Staff, R. Hansen*

15T. Court Sports: Volleyball (no credit). F,W,S
Coeducational. Beginning/intermediate, intermediate, and advanced sections are offered for students who desire to learn and improve the basic skills, as well as to understand the rules. Competitive section is open to students interested in participation in the UCSC NCAA Women's Volleyball team. It covers information and practice in all aspects of the competitive volleyball season. Enrollment limited to 25. *The Staff*

20A. Dance: Ballet (no credit). F,W,S
Coeducational. Sections offered at various technical levels graded from I to III. Emphasis on principles of movement, style, and execution of ballet technique. Section in ballet repertory where advanced students have the opportunity to perform is offered in the spring quarter. Students pay a course fee. *The Staff, R. Cochlin, L. Norris*

20B. International Folk Dance (no credit). F,W,S
Coeducational. International folk dance with an emphasis on Balkan and Israeli dances. Sections are also offered periodically in Mexican dance. *R. Cochlin*

20B. International Folk Dance (no credit). F,W,S
Coeducational. International folk dance with an emphasis on Balkan and Israeli dances. Sections are also offered periodically in Mexican dance. *R. Cochlin*

20C. Dance: Jazz (no credit). F,W,S
Coeducational. Sections offered at various technical levels graded from I to III. Exploration of jazz dance emphasizing basic technique, styling, rhythm, and isolations. Jazz and contemporary music is used as accompaniment. Some background in ballet strongly recommended before continuing to Jazz II or III. Section in jazz dance repertory where advanced students have the opportunity to perform is offered in spring quarter. Students pay a course fee. Enrollment limited to 40. *The Staff, L. Norris*

20D. Dance: Modern (no credit). F,W,S
Coeducational. Sections offered at various technical levels graded from I to III. Emphasis on basic techniques and building phrases of movement. Section in choreography and improvisation offered in spring quarter. Section in dance repertory offered periodically. Students pay a course fee. *The Staff, R. Cochlin*

20F. Dance: Individual Studies in Dance (no credit). F,W,S
Coeducational. Designed to give students the opportunity of pursuing their particular interests in the field of dance with the support and direction of a faculty member. Prerequisite(s): instructor determination at first class meeting. *R. Cochlin, L. Norris*

25A. Fencing: Épée (no credit). F,W,S
Coeducational. Basic instruction in the techniques, strategy, and general methodology of modern épée fencing. Emphasis on épée fencing as a development from the traditional French and Italian dueling sword styles as they have evolved to form the modern electrical épée game. Students pay a course fee. *C. Blackburn*

25B. Fencing: Foil (no credit). F,W,S
Coeducational. Instruction in modern competitive French-Italian foil techniques for beginning, intermediate, and advanced levels. Emphasis on physical and mental conditioning leading to improved skill in recreational and competitive areas of involvement. Students pay a course fee. *C. Blackburn*

25C. Fencing: Sabre (no credit). F,W,S
Coeducational. Instruction and practice in basic offensive and defensive skills of modern Hungarian sabre technique. Emphasis on physical and mental conditioning as a foundation for more advanced levels of instruction. Preparation for recreational and competitive involvement. Students pay a course fee. *C. Blackburn*

28K. Field Sports: Soccer (no credit). F,W,S
Coeducational/Women's. Sections are offered in field soccer and indoor soccer. Instruction in the basic techniques, tactics, laws of the game, and injury prevention for beginners and advanced players. Prerequisite(s): determination at first class meeting. *The Staff, M. Rumeare*

30G. Fitness Activities: Physical Conditioning (no credit). F,W,S
Coeducational. An exercise course designed to increase the participants' strength, flexibility, coordination, and cardiovascular endurance. Special attention is given to understanding and utilizing sound and safe principles of body alignment and movement. Courses include, but not limited to: Pilates, cardio boxing, stretch and strengthen, and aerobics. *L. Hallock, R. Andrews, C. Mori, R. Cochlin*

30H. Fitness Activities: T'ai Chi Ch'uan (no credit). F,W,S
Through balanced movement and breath control, T'ai Chi Ch'uan attempts to forestall many processes of aging by cultivating greater strength of body, mind, and spirit. *C. Blackburn*

30J. Fitness Activities: Weight Training (no credit). F,W,S
Coeducational. An introduction to safe and effective methods of using weight training and other personal conditioning activities. Topics covered include proper weight training techniques, care of body and equipment, and elementary exercise physiology. *L. Hallock, R. Andrews, C. Mori, D. Lewis, T. Hammonds*

30L. Fitness Activities: Yoga Exercises (no credit). F,W,S
Coeducational. Sections offered at beginning, continuing beginning, and advanced beginning levels of Hatha Yoga. *J. Kimball, R. Cochlin*

43A. Martial Arts: Aikido (no credit). F,W,S
Coeducational. A nonviolent, noncompetitive Japanese martial art emphasizing mind-body harmony, balance, relaxation, and the understanding of vital energy. Aikido self-defense techniques aim toward the creative resolution of conflict and the growth of the individual. Sections offered at beginning and experienced levels. *Y. Shibata*

43G. Martial Arts: Tae Kwon Do (Karate) (no credit). *
Coeducational. Sections offered at the beginning and intermediate/advanced levels. Covering basic skills, knowledge, and philosophy of Tae Kwon Do and providing instruction in the following aspects of martial arts study: fundamental techniques of self-defense, physical conditioning, emotional control, self-discipline, and self-confidence. Enrollment limited to 35. *The Staff*

50. Personal Fitness and Wellness (no credit). *
Designed to improve the overall health of each participant. Course material will touch on all the major components of wellness: physical, emotional, social, spiritual, and intellectual health. Topics include cardiovascular training, strength training, flexibility, fitness testing, stress reduction, nutrition, and recreation. Enrollment limited to 20. *The Staff, R. Andrews, C. Mori, D. Lewis*

Physics

211 Interdisciplinary Sciences Building
(831) 459-2329
<http://physics.ucsc.edu>

Faculty and Professional Interests

Professor

THOMAS BANKS
String and particle theory, quantum gravity, and cosmology

DAVID P. BELANGER
Experimental condensed matter physics, phase transitions

FRANK G. BRIDGES, Emeritus

GEORGE BROWN, Emeritus

SUE A. CARTER
Experimental condensed matter physics, polymer physics, molecular electronics, phase transitions, electronic and optical properties of materials

JOSHUA M. DEUTSCH
Condensed matter theory

MICHAEL DINE
Theory of elementary particles

DAVID E. DORFAN, Emeritus

GEORGE D. GASPARI, Emeritus

HOWARD E. HABER
Theory and phenomenology of fundamental particles and their interactions

CLEMENS A. HEUSCH, Emeritus

ROBERT P. JOHNSON
Experimental high-energy physics, astrophysics

ONUTTOM NARAYAN

Theoretical condensed matter physics

MICHAEL NAUENBERG, Emeritus

JOEL R. PRIMACK

Theory of fundamental particles, cosmology, astrophysics

BRUCE ROSENBLUM, Emeritus

MATTHEW SANDS, Emeritus

ZACK SCHLESINGER

Experimental condensed matter physics, infrared and optical spectroscopy, strongly correlated electron systems, novel materials, negative thermal expansion, underconstraint and geometrical frustration

BRUCE SCHUMM

Experimental particle physics

PETER L. SCOTT, Emeritus

ABRAHAM SEIDEN

Experimental high-energy physics

B. SHASTRY

Condensed matter physics, strongly correlated matter, Mott-Hubbard physics, high T_c superconductivity, quantum magnetism, exactly integrable systems, exactly solvable models of many-body systems and in statistical mechanics, quantum chaos, geometric frustration

A. PETER YOUNG

Condensed matter theory, statistical mechanics

Associate Professor

ANTHONY AGUIRRE

Cosmology of the early and late universe: inflation and the global structure of cosmological models; the intergalactic medium and its enrichment with heavy elements; galaxy formation, evolution, and feedback processes; dark matter; theories of modified gravity

DAVID M. SMITH

High-energy astrophysics; X-ray and gamma-ray detectors and instrumentation; solar, terrestrial, and planetary sources of gamma radiation

Assistant Professor

GEY-HONG GWEON

Experimental condensed matter physics

JASON NIELSEN

Experimental high-energy physics

STEFANO PROFUMO

Theory of particle physics and particle astrophysics

Lecturer

FRED KUTTNER

Foundations of quantum mechanics; physics education



Professor

GEORGE R. BLUMENTHAL (Astronomy and Astrophysics)

Cosmology, galaxy formation, high-energy astrophysics

WENTAI LIU (Electrical Engineering)

Retinal prosthesis, biomimetic systems, integrated neuro-electronics, molecular electronics, CMOS and SOI transceiver design, current mode band limited signaling, microelectronic sensor, timing/clock recovery and optimization, noise characterization and modeling, and computer vision/image processing

WILLIAM G. MATHEWS (Astronomy and Astrophysics)

Galaxies, high-energy astrophysics, gaseous nebulae; cornetto (music)

RICHARD MONTGOMERY (Mathematics)

Celestial mechanics, differential geometry, gauge theory, mechanics (quantum and classical), and control theory

ALI SHAKOURI (Electrical Engineering)

Quantum electronics, nano- and microscale heat and current transport in semiconductor devices; thermoelectric/thermionic energy conversion; renewable energy sources; thermal imaging; micro-refrigerators on a chip; and optoelectronic integrated circuits

Associate Professor

JOEL A. KUBBY (Electrical Engineering)

Micro-Electro-Mechanical-Systems (MEMS), adaptive optics, integrated optics, bio-MEMS

Assistant Professor

PASCAL GARAUD (Applied Mathematics and Statistics)

Astrophysics, geophysics, fluid dynamics, numerical resolutions of differential equations, and mathematical modeling of natural flows

HOLGER SCHMIDT (Electrical Engineering)

Integrated optics for biomedicine and quantum optics, nano-mageto-optics, semiconductor physics, optoelectronic and photonic devices, ultrafast optics, quantum interference

JOHANNES WALCHER (Mathematics)

String theory, mirror symmetry, mathematical and particle physics

Adjunct Professor

WILLIAM ATWOOD

DONALD COYNE, Emeritus

ALAN LITKE

MICHAEL RIORDAN

HARTMUT F.-W. SADROZINSKI

TERRY L. SCHALK

DAVID A. WILLIAMS

Research Physicist

AL EISNER, Emeritus

VITALIY FADEYEV

ALEXANDER GRILLO

WILLIAM LOCKMAN

TROY PORTER

ALEXANDER SHER

Postgraduate Research Physicist

SERENA BERTONE

LINDA CARPENTER

SOFIA CHOURIDOU

GUIDO FESTUCCIA

DEBBIE GUNNING

PAWEL HOTTOWY

PATRIK JONSSON

JOVAN MITREWSKI

NEPOMUK OTTE

PABLO SAZ PARKINSON

LEI WANG

MARCUS ZIEGLER

Program Description

Physics seeks to discover the fundamental regularities or “laws” that govern our universe and to apply these laws to explain the behavior of fundamental and complex systems. The same underlying principles describe the behavior of atoms, lasers, living cells, and galaxies. Physics is, therefore, at the base of all modern science and technology, and, even at an elementary level, this fundamental nature can be appreciated.

The Physics Department offers majors in physics; physics (astrophysics), referred to subsequently as astrophysics; and applied physics. These programs prepare students for graduate work in physics, astrophysics, and astronomy; for engineering and other technical positions in industry; and for careers in education. With appropriate courses in other disciplines, these majors provide excellent preparation for advanced study in technical subjects such as biology, chemistry, engineering, geophysics, and the philosophy of science. The applied physics major is excellent preparation for positions in industry directly upon graduation.

Physics students and faculty often interact closely in both formal and informal settings. All undergraduate physics majors have the opportunity to work individually with a faculty member in completing the senior thesis requirement.

The main areas of physics research at UCSC are the study of fundamental particles and interactions (high-energy physics), the study of condensed matter physics, and astrophysics/cosmology.

Efforts in high-energy physics are aided by the presence of an organized research unit, the Santa Cruz Institute for Particle Physics (SCIPP). The SCIPP experimentalists play significant roles in experiments at some of the major accelerator laboratories in the world, including SLAC at Stanford University and the European centers at CERN and DESY. The SCIPP theorists are active in the phenomenology of high-energy particle interactions; the theory of strong and electroweak interactions; electroweak symmetry breaking and Higgs bosons; and theories of supersymmetry, superstrings, and gravity. SCIPP also maintains a vigorous program in particle astrophysics. SCIPP theorists are involved in research in high-energy astrophysics, dark matter, formation of galaxies and large-scale structure in the universe, and theories of cosmology. SCIPP experimentalists are playing an important role in creating the next major satellite for gamma-ray astronomy, the Gamma Large Area Space Telescope (GLAST). In addition, SCIPP experimentalists, working with colleagues at Los Alamos, conduct a thriving particle astrophysics program detecting TeV gamma rays.

The presence of the strong astrophysics group from the Astronomy and Astrophysics Department in the same building provides a healthy symbiosis in this area. Note that the Astronomy and Astrophysics Department does not offer an undergraduate major. UCSC is the headquarters for the University of California Observatories, which include Lick Observatory near San Jose and the Keck Observatory in Hawaii; these provide additional opportunities for collaboration between researchers in physics and astronomy.

Condensed matter physics research at UCSC covers a range of topics including the behavior of exotic many-electron systems (for example, superconductors); the study of magnetic phase transitions; the organization of complex systems (proteins, DNA, and polymers); the development of new electronic devices using novel materials (e.g., polymer-based LEDs); and research in biophysics.

The experimental program uses X-ray and synchrotron radiation techniques at facilities such as the Stanford Synchrotron Radiation Laboratory (SSRL); neutron scattering techniques at various national laboratories; and microwave, optical, X-ray, and specific heat techniques at UCSC. Topics include phase transitions, crystal defects, correlated electron systems, negative thermal expansion materials, polymer LEDs, and thermoelectric materials. Research topics in theoretical condensed matter physics include the behavior of high-temperature superconductors, phase transitions, and the dynamics of polymers such as DNA. Undergraduate students are actively involved in several condensed matter physics laboratories.

Courses

An undergraduate physics education is broad and basic. Undergraduate students, even in introductory classes, are exposed to new ideas associated with explorations at the boundaries of human knowledge. Physics 10 is a 2-credit survey course that provides an overview of the research activities of the physics faculty. It is recommended for all beginning physics majors and those considering the major.

The lower-division introductory courses in the major programs (Physics 5A, 5B, 5C, and 5D sequence) are well suited to students in the physical sciences and engineering. The 6A, 6B, 6C sequence, which also provides a calculus-based introduction to the basic concepts in physics, is better suited to students in the life sciences. The Physics 6 sequence is also appropriate for nonscience students who have a calculus background. Students who take Physics 6A instead of Physics 5A, and do very well in it, may contact the department chair for permission to enter the major. The Physics 7A-7B sequence is an algebra- and trigonometry-based sequence covering the basic ideas and applications of physics. The laboratory courses, 5L-5M-5N, 6L-6M-6N, and 7L-7M, must be taken concurrently with the corresponding lecture courses. Finally, Physics 1 and 2 are conceptual introductions to physics for nonscience majors.

Major Program

The physics, astrophysics, and applied physics major programs provide a comprehensive coverage of the field and the background necessary for graduate school or industrial careers. Students earn a bachelor of science (B.S.) degree. The UCSC physics, astrophysics, and applied physics programs begin with a four-quarter presentation of the introductory concepts of the subject, Introduction to Physics. (Note: the applied physics program also requires completion of a beginning programming course and a general chemistry course.) This is followed by courses which provide an introduction to relativity and quantum physics. The programs continue with a three-quarter sequence in mathematical methods of physics designed to provide the mathematics preparation necessary for most of the upper-division physics courses required for the majors. Included in the upper-division programs are two intensive laboratory courses designed to illustrate both historical experiments in the development of physics, astrophysics, and applied physics, and modern experimental methods. Advanced and especially motivated students may enroll in some graduate courses with the approval of the instructor.

The senior thesis, required of all physics, astrophysics, and applied physics majors at UCSC, provides the opportunity for students to apply their skills to problems of interest to them, either theoretical or experimental, usually with technical advice from a

faculty member. The senior thesis may be based on work undertaken in a faculty research laboratory. Topics have included particle physics, condensed matter physics, astrophysics, biophysics, and various applied technologies. The senior thesis is a distinctive part of the UCSC physics major program and entails a substantial investment of both student and faculty time. The learning experience involved in the thesis, as well as the thesis itself, has proven extremely valuable to students in enhancing employment opportunities upon graduation or in gaining admission to graduate school.

Course Requirements

Physics

The requirements for the major include Physics 5A/L, 5B/M, 5C/N, and 5D; Mathematics 19A or 20A, 19B or 20B, 23A, and either 23B or Physics 14; plus the following upper-division courses: 101A-B, 105, 110A-B, 112, 116A-B-C, 133, 134, and 139A. In addition, students must pass at least two upper-division electives chosen from physics or the following astronomy and astrophysics courses: 112, 113, 117, or 118. At least one of the two electives must be from the following physics courses: 129, 139B, 155, or 171. In some cases, the second elective requirement may be satisfied by an approved upper-division science or engineering course.

Physics (Astrophysics)

The requirements for the major include Physics 5A/L, 5B/M, 5C/N, and 5D; Mathematics 19A or 20A, 19B or 20B, 23A, and either 23B or Physics 14; plus the following upper-division courses: 101A-B, 105, 110A-B, 112, 116A-B-C, 133, 135, and 139A. In addition, students must pass at least three upper-division electives selected from the following upper-division courses: Astronomy and Astrophysics 112, 113, 117, 118, or 171 (cross-listed with Physics 171).

Applied Physics

The requirements for the major include Physics 5A/L, 5B/M, 5C/N, and 5D; Mathematics 19A or 20A, 19B or 20B, 23A, and either 23B or Physics 14; Computer Science 5C; Chemistry 1A; plus the following upper-division physics courses: 101A-B, 105, 110A-B, 112, 116A-B-C, 133, and 134. In addition, students must pass at least three upper-division applied physics electives selected from the following approved list of courses: Electrical Engineering 103, 127, 128, 145, Physics 107, 109, 115, 152, 155, 156, and 160; or other courses with approval from a faculty adviser.

Comprehensive Requirement

Finally, to satisfy the comprehensive requirement (see below) via a thesis, Physics 195A and 195B are required. Note that successful completion of 195A and 195B satisfies the "W" or Writing Intensive general education requirement.

In special cases, minor modifications of these requirements may be granted to suit the specific program of a particular student. Before embarking on a program needing such waivers, students should discuss their plans with a physics adviser and seek approval by petition from the Physics Department office.

Sample Physics Major Planner

The following is a recommended academic plan for students to complete during their four years to fulfill requirements for the physics major.

Year	Fall	Winter	Spring
1st (frsh)	Math 19A or 20A Phys 5A/L Phys 10 (recommended)	Math 19B or 20B Phys 5B/M	Math 23A Phys 5C/N
2nd (soph)	Phys 101A Phys 5D (2 units) Math 23B	Phys 101B Phys 116A	Phys 116B Phys 133*
3rd (jr)	Phys 105 Phys 116C Phys 134*	Phys 110A Phys 112	Phys 110B Phys 139A
4th (sr)	Phys 195A Phys elective**	Phys 195B Phys elective**	

* Course 133 is offered winter and spring quarters. Course 134 is offered fall and winter quarters and may be taken junior or senior year after completing course 133.

** Students should look into taking electives earlier where possible, as some courses are only offered every alternate year.

Sample Physics (Astrophysics) Major Planner

The following is a recommended academic plan for students to complete during their four years to fulfill requirements for the astrophysics major.

Year	Fall	Winter	Spring
1st (frsh)	Math 19A or 20A Phys 5A/L	Math 19B or 20B Phys 5B/M	Math 23A Phys 5C/N
2nd (soph)	Phys 101A Phys 5D (2 units) Math 23B	Phys 101B Phys 116A	Phys 116B Phys 133*
3rd (jr)	Phys 105 Phys 116C Phys 135*	Phys 110A Phys 112	Phys 110B Phys 139A Astr elective**
4th (sr)	Phys 195A Astr elective**	Phys 195B Astr elective**	

* Physics 133 is offered winter and spring quarters. Physics 135 is offered some academic years as a multiple-term course: 135A in fall and 135B in winter or spring, depending on astronomical conditions.

** Students should look into taking electives earlier where possible, as some courses are only offered every alternate year.

Sample Applied Physics Major Planner

The following is a recommended academic plan for students to complete during their four years to fulfill requirements for the applied physics major.

Year	Fall	Winter	Spring
1st (frsh)	Math 19A or 20A Phys 5A/L	Math 19B or 20B Phys 5B/M	Math 23A Phys 5C/N Cmps 5C
2nd (soph)	Phys 101A Phys 5D (2 units) Math 23B	Phys 101B Phys 116A Chem 1A	Phys 116B Phys 133*
3rd (jr)	Phys 105 Phys 116C Phys 134*	Phys 110A Phys 112	Phys 110B Apph elective** Phys 11 (recommended)
4th (sr)	Phys 195A Apph elective**	Phys 195B	Apph elective**

* Course 133 is offered winter and spring quarters. Course 134 is offered fall and winter quarters and may be taken junior or senior year after completing course 133.

** Students should look into taking electives earlier where possible, as some courses are only offered every alternate year.

Students who take Physics 6A instead of Physics 5A, and do very well in it, may contact the department chair for permission to enter the major.

Depending on the student's interests, further preparation for graduate school in physics, astrophysics, applied physics, or for other careers is obtained by

electing more specialized or applied courses (see the descriptions of courses below). In addition, again depending on the student's academic focus, elective courses may be selected in mathematics, astronomy and astrophysics, and/or other areas of physical science.

For further information about the physics program, please request the undergraduate handbook, A Physics Major's Guide, from the Physics Department office, or look for it online at <http://physics.ucsc.edu>.

Comprehensive Requirement

The comprehensive exit requirement is normally satisfied by the submission and approval of a thesis (in conjunction with Physics 195). For physics majors completing either a major or a minor in another field within the Physical and Biological Sciences Division or the Baskin School of Engineering, the comprehensive requirement may be satisfied by scoring at or above the 50th percentile on the Graduate Record Examination Physics Subject Test.

Minor Requirements

Requirements for the minor in physics include Physics 5A/L, 5B/M, 5C/N, 5D (or Physics 6A/L, 6B/M, 6C/N with minimum GPA of 3.5); Mathematics 19A or 20A, 19B or 20B, 23A, 23B or Physics 14; Physics 101A, 101B, 133, and one upper division elective (and any prerequisites) from physics or from a list of courses from other departments approved by the Physics Undergraduate Committee. See the Physics Department for the listing.

Advising and Preparation for the Major

Because the courses for the physics major are sequential, it is strongly advised that students declare their major in physics, astrophysics, or applied physics as early as possible (either at initial registration or by the end of the first year). Advising can be arranged through the Physics Department office.

High school students coming directly to UCSC should emphasize their mathematics preparation with the expectation that they will take calculus in their first quarter at UCSC in order to concurrently take the Physics 5 series, calculus-based physics for physics majors.

Students transferring to UCSC as junior physics, astrophysics, or applied physics majors should have completed three quarters of introductory calculus-based physics with laboratory and three quarters of calculus. It is also desirable to have an introductory course in modern physics as well as mathematics courses in linear algebra, vector calculus, and differential equations. The Physics Department advises each junior transfer student individually upon their arrival.

Graduate Programs

The Physics Department offers graduate programs leading to the M.S. and/or the Ph.D. degrees. In the first year of study, Ph.D. students are expected to take two core graduate-level courses per quarter, including the courses required for the Ph.D. degree (210, 212, 214, 215, 216, 219) and other courses specific to the student's field of interest. All first-year students also take 205, Introduction to Research. All graduate students also attend a weekly colloquium, 292. Each student has a faculty adviser who helps to determine which courses are most appropriate, taking into account the student's background and interests. The student-faculty ratio is low so that M.S. and Ph.D. students can work closely with faculty and pursue programs that fit their

individual needs. Research is currently conducted in theoretical and experimental particle physics, theoretical and experimental condensed matter physics (including materials physics, biophysics, and synchrotron radiation), and in theoretical and experimental high-energy astrophysics (including cosmology). After passing a written qualifying examination, Ph.D. students pursue independent research leading to an oral examination and completion of a doctoral dissertation.

Students may obtain a master's degree through course work (eight physics graduate courses) and submission of an approved thesis. The thesis may be waived by passing four sections of the written Ph.D. qualifying examination. Master's candidates are encouraged to write a research thesis and may do so in any of the research fields in the program, thereby developing laboratory and computational skills in areas such as electronics design, computer simulation and visualization, cryogenics, X-ray scattering, complex novel materials and devices, or materials science. Each M.S. student is assigned a faculty adviser who helps to design a course work plan suited to the interests of the student.

Physics students and faculty use a number of UCSC research facilities (described at the beginning of this section and elsewhere in this catalog): the Santa Cruz Institute for Particle Physics (SCIPP), Lick Observatory (headquartered at UCSC), the Institute of Marine Sciences, and the Institute of Tectonics. There is strong interaction with other disciplines, especially astronomy and astrophysics, biology, chemistry, Earth sciences, electrical engineering, and mathematics. Proximity to the Stanford Linear Accelerator Center and the Stanford Synchrotron Radiation Laboratory provides additional local research opportunities. UCSC faculty and graduate students also participate in research programs at CERN in Geneva, Los Alamos, Oak Ridge National Laboratory, NASA, Ames, NREL, Lucent, Xerox, IBM, Bell Labs, and other national and international laboratories.

Application materials and brochures describing the physics M.S. and Ph.D. graduate programs in more detail may be obtained by visiting our web site at <http://physics.ucsc.edu> or by contacting the Division of Graduate Studies at <http://graddiv.ucsc.edu>.

Lower-Division Courses

1. Conceptual Physics. W

Addressed to majors in non-science disciplines. Topics in classical and modern physics and the relation to physical phenomena in the world around us. Concepts are stressed, but some calculational techniques are developed. Knowledge of high school algebra is desirable. (General Education Code(s): IN, Q.) *Z. Schlesinger*

2. The Quantum Enigma. *

Addressed to non-science majors but may be of interest to science majors as well, since material is largely not covered in the regular physics program. Focus is the bizarre view of physical reality and connectedness demanded by quantum mechanics, the basis of modern physics. A brief overview of classical physics and relativity is included. Concepts are stressed, but some calculational techniques are developed. (General Education Code(s): IN, Q.) *F. Kuttner*

5A. Introduction to Physics I. F

Elementary mechanics. Vectors, Newton's laws, inverse square force laws, work and energy, conservation of momentum and energy, and oscillations. Corequisite(s): concurrent enrollment in course 5L and Mathematics 19A or 20A is required. (General Education Code(s): IN, Q.) *D. Smith*

5B. Introduction to Physics II. W

A continuation of 5A. Wave motion in matter, including sound waves. Geometrical optics, interference and polarization, statics and dynamics of fluids. Prerequisite(s): courses 5A/L and Mathematics 19A or 20A; concurrent enrollment in course 5M is required. Corequisite: Mathematics 19B or 20B. (General Education Code(s): IN.) *H. Haber*

5C. Introduction to Physics III. S

Introduction to electricity and magnetism. Electromagnetic radiation, Maxwell's equations. Prerequisite(s): courses 5A/L and Mathematics 19B or 20B. Concurrent enrollment in 5N is required. Corequisite: Mathematics 22 or 23A. Courses 5B/M recommended. (General Education Code(s): IN.) *A. Aguirre*

5D. Heat, Thermodynamics, and Kinetics (2 credits). F

Introduction to temperature, heat, and thermal conductivity, ideal gases, the first and second laws of thermodynamics, and an introduction to kinetic theory. Prerequisite(s): courses 5A/L and Mathematics 19B or 20B. *The Staff*

5I. Introduction to Physics Honors I (2 credits). F

Weekly 90-minute section covering advanced and modern topics. Topics may include the theory of relativity; complicated dynamics (air resistance, planetary dynamics, etc.); fallacies in perpetual-motion machines; the Euler disk and unusual tops; elasticity of materials applied to structures. Concurrent enrollment in course 5A is required. *The Staff*

5J. Introduction to Physics Honors II (2 credits). W

Weekly 90-minute section covering advanced and modern topics. Topics may include nonlinear oscillators and chaos; waves in deep water and inside the earth; redshift in astronomy; negative refractive index materials; photons and matter waves; holography; viscosity; and turbulence. Concurrent enrollment in course 5B is required. *The Staff*

5K. Introduction to Physics Honors III (2 credits). S

Weekly 90-minute section covering advanced and modern topics. Topics may include atmospheric electricity; shielding; tensor polarization; alternative energy sources; semiconductor devices; particle accelerators and relativistic electrodynamics; Thomson scattering; digital and analog communication. Concurrent enrollment in course 5C is required. *The Staff*

5L. Introduction to Physics Laboratory (1 credit). F

Laboratory sequence illustrating topics covered in course 5A. One three-hour laboratory session per week. Prerequisite(s): concurrent enrollment in course 5A is required. *The Staff*

5M. Introduction to Physics Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 5B. One three-hour laboratory session per week. Prerequisite(s): courses 5A/L; concurrent enrollment in course 5B is required. *The Staff*

5N. Introduction to Physics Laboratory (1 credit). S

Laboratory sequence illustrating topics covered in course 5C. One three-hour laboratory session per week. Prerequisite(s): courses 5A/L. Concurrent enrollment in 5C is required. Courses 5B/M recommended. *The Staff*

6A. Introductory Physics I. F,W

Elementary mechanics. Vectors, Newton's laws, inverse square force laws, work and energy, conservation of momentum and energy, and oscillations. Prerequisite(s): Concurrent enrollment in course 6L required. Corequisite: Mathematics 11A or 19A or 20A. (General Education Code(s): IN, Q.) (F) *G. Gweon*, (W) *The Staff*

6B. Introductory Physics II. W,S

A continuation of 6A. Wave motion in matter, including sound waves. Geometrical optics, interference and polarization, statics and dynamics of fluids. Introduction to thermodynamics, including temperature, heat, thermal conductivity, and kinetic energy. Prerequisite(s): courses 5A/L or 6A/L and Mathematics 11A or 19A or 20A; concurrent enrollment in course 6M required. Corequisite: Mathematics 11B or 19B or 20B. (General Education Code(s): IN.) (W) *The Staff*, (S) *B. Schumm*

6C. Introductory Physics III. F,S

Introduction to electricity and magnetism. Electromagnetic radiation, Maxwell's equations. Prerequisite(s): courses 6A/L or 5A/L and Mathematics 11B or 19B or 20B; concurrent enrollment in course 6N required. Corequisite: Mathematics 22 or 23A. Courses 6B/M are suggested. (General Education Code(s): IN.) (F) *F. Kuttner*, (S) *J. Deutsch*

6L. Introductory Physics Laboratory (1 credit). F,W

Laboratory sequence illustrating topics covered in course 6A. One three-hour laboratory session per week. Prerequisite(s): Concurrent enrollment in course 6A required. *The Staff*

6M. Introductory Physics Laboratory (1 credit). W,S

Laboratory sequence illustrating topics covered in course 6B. One three-hour laboratory session per week. Prerequisite(s): courses 5A/L or 6A/L; concurrent enrollment in course 6B required. *The Staff*

6N. Introductory Physics Laboratory (1 credit). F,S

Laboratory sequence illustrating topics covered in course 6C. One three-hour laboratory session per week. Prerequisite(s): courses 6A/L or 5A/L; concurrent enrollment in course 6C required; courses 6B/M are suggested. *The Staff*

7A. Elementary Physics I. W

The physics of mechanics, wave motion, temperature, pressure, and fluids. A lecture and discussion course that provides a basic foundation of physics for students whose major interest is in biology or another science. Concurrent enrollment in PHYS 7L is required. High school algebra, geometry, and trigonometry are recommended. (General Education Code(s): IN, Q.) *R. Johnson*

7B. Elementary Physics II. S

A continuation of course 7A. The physics of electricity and magnetism, optics, special relativity, quantum theory and the atom. Prerequisite(s): course 7A. Concurrent enrollment in course 7M is required. (General Education Code(s): IN.) *S. Carter*

7L. Elementary Physics Laboratory (1 credit). W

Laboratory sequence illustrating topics covered in course 7A. One three-hour laboratory session per week. Concurrent enrollment in PHYS 7A is required. *The Staff*

7M. Elementary Physics Laboratory (1 credit). S

Laboratory sequence illustrating topics covered in course 7B. One three-hour laboratory session per week. Concurrent enrollment in course 7B is required. *The Staff*

10. Overview of Physics (2 credits).

One lecture per week providing a descriptive overview of major areas in the discipline. These include fundamental particles, solid state, fluids, nonlinear dynamics, biophysics, and cosmology. Lectures by various faculty with research interests in these fields. The course is suggested for prospective physics majors, or others, before they enroll in the Physics 5 sequence. *F. Kuttner*

11. The Physicist in Industry (2 credits). *

One two-hour meeting per week. Subjects include roles of the physicist in industry, the business environment in a technical company, economic considerations, job hunting, and discussions with physicists with industrial experience. Enrollment by permission of instructor. Priority given to applied physics upper-division students; other majors if space available. Enrollment limited to 15. *F. Kuttner*, *B. Rosenblum*

14. Introduction to Vector Calculus with Applications (2 credits). *

Partial differentiation, the chain rule, multiple integrals, Jacobians, surface integrals and the divergence, line integrals and the curl, Stokes theorem, gradients and directional derivatives. Prerequisite(s): Mathematics 22 or 23A. *The Staff*

42. Student-Directed Seminar.

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

75. The Observer in Quantum Mechanics (2 credits). W

Non-mathematical seminar discussing the mysteries arising with the role of the observer in quantum mechanics. Addressed to majors in the physical or biological sciences. Covers material largely untreated in the usual science curriculum. Enrollment restricted to sophomores, juniors, seniors, and graduate students. Enrollment limited to 14. *B. Rosenblum*

80A. Physics and Psychophysics of Music. *

Fundamental theory of vibration, sound waves, sound propagation, diffraction, and interference. Free, coupled, and driven oscillations. Resonance phenomena and modes of oscillation. Fourier's theorem. Anatomy and psychophysics of the ear. Musical scales and intervals. Nature of plucked and bowed strings; guitar, violin, piano. Woodwind and brass instruments. Architectural acoustics. High school algebra and basic knowledge of musical notation recommended. (General Education Code(s): T2-Natural Sciences, Q.) *The Staff*

80C. Cosmology and Culture. *

Introduction to scientific cosmology. Examination of cultural roles of creation myths and cosmologies; examples include Zunian, Mayan, and ancient, medieval, and modern Judeo-Christian cosmologies. Possible cultural and religious repercussions of Big Bang, Gaia, and other modern origin stories. (Also offered as Crown College 80C. Students cannot receive credit for both courses.) (General Education Code(s): T7-Natural Sciences or Social Sciences.) *J. Primack*

80D. The Quantum Century. *

Survey of 20th-century physics, emphasizing quantum theory and its impact upon science and culture. Includes relativity, atomic and nuclear structure, and applications in transistors, lasers, and nuclear weapons. Ends with discussions of elementary particle physics and quantum cosmology. Aimed at non-science majors as it stresses historical and philosophical perspectives rather than calculations (only non-calculus math will be used), but will

also be of interest to science majors. (General Education Code(s): T6-Natural Sciences or Humanities and Arts, Q.) *E. Riordan*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. *The Staff*

*Upper-Division Courses***101A. Introduction to Modern Physics I. F**

Special theory of relativity. Early experiments and models in quantum physics. Introduction to concepts and calculations in quantum mechanics. Single-electron atoms. Prerequisite(s): courses 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N. *B. Schumm*

101B. Introduction to Modern Physics II. W

Topics in quantum physics, including angular momentum and spin, the Pauli exclusion principle, and quantum statistics. Applications in multi-electron atoms, molecules, solid state physics, and nuclear and particle physics. Prerequisite(s): course 14 or Mathematics 23B; course 101A; 5A/L, 5B/M, and 5C/N or 6A/L, 6B/M, and 6C/N. *F. Kuttner*

105. Mechanics. F

Particle dynamics in one, two, and three dimensions. Conservation laws. Small oscillations, Fourier series and Fourier integral solutions. Phase diagrams and nonlinear motions, Lagrange's equations, and Hamiltonian dynamics. Prerequisite(s): courses 5A/L, 5B/M, 5C/N, and 116A-B. *R. Johnson*

107. Introduction to Fluid Dynamics. W

Fundamental topics in fluid dynamics. Euler and Lagrange descriptions of continuum dynamics. Conservation laws for inviscid and viscous flows. Potential flows. Exact solutions of the Navier-Stokes equation. Boundary layer theory. Gravity waves. Students cannot receive credit for this course and Applied Mathematics and Statistics 217. (Also offered as Applied Math and Statistics 107. Students cannot receive credit for both courses.) Prerequisite(s): Applied Mathematics and Statistics 27, or courses 116A-B-C, or equivalent. *N. Brummell*

110A. Electricity, Magnetism, and Optics. W

Maxwell's equations, electrostatics, magnetostatics, induction, electromagnetic waves, physical optics, and circuit theory. Prerequisite(s): 116A-B-C. *A. Young*

110B. Electricity, Magnetism, and Optics. S

Maxwell's equations, electrostatics, magnetostatics, induction, electromagnetic waves, physical optics, and circuit theory. Prerequisite(s): course 110A, and 116A-B-C. *J. Nielsen*

112. Thermodynamics and Statistical Mechanics. W

Consequences of the first and second laws of thermodynamics, elementary statistical mechanics, thermodynamics of irreversible processes. Prerequisite(s): courses 5B/M, 5C/N, 5D, 101A, 101B, 105, and 116A-B. *B. Shastry*

115. Computational Physics. S

This course will apply efficient numerical methods to the solutions of problems in the physical sciences which are otherwise intractable. Examples will be drawn from classical mechanics, quantum mechanics, statistical mechanics, and electrodynamics. Students will apply a high-level programming language, such as Mathematica, to the solution of physical problems and develop appropriate error and stability estimates. Prerequisite(s): courses

101B, 105, 116A-B-C, or equivalent. Basic programming experience in C or Fortran. No previous experience with Mathematica is required. *A. Young*

116A. Mathematical Methods in Physics. W

Infinite series include power series, asymptotic expansions, special functions defined by an integral, complex numbers and some functions of a complex variable, topics in linear algebra including matrices and determinants, solving systems of linear equations, eigenvalue problems and matrix diagonalization, introduction to tensors. Prerequisite(s): courses 5A/L, 5B/M, 5C/N; Mathematics 23A, 23B. *S. Profumo*

116B. Mathematical Methods in Physics. S

Probability and statistics, including discrete and continuous random variables; mean and standard deviation; Gaussian, binomial and Poisson distributions; least squares fits and estimation of error bars; ordinary differential equations; series solution of differential equations including Legendre polynomials and Bessel functions; orthogonal polynomials and Sturm-Liouville problems; Fourier series. Prerequisite(s): courses 5A/L, 5B/M, 5C/N, 116A; and Mathematics 23A and 23B. *O. Narayan*

116C. Mathematical Methods in Physics. F

Calculus of variations, including Euler equations and Lagrange's equations of motion in classical mechanics; partial differential equations and boundary value problems by separation of variables; functions of a complex variable including the residue theorem and a brief discussion of conformal mapping; Fourier transforms including applications to partial differential equations; the Dirac delta function and a discussion of Green's functions; Laplace transforms. Prerequisite(s): courses 5A/L, 5B/M, 5C/N, 116A-B, Mathematics 23A and 23B. *A. Young*

120. Polymer Physics. *

Statistical properties polymers; scaling behavior, fractal dimensions; random walks, self avoidance; single chains and concentrated solutions; dynamics and topological effects in melts; polymer networks; sol-gel transitions; polymer blends; application to biological systems; computer simulations will demonstrate much of the above. Students cannot receive credit for this course and course 240. Prerequisite(s): courses 112, 116A-B-C. Offered in alternate academic years. *J. Deutsch*

129. Nuclear and Particle Physics. *

Properties and classification of the elementary particles, their weak and strong interactions, nuclear physics, high energy phenomena analyzed by quantum mechanical methods, experimental methodology. Prerequisite(s): courses 116A-B-C and 139A; students with equivalent course work may contact instructor for permission to enroll. Offered in alternate academic years. *D. Williams*

133. Intermediate Laboratory. W,S

Demonstration of phenomena of classical and modern physics. Development of a familiarity with experimental methods. Special experimental projects may be undertaken by students in this laboratory. Prerequisite(s): course 101A. (W) *D. Belanger*, (S) *D. Smith*

134. Physics Advanced Laboratory. F,W

Individual experimental investigations of basic phenomena in atomic, nuclear, and solid state physics. Prerequisite(s): courses 133 and 101B. May be repeated for credit. (W) *G. Gweon*

135. Astrophysics Advanced Laboratory. *

Introduction to the techniques of modern observational astrophysics at optical and radio wavelengths through

hands-on experiments. Offered in some academic years as a multiple-term course: 135A in fall and 135B in winter, depending on astronomical conditions. (Also offered as Astronomy and Astrophysics 135. Students cannot receive credit for both courses.) Prerequisite(s): course 133 and at least one astronomy course. Intended primarily for juniors and seniors majoring or minoring in astrophysics. *R. Dewey*

135A. Astrophysics Advanced Laboratory (3 credits). F

Introduction to techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Intended primarily for juniors and seniors majoring or minoring in astrophysics. Offered in some academic years as single-term course 135 in fall, depending on astronomical conditions. (Also offered as Astronomy and Astrophysics 135A. Students cannot receive credit for both courses.) Prerequisite(s): course 133 and at least one astronomy course. *R. Dewey*

135B. Astrophysics Advanced Laboratory (2 credits). W

Introduction to techniques of modern observational astrophysics at optical and radio wavelengths through hands-on experiments. Intended primarily for juniors and seniors majoring or minoring in astrophysics. Offered in some academic years as single-term course 135 in fall, depending on astronomical conditions. (Also offered as Astronomy and Astrophysics 135B. Students cannot receive credit for both courses.) Prerequisite(s): course 133 and at least one astronomy course. *R. Dewey*

139A. Quantum Mechanics. S

The principles and mathematical techniques of non-relativistic quantum mechanics: the Schrödinger equation, Dirac notation, angular momentum, approximation methods, and scattering theory. Offered in spring. Prerequisite(s): courses 101A, 101B, 116A-B-C. *G. Gweon*

139B. Quantum Mechanics. F

The principles and mathematical techniques of non-relativistic quantum mechanics: the Schrödinger equation, Dirac notation, angular momentum, approximation methods, and scattering theory. Offered in fall. Prerequisite(s): courses 101A, 101B, 116A-B-C and 139A. *Z. Schlesinger*

143. Supervised Teaching (2 credits). F,W,S

Supervised tutoring in selected introductory courses. Students should have completed course 101A and 101B as preparation. Students submit petition to sponsoring agency. *The Staff*

152. Optoelectronics. *

The first half of the course covers the theory of optoelectronics including wave, electromagnetic, and photon optics, modulation of light by matter, and photons in semiconductors. The second half covers applications including displays, lasers, photodetectors, optical switches, fiber optics, and communication systems. Prerequisite(s): courses 101A, 101B, and 110A. *S. Carter*

155. Solid State Physics. W

Interatomic forces and crystal structure, diffraction, lattice vibrations, free electron model, energy bands, semiconductor theory and devices, optical properties, magnetism, magnetic resonance, superconductivity. Prerequisite(s): courses 112 and 139A; students with equivalent course work may contact instructor for permission to enroll. *The Staff*

156. Applications of Solid State Physics. S

Emphasizes the application of condensed matter physics to a variety of situations. Examples chosen from subfields such as semiconductor physics, lasers, superconductivity, low temperature physics, magnetism, and defects in crystals. Prerequisite(s): courses 101A and 101B. *G. Alers*

160. Practical Electronics. S

Provides a practical knowledge of electronics that experimentalists generally need in research. The course assumes no previous knowledge of electronics and progresses according to the interest and ability of the class. Based on weekly lectures. However, with the aid of the instructor, the students are expected to learn mainly through the design, construction, and debugging of electronics projects. Students are billed a materials fee. Prerequisite(s): courses 5C and 5N or 6C and 6N. Offered in alternate academic years. *R. Johnson*

171. General Relativity, Black Holes, and Cosmology. *

Special relativity is reviewed. Curved space-time, including the metric and geodesics, are illustrated with simple examples. The Einstein equations are solved for cases of high symmetry. Black-hole physics and cosmology are discussed, including recent developments. (Also offered as Astronomy and Astrophysics 171. Students cannot receive credit for both courses.) Prerequisite(s): courses 105, 110A, 110B, and 116A-B-C. *M. Dine*

191. Teaching Practicum. F,W,S

Designed to provide upper-division undergraduates with an opportunity to work with students in lower division courses, leading discussions, reading and marking submissions, and assisting in the planning and teaching of a course. Prerequisite(s): excellent performance in major courses; instructor approval required; enrollment restricted to senior physics majors. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Prerequisite(s): upper-division standing; submission of a proposal supported by a faculty member willing to supervise. *The Staff*

195A. Senior Thesis Research (3 credits). F

A seminar course to help students explore their theses topics and plan, organize, and develop their theses. Choosing a thesis topic, preparing a work plan for the research, assembling an annotated bibliography, and writing a draft outline of the thesis. Students must complete 5 credits in the 195 series to satisfy the writing intensive (W) general education requirement. *D. Belanger*

195B. Senior Thesis Research (2 credits). W

Seminars to help students explore their theses topics and plan, organize, and develop their theses. Refining the thesis outline; preparing draft sections, preparing a written progress report; delivering an oral progress report. Students must complete 5 credits in the 195 series to satisfy the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *D. Belanger*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits).

Tutorial. May be repeated for credit. *The Staff*

Graduate Courses

205. Introduction to Research in Physics (2 credits). W

Introduction to current research opportunities at UCSC for graduate students. Topics include: elementary particle physics, condensed matter and solid state physics, high energy astrophysics, biophysics, and cosmology. Selected topics related to career development may also be included. Enrollment restricted to graduate students or by permission of instructor. *J. Primack*

210. Classical Mechanics. F

Generalized coordinates, calculus of variations, Lagrange's equations with constraints, Hamilton's equations, applications to particle dynamics including charged particles in an electromagnetic field, applications to continuum mechanics including fluids and electromagnetic fields, introduction to nonlinear dynamics. Enrollment restricted to graduate students only, except by permission of instructor. *J. Nielsen*

212. Electromagnetism I. F

Electrostatics and magnetostatics, boundary value problems with spherical and cylindrical symmetry, multipole expansion, dielectric media, magnetic materials, electromagnetic properties of materials, time-varying electromagnetic fields, Maxwell's equations, conservation laws, plane electromagnetic waves and propagation, waveguides and resonant cavities. Enrollment restricted to graduate students only, except by permission of instructor. *O. Narayan*

214. Electromagnetism II. W

Lorentz covariant formulation of Maxwell's equations, dynamics of relativistic charged particles and electromagnetic fields, scattering and diffraction. Topics in classical radiation theory: simple radiating systems radiation by moving charges, multipole radiation, synchrotron radiation, Cerenkov radiation, bremsstrahlung and radiation damping. Prerequisite(s): course 212. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *T. Banks*

215. Introduction to Non-Relativistic Quantum Mechanics. W

Mathematic introduction; fundamental postulates; time evolution operator, including the Heisenberg and Schrodinger pictures; simple harmonic oscillator and coherent states; one-dimensional scattering theory, including S-matrix resonant phenomena; two-state systems, including magnetic resonance; symmetries, including rotation group, spin, and the Wigner-Eckart theorem; rotationally invariant problems, including the hydrogen atom; gauge invariance, including Landau levels; introduction to path integral. Enrollment restricted to graduate students only, except by permission of instructor. *O. Narayan*

216. Advanced Topics in Non-Relativistic Quantum Mechanics. S

Approximate methods: time-independent perturbation theory, variational principle, time-dependent perturbation theory; three-dimensional scattering theory; identical particles; permutation symmetry and exchange degeneracy, anti-symmetric and symmetric states; many-body systems and self-consistent fields: variational calculations; second quantized formalism, including Fock spaces/number representation, field operators and Green functions; applications: electron gas; quantization of the electromagnetic field and interaction of radiation with matter: absorption, emission, scattering, photoelectric effect,

and lifetimes. Prerequisite(s): course 215. Enrollment restricted to graduate students only, except by permission of instructor. *A. Seiden*

217. Quantum Field Theory I. F

Lorentz invariance in quantum theory, Dirac and Klein-Gordon equations, the relativistic hydrogen atom, Green functions and canonical approach to field theory, quantum electrodynamics, Feynman diagrams for scattering processes, symmetries and Ward identities. Students learn to perform calculations of scattering and decay of particles in field theory. Prerequisite(s): course 216. Enrollment restricted to graduate students only, except by permission of instructor. *A. Aguirre*

218. Quantum Field Theory II. W

Path integral approach to quantum field theory. Theory of renormalization and the renormalization group, introduction to gauge theories and spontaneously broken field theories. Applications to the standard model of strong, weak, and electromagnetic interactions. Prerequisite(s): course 217. Enrollment restricted to graduate students only, except by permission of instructor. *M. Dine*

219. Statistical Physics. S

The basic laws of thermodynamics, entropy, thermodynamic potentials, kinetic theory of gases, quantum and classical statistical mechanics, virial expansion, linear response theory. Applications in condensed matter physics. Enrollment restricted to graduate students only, except by permission of instructor. *B. Shastry*

220. Theory of Many-Body Physics. *

Finite temperature Green functions, Feynman diagrams, Dyson equation, linked cluster theorem, Kubo formula for electrical conductivity, electron gas, random phase approximation, Fermi surfaces, Landau fermi liquid theory, electron phonon coupling, Migdal's theorem, superconductivity. Prerequisite(s): courses 216 and 219. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *B. Shastry*

221A. Introduction to Particle Physics I. F

First quarter of a two-quarter graduate level introduction to particle physics, including the following topics: discrete symmetries, quark model, particle classification, masses and magnetic moments, passage of radiation through matter, detector technology, accelerator physics, Feynman calculus, and electron-positron annihilation. Prerequisite(s): course 217 or concurrent enrollment. Enrollment restricted to graduate students only, except by permission of instructor. *S. Profumo*

221B. Introduction to Particle Physics II. W

Second quarter of a two-quarter graduate level introduction to particle physics, including the following topics: nucleon structure, weak interactions and the Standard Model, neutrino oscillation, quantum chromodynamics, CP violation, and a tour of the Stanford Linear Accelerator Center. Prerequisite(s): course 221A; course 217 or concurrent enrollment. Enrollment restricted to graduate students only, except by permission of instructor. *B. Schumm*

222. Quantum Field Theory III. S

Focuses on the theoretical underpinnings of the standard model, including the spontaneous symmetry breaking, the renormalization group, the operator product expansion, and precision tests of the Standard Model. Prerequisite(s): courses 218 and 221B. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *M. Dine*

224. Origin and Evolution of the Universe. *

Introduction to the particle physics and cosmology of the very early universe: relativistic cosmology, initial conditions, inflation and grand unified theories, baryosynthesis, nucleosynthesis, gravitational collapse, hypotheses regarding the dark matter and consequences for formation of galaxies and large scale structure. (Also offered as Astronomy and Astrophysics 224. Students cannot receive credit for both courses.) Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *J. Primack*

226. General Relativity. *

Develops the formalism of Einstein's general relativity, including solar system tests, gravitational waves, cosmology, and black holes. (Also offered as Astronomy and Astrophysics 226. Students cannot receive credit for both courses.) Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *A. Aguirre*

227. Advanced Fluid Dynamics. *

Fundamentals of heat transfer and fluid flow: thermal convection, gravity waves, vortex dynamics, viscous flows, instabilities, turbulence, and compressible flows. Students develop computer program for simulating thermal convection and gravity waves. Vector calculus and computer programming experience required. (Formerly Fluid Dynamics.) An introductory course in fluid dynamics recommended as preparation. Enrollment restricted to graduate students. Offered in alternate academic years. *G. Glatzmaier, C. Edwards*

231. Introduction to Condensed Matter Physics. F

Crystal structures, reciprocal lattice, crystal bonding, phonons (including specific heat), band theory of electrons, free electron model, electron-electron and electron-phonon interactions, transport theory. Prerequisite(s): course 216. Enrollment restricted to graduate students only, except by permission of instructor. *The Staff*

232. Condensed Matter Physics. W

Magnetism (para, ferro, anti-ferro, ferri), spin waves, superconductivity, introduction to semiconductors. Prerequisite(s): course 231. Enrollment restricted to graduate students only, except by permission of instructor. *J. Deutsch*

233. Advanced Condensed Matter Physics. *

A special topics course which includes areas of current interest in condensed matter physics. Possible topics include superconductivity, phase transitions, renormalization group, disordered systems, surface phenomena, magnetic resonance, and spectroscopy. Prerequisite(s): course 231. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *The Staff*

234. Soft Condensed Matter Physics. *

A selection of topics from: liquid crystals, biological systems, renormalization group and critical phenomena, stochastic processes, Langevin and Fokker Planck equations, hydrodynamic theories, granular materials, glasses, quasi-crystals. Prerequisite(s): courses 219 and 232. Enrollment restricted to graduate students. *O. Narayan, A. Young*

240. Polymer Physics. *

Statistical properties polymers. Scaling behavior, fractal dimensions. Random walks, self avoidance. Single chains and concentrated solutions. Dynamics and topological effects in melts. Polymer networks. Sol-gel transitions. Polymer blends. Application to biological systems. Computer simulations demonstrating much of the above.

Students cannot receive credit for this course and course 120. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *J. Deutsch*

242. Computational Physics. S

This course will apply efficient numerical methods to the solution of problems in the physical sciences which are otherwise intractable. Examples will be drawn from classical mechanics, quantum mechanics, statistical mechanics, and electrodynamics. Students will apply a high-level programming language such as Mathematica to the solution of physical problems and will develop appropriate error and stability estimates. Prerequisite(s): basic programming experience in C or Fortran. No previous experience with Mathematica is required. Enrollment restricted to graduate students only, except by permission of instructor. *A. Young*

250. Mathematical Methods. *

Probability theory with applications to data analysis, complex variables, Cauchy's residue theorem, dispersion relations, saddle-point type asymptotic methods for integrals, integral transforms, ordinary differential equations and orthogonal polynomials, partial differential equations and boundary value problems, and Greens functions. Integral equations also included if time permits. Enrollment restricted to graduate students. *A. Young*

251. Group Theory and Modern Physics. S

Finite and continuous groups, group representation theory, the symmetric group and Young tableaux, Lie groups and Lie algebras, irreducible representations of Lie algebras by tensor methods, unitary groups in particle physics, Dynkin diagrams, Lorentz and Poincaré groups. Enrollment restricted to graduate students only, except by permission of instructor. Offered in alternate academic years. *H. Haber*

290. Special Topics. *

A series of lectures on various topics of current interest in physics at UC Santa Cruz. Enrollment restricted to graduate students only, except by permission of instructor. May be repeated for credit. *T. Banks*

291A. Cosmology (2 credits). F,W,S

Intensive research seminar on cosmology and related topics in astrophysics: nature of dark matter; origin of cosmological inhomogeneties and other initial conditions of the big bang; origin and evolution of galaxies and large scale structure in the universe. Enrollment restricted to graduate students only, except by permission of instructor. *J. Primack, A. Aguirre*

291C. Developments in Theoretical Particle Physics (2 credits). F,W,S

Seminar on the current literature of elementary particle physics, ranging from strong and weak interaction phenomenology to Higgs physics, supersymmetry, and superstring theory. Students may present their own research results. Prerequisite(s): course 218; enrollment restricted to graduate students. May be repeated for credit. *H. Haber, M. Dine*

291D. Experimental High-Energy Collider Physics (2 credits). F,W,S

Seminar on current results in experimental high-energy particle physics. Topics follow recently published results, including design of experiments, development of particle detector technology, and experimental results from new particle searches, quantum chromodynamics, and properties of heavy flavor quarks. Enrollment restricted to graduate students. May be repeated for credit. *J. Nielsen*

291E. Applied Physics (2 credits). F,W,S

Intensive research seminar on applied physics and related topics in materials science, including semiconductor devices, optoelectronics, molecular electronics, magnetic materials, nanotechnology, biosensors, and medical physics. Students may present their own research results. Enrollment restricted to graduate students. May be repeated for credit. *S. Carter, G. Alers*

291F. Experimental High-Energy and Particle Astrophysics Seminar (2 credits). F,W,S

Survey of current research in experimental high-energy and particle astrophysics. Recent observations and development in instrumentation for x-rays, gamma rays, and neutrinos, and evidence for dark matter and other new particles. Students lead discussion of recent papers. Enrollment restricted to seniors and graduate students and by permission of instructor. Enrollment limited to 15. May be repeated for credit. *D. Smith*

291G. Condensed Matter Physics Research Seminar (2 credits). F,W,S

Weekly seminar series covering topics of current interest in condensed matter physics. Local and external speakers discuss their work. Enrollment restricted to graduate students. May be repeated for credit. *A. Young*

292. Seminar (no credit). F,W,S

Weekly seminar attended by faculty and graduate students. Directed at all physics graduate students who have not taken and passed the qualifying examination for the Ph.D. program. Enrollment restricted to graduate students only, except by permission of instructor. *D. Belanger*

297. Independent Study. F,W,S

Enrollment restricted to graduate students only, except by permission of instructor. *The Staff*

298. Theoretical and Experimental Research Project. F,W,S

Enrollment restricted to graduate students only, except by permission of instructor. *The Staff*

299. Thesis Research. F,W,S

Enrollment restricted to graduate students only, except by permission of instructor. *The Staff*

Plant Sciences

See Biological Sciences, page 135.

Politics

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Faculty and Professional Interests

Professor

MICHAEL K. BROWN
Inequality, race and African American politics, political economy, political development of welfare states, theories and methods of historical social science

J. PETER EUBEN, Emeritus

ISEBILL V. GRUHN, Emerita

BRUCE D. LARKIN, Emeritus

RONNIE D. LIPSCHUTZ
International relations; global political economy; globalization and foreign policy; resource/environmental politics; global political networks; global civil society and social movements; popular culture and politics; technology and society; risk society

JOHN A. MARCUM, Emeritus

ROBERT L. MEISTER
Political and moral philosophy, law and social theory, Marxian theory, institutional analysis, antidiscrimination law

JOHN H. SCHAAR, Emeritus

DAVID J. THOMAS, Emeritus

MICHAEL E. URBAN
Russian politics, postcommunist transitions, U.S.-Russian relations, political language and ideology, revolution

GEORGE E. VON DER MUHLL, Emeritus

DANIEL J. WIRLS, Chair
American politics, including national political institutions (Congress) and the President; public policy (military and foreign policy) and political history

Associate Professor

KENT EATON
Comparative politics, international relations, political economy, public policy, territorial conflict, federalism, decentralization, party and electoral systems, Latin America, the Philippines

PAUL FRYMER
American politics and institutional development; law, race, and civil rights; parties, elections, and representation; organizations, collective action, and social movements; labor and employment; political history

VANITA SETH
Early modern and modern political theory, feminist theory, cultural history, race politics, postcolonial theory

Assistant Professor

EVA C. BERTRAM
American politics, including the welfare state and social policy; political economy and the politics of labor markets; civil society and non-governmental organizations; public policy, including drug-control policy

ANNETTE CLEAR
Comparative democratization, social movements, NGOs, transnationalism, foreign aid, global politics, global organization, Southeast Asia

DEAN MATHIOWETZ
Political theory, philosophy of language, political economy

ELEONORA PASOTTI
European politics, comparative politics, democratization, public policy, political economy, methodology

BENJAMIN READ
Comparative politics with special interest in the politics of China; theories of associations and social networks; communist and post-communist states; political participation and collective action

ROGER SCHOENMAN
Post-socialism, political economy, comparative capitalism, politics of pipelines, politics of memory, political networks, politics and money, Balkan and East European politics, Central Asian transitions

MEGAN THOMAS
Political theory, especially of the 19th century; nationalist thought; Orientalism; comparative colonialism; Southeast Asia

**Professor**

EDMUND BURKE III (History)

BARBARA EPSTEIN (History of Consciousness)

JONATHAN A. FOX (Latin American and Latino Studies)

WALTER L. GOLDFRANK (Sociology)

DAVID E. GOODMAN, Emeritus (Environmental Studies)

DAVID C. HOY (Philosophy)

PAUL M. LUBECK (Sociology)

DANIEL M. PRESS (Environmental Studies)

CRAIG REINARMAN (Sociology)

ALAN RICHARDS (Environmental Studies)

ANDREW SZASZ (Sociology)

DAVID WELLMAN (Community Studies)

DONALD A. WITTMAN (Economics)

Lecturer

SUZANNE JONAS (Latin American and Latino Studies)

Program Description

In describing the department and major at UCSC, the term politics (rather than political science or government) is used because the study of political life requires a far more inclusive approach than that which is associated with conventional political science methods, and because politics happens in places other than governments. More specifically, the study of politics is the study of the way human communities shape and share a common life through their institutional practices, ideas, interests, and expectations. It looks at the way collective decisions are made and at the obstacles citizens meet as they try to forge a shared and just life. Courses address issues central to public life, such as democracy, power, freedom, political economy, social movements, international law and conflict, institutional reforms, and how public life, as distinct from private life, is constituted.

A major in politics is appropriate for students interested in careers in law, journalism, or teaching; in political and governmental work from local to international settings; and in corporations dealing with global issues. Many UCSC politics graduates have also gone on to do advanced work in distinguished graduate and professional schools. Others have found active and challenging careers in business and community organizing. Still others have turned to scholarship and writing. But regardless of career direction, the most significant purpose of the politics major is to help educate a reflective and activist citizenry capable of sharing power and responsibility in a contemporary democracy.

The study of politics is a critical part of a liberal arts education. Since political issues and practices are embedded in and reflective of the whole experience of a community, the study of politics can constitute the center of a broad-based course of study drawing on history, sociology, anthropology, philosophy, economics, literature, and law.

The programs offered by the UCSC Politics Department are designed to acquaint students with a broad range of issues studied by those in the field. The department offers an undergraduate major, a minor, a combined Latin American and Latino studies/politics

major, and a doctoral degree. The Politics Department also houses a program in legal studies; see the Legal Studies Department, for details.

UCSC politics students have many opportunities for field work and for internship placements. Students are encouraged to develop their own extensive independent research projects.

Politics faculty members give students individual attention to help them in their studies. Faculty members are firmly committed to the value of a liberal arts education, but they are also actively engaged in programs of research and writing. The research interests of the faculty range from the theory of justice to the problem of war, from campaign strategy to relations between the rich and the poor countries of the world.

No specific courses at the high school level are required for admission to the major in politics at UCSC. Courses in history, literature, philosophy, and the social sciences, whether taken at the high school or college level, are appropriate background and preparation for the politics major.

Major Requirements as Follows

Two lower-division politics courses. All students are required to complete and pass two courses from those numbered 1 through 79, as a prerequisite to upper-division courses in politics and prior to declaring the major. (These have an IS general education code.) These courses are normally taken during the first year.

Four upper-division politics core courses. The following four groups of courses constitute the core of the politics major. Four courses are required: two courses from one group, one course from a second group, and one course from a third group. In general, upper-division courses are not recommended for freshmen.

Theory

- 105A *Ancient Political Thought*
- 105B *Early Modern Political Thought*
- 105C *Modern Political Thought*
- 105D *Late 20th Century Political Thought*

U.S. Politics

- 120A *Congress, President, and the Court in American Politics*
- 120B *Society and Democracy in American Political Development*
- 120C *State and Capitalism in American Political Development*

Comparative

- 140A *Politics of Advanced Industrialized Societies*
- 140B *Comparative Post-Communist Politics*
- 140C *Latin American Politics*
- 140D *Politics of East Asia*
- 140E *Postcolonial States and Societies*

International

- 160A *International Politics*
- 160B *Global Organization*
- 160C *Security, Conflict, Violence, War*

Politics 160A, normally offered fall quarter, is very strongly recommended prior to taking the other international core courses.

Five upper-division politics electives. Five additional politics courses are to be selected from courses numbered 101–199. One of these courses may satisfy the senior comprehensive requirement.

Comprehensive Requirements

The comprehensive requirement in the Politics Department can be satisfied in any of the following methods:

- successful completion of a politics senior seminar (190-series) that includes the writing of an extensive paper (no less than 15 pages) with a substantial research content. To enroll in a specific 190 seminar, students must have successfully completed the prerequisite courses listed in the seminar's catalog course description;
- successful completion of a politics graduate core seminar (enrollment in which is contingent on the written recommendation of two politics faculty) that includes the writing of an extensive paper (no less than 15 pages) with a substantial research content;
- successful completion of a senior thesis (Politics 195A-B-C) of approximately 50 pages with a substantial research content, supervised by a politics faculty member with a second reader;
- successful completion of one additional politics upper-division course. In addition to the existing requirements of this course the student must receive faculty approval for and enroll in a two-credit independent study, Politics 199F, which requires completion of a substantial writing component (e.g., a term paper of no less than 15 pages in length).

Minor Requirements

All students are required to complete and pass one lower-division politics course from those numbered 1 through 79, as a prerequisite to upper-division courses in politics and prior to declaring the minor. Additionally, five upper-division politics courses are required. Of these, four are to be selected from the core courses: two from one subfield and two from another subfield; these courses are listed above. The fifth course is to be selected from courses numbered 101–199.

General Undergraduate Information

Combined major. The Politics Department offers a combined major with the Latin American and Latino Studies Department. Requirements may be reviewed in the Latin American and Latino Studies section of the catalog.

Double majors. The department accepts proposals for double majors. A student pursuing a double major meets the full requirements of the politics major as well as the full requirements of the other major subject.

Advising. Declaring the major in politics is a three-step process: (1) attend a declaration orientation workshop, (2) meet with your faculty adviser, and (3) meet with the politics undergraduate adviser. Each student meets with an assigned faculty adviser to discuss an intended program of study, including its breadth and purpose. The faculty adviser may suggest additional courses so that the student can achieve greater breadth or concentration. Students are encouraged to select related courses from other departments which complement their interests in politics.

Pathways. The following pathways are suggested to help students choose courses in their area(s) of interest. The pathways do not constitute tracks within the politics major.

Conflict and security: Politics 70, 107, 129, 160, 161, 173, 190B, 190C, 190G, 190U, 190W

Markets and politics: Politics 17, 43, 70, 105A, 105C, 111, 115, 120C, 122, 124, 132, 141, 142, 160, 174, 176, 178, 190J, 190K, 190S

Race, class, and gender: Politics 5, 10, 17, 25, 101, 105C, 110, 111, 115, 112, 120B, 120C, 122, 124, 127, 132, 140C, 146, 150, 190J, 190K, 190L, 190Q, 190T, 190V

Culture and power: Politics 3, 5, 43, 101, 105A, 105B, 105C, 107, 109, 110, 114, 115, 120B, 140B, 141, 142, 146, 148, 150, 190A, 190V, 190W

Citizenship and democracy: Politics 5, 10, 15, 20, 25, 101, 105A, 105B, 105C, 107, 110, 111, 112, 114, 120A, 120B, 133, 140B, 141, 142, 146, 148, 150, 190A, 190N, 190Q, 190W

Law and government: Politics 20, 25, 105A, 105C, 107, 110, 111, 112, 120A, 120C, 122, 127, 129, 132, 133, 141, 146, 163, 173, 174, 179, 190G, 190L, 190N, 190Q, 190W

States and regions: Politics 43, 70, 107, 140B, 140C, 140D, 140E, 141, 142, 146, 150, 160, 175, 190V, 190W

Global governance: Politics 17, 70, 107, 111, 140E, 160, 173, 174, 175, 176, 179, 190B, 190G, 190S, 190U, 190W

Course credit from other institutions. Courses from another institution may be considered only if they appear on the student's Transfer Credit Summary. Students who wish to substitute courses taken elsewhere for the Politics Department's requirements should discuss the procedure with the department adviser.

Senior thesis. Students interested in working on original research and writing under the supervision of a faculty member may pursue an independent study, Politics 195A-B-C. Completion of the senior thesis satisfies the comprehensive requirement.

Graduate Program

The Faculty

The UCSC Politics Department's faculty provides a distinctive mix of senior scholars whose work has led the field toward interdisciplinary and engaged research, and junior scholars whose work represents the diverse cutting edge of U.S. and international political research. The small size of the program encourages close interaction among faculty and students.

The department enjoys several areas of special strength, including American political development and a focus on the social foundations of democratic politics and democratization. Clusters of faculty also specialize in the study of varieties of capitalism and post-communist politics and economy; the politics of Southeast Asia and Latin America; the study of race and politics; the politics of language; post-colonial theory and nationalist discourse; early modern political thought; and informal and translocal political organization.

The Curriculum

The Politics Department is impressed by the fact that many of the best studies of politics today disregard the conventional boundaries of the political science's disciplinary subfields. Therefore, the core graduate curriculum and qualifying examination process are structured around four interrelated themes central to political inquiry. Each of these areas of emphasis focuses, in a different way, on the relations among material life, institutional authority, collective mobilization, and political vision at all levels of politics.

Social and Political Thought. Brings together the history of political thought; contemporary social and critical theory; and the contributions of legal and institutional analysis of various kinds. This area of inquiry emphasizes the critical study of political practices that are experienced or understood as in some way limiting, oppressive, or wrong. The work of political and social theory as we see it is to transform our understanding of these practices; to see their contingent conditions; and to articulate the possibilities of governing ourselves differently.

Political Institutions. Emphasizes the comparative and international study of political institutions as instruments of collective decision-making and action. This area of inquiry focuses on the state and on transnational, subnational, and regional political institutions. In this area, we emphasize historical patterns of institutional development in relation to domestic political conflict and the changing contours of international political economy and patterns of conflict and cooperation among states.

Political Economy. Focuses on the relationship between states, markets, and societies. This area of inquiry addresses the history of the liberal state in the context of the origins and development of markets and capitalisms and the historical evolution of national and supranational economies. This area considers the relationships among labor, capital, production, and consumption; political contexts for economic regulation and management; and the global and national problems of social welfare, resources, and the environment.

Social and Political Forces. Concerns the interaction of social forces and political forces, drawing upon the work of scholars focused on social mobilizations and histories. Accordingly, this area of inquiry focuses on the articulation and organization of political interest and identities. This area studies the mutual interaction of these interests and identities with structure (states, discourses, public policy, and the law) uniting substantive and theoretical concerns across regional, national, and global politics.

The politics graduate curriculum works critically upon and within conventional social science research and also ranges beyond its methods, drawing upon cultural studies, historical sociology, and history as they inform the study of politics. Students in the politics graduate program also work with faculty in other distinguished departments at UCSC, including literature, history of consciousness, history, Latin American and Latino studies, environmental studies, philosophy, international economics, and feminist studies.

Scholars and students in the program emphasize the articulation of important questions prior to the development of methods for grappling with them, while recognizing the importance of appropriate methodological tools for doing meaningful political research.

Graduate students may also obtain a parenthetical notation on the politics Ph.D. diploma indicating that they have specialized in Latin American and Latino studies or feminist studies. This notation recognizes the scholarly expertise obtained after the completion of additional curriculum that is required by these departments.

Teaching

Throughout its history, the department has been strongly committed to undergraduate teaching. The graduate program offers graduate students the opportunity to work closely with faculty and undergraduates as teaching assistants. The Politics Department's faculty

is committed to "the teaching of teaching": its training of college educators emphasizes the importance of civic education in undergraduate instruction.

See our web site, <http://politics.ucsc.edu>, for details about the policies for admission to graduate standing as well as the application, and information about financial-support opportunities. For more information, refer to the Graduate Division web site.

Ph.D. Program Requirements

The graduate curriculum in politics includes six stages: (1) five core seminars; (2) seven other graduate-level courses, four of which must be Politics Department courses, along with further training as appropriate in language and methodology; (3) teaching assistant seminars and graduate colloquia; (4) a qualifying examination consisting of written and oral parts; (5) the research and writing of the dissertation; and (6) its oral defense.

Note: Please check with the department office for updated listings of course offerings and the appropriate year in which to undertake specific electives.

M.A. Degree

Our program is intended to lead to a Ph.D. in politics; there is no separate M.A. program. All curricular requirements are aimed at preparing students for timely and successful completion of a doctoral dissertation. However, all students will be eligible to receive an M.A. upon successfully passing the course work requirements and completing an acceptable 30-page journal-quality paper, either within the context of a course or independently, although not the written qualifying exam. Students will be advanced to candidacy only upon successful completion of the coursework requirements and the qualifying examination.

Lower-Division Courses

1. Democratic Politics. F

Systematic introduction to the nature of politics and government, organized around the dynamic relationship between power, principle, and process in democratic politics. Provides historic and contemporary overview; explores the interactions among government, laws, and societies at the national and international levels. (General Education Code(s): IS.) *D. Wirls*

3. Keywords: Concepts in Politics. W

Introduces key concepts in political discourse and key debates generated by contested terms such as "powers," "ideology," and "multiculturalism." Students read from canonical texts, feminist scholarship, historical materials, and contemporary cultural and postmodernist writings. (General Education Code(s): IS.) *V. Seth*

4. Citizenship and Action. *

What does a citizen do? Uses political theory to answer this question as it relates to a number of issues, such as voting rights, diversity, gay marriage, and revolution. Draws on texts ranging from Aristotle to contemporary legal and cultural debates, to bear on the relationship of citizen action and identity. Other readings include Thoreau, Ellison, Rousseau, Marx, Arendt, and Socrates. (General Education Code(s): IS.) *D. Mathiowetz*

7. Politics of Religion. F

Considers both the religious sources of political ideas and the political sources of religious ideas, addressing topics such as sovereignty, justice, love, reason, revelation, sacrifice, victimhood, evil, racism, rebellion, reconciliation, and human rights. (General Education Code(s): IS.) *R. Meister*

15. Digital Democracy. *

Links the study of democratic theories with an interdisciplinary approach to issues at the intersection of democracy and technology, such as participation, freedom of speech, access with regard to diversity, and income inequality. (General Education Code(s): IS.) *E. Pasotti*

17. U.S. and the World Economy. F

Explores intellectual and empirical trends shaping the U.S. relationship with the global economy. Traces debates about liberalism and interventionism, surveys post-war American foreign economic policy and discusses varieties of capitalism emerging around the world. (General Education Code(s): IS.) *R. Schoenman*

20. Democracy and Liberalism in American Politics. *

Analysis of the development and operation of American political institutions, focusing on the constitutional powers of the Congress, presidency, and Supreme Court; and the development of the American political parties. Topics include the ideological underpinnings of American democracy; the changing balance of power between the executive, legislative, and judicial branches; the expansion of national government power; the expansion of the right to vote and political representation; and the rising power of "non-governmental" forces. Satisfies American History and Institutions Requirement. (General Education Code(s): IS.) *M. Brown*

25. American Social Policy. *

Examines role of ideas, interests, and institutions in shaping contemporary social policy in the U.S. Focuses on political struggles and policy debates in the areas of crime and drug control, health care, and income security. (General Education Code(s): IS.) *E. Bertram*

43. Eurasian Politics. *

Following a survey of the development of the former USSR that emphasizes those factors responsible for its dissolution, focuses on the politics of nation building and international reintegration, and the prospects of democratic or authoritarian futures. (General Education Code(s): IS.) *M. Urban*

70. Global Politics. W,S

Can common global interest prevail against particular sovereign desires? Surveys selected contemporary issues in global politics such as wars of intervention, ethnic conflict, globalization, global environmental protection, and some of the different ways in which they are understood and explained. (General Education Code(s): IS.) *R. Lipschutz*

72. Politics of War on Terrorism. *

From September 2001 the U.S. committed to a "War on Terrorism." What are its political sources? Objectives? Effects on internal politics, external alliances, and civil liberties? Military implications? Costs? How is political discourse deployed? How can it be assessed? (General Education Code(s): IS.) *The Staff*

73. Sovereignty and Intervention. *

Beginning with the basic concept of state sovereignty, explores ways in which different types of intervention problematize and compromise state sovereignty, particularly in the Third World. Examines the dis/incentives behind military, economic, humanitarian and cultural interventions, their un/intended consequences, and their ethical controversies. (General Education Code(s): IS.) *A. Clear*

75. The Nation-State and Global Politics. *

Examines role of nation-state in global politics by studying processes of state formation in four regions: Europe,

Africa, Asia, and Latin America. Evaluates recent challenges to the state that have begun to emerge from above and below. (General Education Code(s): IS.) *K. Eaton*

Upper-Division Courses**103. Feminist Interventions. F**

Situates ongoing debates around feminist theory and practice within the context of political theory, the role of the state, and the position of women in contemporary (predominantly Western) society. Engages with classical political theory, second wave feminism, and the role of the state on matters pertaining to pornography and prostitution. Enrollment restricted to politics, legal studies, and Latin American and Latino studies/politics combined majors during priority enrollment only. *V. Seth*

104A. American Political Thought. *

Basic problems of political theory within the American setting. The course explores both the mainstream tradition and some branches of the counter tradition of political ideas in America, focusing on the themes of authority, community, equality, and liberty. Enrollment restricted to politics, legal studies, and Latin American and Latino studies/politics combined majors during priority enrollment only. Satisfies American History and Institutions Requirement. *J. Schaar*

105A. Ancient Political Thought. F

Ancient political ideas in context of tension between democracy and empire, emergence of the psyche, and shift from oral to written culture. Emphasis on Athens, with Hebrew, Roman, and Christian departures and interventions. Includes Sophocles, Thucydides, Socrates, Plato, Aristotle, Stoics, the Bible, and Augustine. (Also offered as Legal Studies 105A. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *D. Mathiowetz*

105B. Early Modern Political Thought. W

Studies republican and liberal traditions of political thought and politics. Authors studied include Hobbes, Locke, and Rousseau. Examination of issues such as authorship, individuality, gender, state, and cultural difference. (Also offered as Legal Studies 105B. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *V. Seth*

105C. Modern Political Thought. S

Studies in 19th- and early 20th-century theory, centering on the themes of capitalism, labor, alienation, culture, freedom, and morality. Authors studied include J. S. Mill, Marx, Nietzsche, Foucault, Hegel, Fanon, and Weber. (Also offered as Legal Studies 105C. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *M. Thomas*

105D. Late 20th Century Political Thought. S

The politics of identity and recognition as the basis for institutional legitimacy and social struggles in the late 20th century. Conflicting views of Hegel's master-slave dialectic are used to relate, e.g., Sartre, Fanon, Bataille, Merleau-Ponty, Foucault, Lacan, Levinas, Derrida, Deleuze, Zizek, and Badiou to present-day concerns. (Also offered as Legal Studies 105D. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment. *R. Meister*

106. Marxism as a Method. *

Examines Marx's use of his sources in political philosophy and political economy to develop a method for analyzing the variable ways in which social change is experienced as a basis for social action. Provides a similar analysis of contemporary materials. Contrasts and compares Marxian critiques of these materials and readings based on Nietzsche, psychoanalysis, cultural studies, and rational choice materialism. (Also offered as Legal Studies 106. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

107. After Evil: Political Morality of Survivorship and Recovery. *

What are the continuing relationships between victims, perpetrators, and beneficiaries of a past that is recognized as evil? Focus on contrast between the competing moral logics of struggle and reconciliation, and various rationales for allowing beneficiaries to keep their gains in order to bring closure to the past. Theoretical perspectives drawn from law, philosophy, theology, and psychoanalysis. (Also offered as Legal Studies 107. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Meister*

108. Political Theologies of Milton and Dante. *

Focuses on reading texts written by Milton and Dante, including *Paradise Lost* and *Purgatorio*. Topics of political theology, medieval and reformation Christian thought and related historical studies are examined. Enrollment restricted to politics majors. *R. Meister*

109. Orientalism. F

Studies "Orientalism" as a concept of political theory and as a historical practice. Considers how "Western" views of the peoples, cultures, and governments of "the East" influenced political, intellectual, and aesthetic projects of the 18th and 19th centuries, with attention to the themes of colonialism, nationalism, language, and gender. Also considers Orientalism as a subject of post-colonial thought. Prerequisite(s): course 105A, or 105B, or 105C, or 105D; or by permission of instructor. Enrollment restricted to politics majors. *M. Thomas*

110. Law and Social Issues. *

Examines current problems in law as it intersects with politics and society. Readings are drawn from legal and political philosophy, social science, and judicial opinions. (Also offered as Legal Studies 110. Students cannot receive credit for both courses.) Enrollment restricted to politics, legal studies, and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

111A. Constitutional Law. S

An introduction to constitutional law, emphasizing equal protection and fundamental rights as defined by common law decisions interpreting the 14th Amendment, and also exploring issues of federalism and separation of powers. Readings are primarily court decisions; special attention given to teaching how to interpret, understand, and write about common law. (Formerly *Problems in Constitutional Law*.) (Also offered as Legal Studies 111A. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

112. Women and the Law. F

Interdisciplinary approach to study of law in its relation to category "women" and production of gender. Considers

various materials including critical race theory, domestic case law and international instruments, representations of law, and writings by and on behalf of women living under different forms of legal control. Examines how law structures rights, offers protections, produces hierarchies, and sexualizes power relations in both public and intimate life. (Also offered as Feminist Studies 112. Students cannot receive credit for both courses.) Enrollment restricted to politics, feminist studies, legal studies, and Latin American and Latino studies/politics combined majors during priority enrollment only. *G. Dent*

114. Thinking Green: Politics, Ethics, Political Economy. S

A course on Green political thought and practice, the origins and content of ecological politics, ethics, and political economy. Asks whether they offer a "realistic" alternative to neo-liberalism and other political ideologies. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Lipschutz*

115. Foundations of Political Economy. W

Examines how ideas about labor, rights, exchange, capital, consumption, the state, production, poverty, luxury, morality, procreation, and markets were imbricated in political-economic discourse from 1690–1936. Readings include Locke, Rosseau, Smith, Malthus, Hegel, Marx, Lenin, and Keynes. Particular focus given to theoretical origins of and justifications for property and implications of economic interdependence for politics. Prerequisite(s): course 105B, 105C, or 120C. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *D. Mathiowetz*

116. Comparative Law. *

Explores legal systems and legal rules around the world, for a better understanding of the factors that have shaped both legal growth and legal change. Particular attention given to differences between common and civil law systems, changes brought about by the European Union, and expansion of legal norms around the globe. (Also offered as Legal Studies 116. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

117. U.S. Telecommunications Law and Policy. F

Surveys the U.S. telecommunications and broadcasting law and policy from the mid-19th century through the present. Offers a range of perspectives from the vantage point of the telecommunications industry, government, and the media-reform movement. Enrollment restricted to politics majors during priority enrollment only. *The Staff*

120A. Congress, President, and the Court in American Politics. *

Study of political development, behavior, performance, and significance of central governmental institutions of the U.S. Emphasizes the historical development of each branch and their relationship to each other, including changes in relative power and constitutional responsibilities. (Also offered as Legal Studies 120A. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Satisfies American History and Institutions Requirement. *D. Wirls*

120B. Society and Democracy in American Political Development. F

Examines role of social forces (e.g., race, class, and gender) in development of the American democratic processes and in the changing relationship between citizen and state. Course materials address ideas, social tensions, and economic pressures bearing on social movements, interest groups, and political parties. (Also offered as Legal Studies 120B. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics majors during priority enrollment period. Satisfies American History and Institutions Requirement. *M. Brown*

120C. State and Capitalism in American Political Development. S

Examines the relationship between state and economy in the U.S. from the 1880s to the present, and provides a theoretical and historical introduction to the study of politics and markets. Focus is on moments of crisis and choice in U.S. political economy, with an emphasis on the rise of regulation, the development of the welfare state, and changes in employment policies. (Also offered as Legal Studies 120C. Students cannot receive credit for both courses.) Enrollment restricted to politics, Latin American and Latino studies/politics, and legal studies majors during priority enrollment only. Satisfies American History and Institutions Requirement. *E. Bertram*

122. Politics, Labor, and Markets in the U.S.. W

Examines political and social dimensions of recent transformations in the U.S. labor market. Includes classical and contemporary theoretical debates over the nature and functions of work under capitalism. Focuses on shifts in the organization and character of work in a globalizing economy. Addresses recent trends in economic inequality, low-wage and contingent work, job mobility and security, and work/family relations. Includes attention to the roles and responses of business, labor, government, and social movements. Enrollment restricted to politics and Latin American and Latino studies/politics combined major during priority enrollment. *E. Bertram*

124. Politics, Poverty, and Inequality in America. *

Investigation of the causes and consequences of poverty and income inequality in the U.S., including racial and gender inequality. Consideration of the origins of contemporary anti-poverty policies and evaluation of current policy alternatives. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *E. Bertram*

125. Political Organizations in American Politics. *

Introduces the literature on interest groups and attempts to answer the question: Do such groups promote or hinder American democracy? Class readings and lectures review and assess the participation of interest groups in the electoral process and in Congress, the executive branch, and the courts. Pays particular attention to the role business and environmental groups play in American politics and policy. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *S. Kamieniecki*

127. Black Politics and Federal Social Policy. S

Examination of changes in the political and economic status of African Americans in the 20th century; particular focus on the role of national policies since 1933 and the significance of racism in 20th-century U.S. political development. (Also offered as Legal Studies 127. Students cannot receive credit for both courses.) Enrollment

restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. (General Education Code(s): E.) *M. Brown*

129. Policies and Politics of American Defense. *

Examines the evolution of the policy and politics of American national security, from the Cold War to the present. Content of military policy explored with analytic focus on formation of policy and interactions between military policies and domestic policies. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *D. Wirls*

132. California Water Law and Policy. W

Explores the rich history and fundamental legal concepts surrounding water in California. Students identify, evaluate, and debate some critical water policy questions faced by Californians today and in the future. (Also offered as Legal Studies 132. Students cannot receive credit for both courses.) *R. Langridge*

133. Law of Democracy. W

Explores the role of law in both enabling and constraining the actions of elected politicians in the U.S. Among issues examined are voting rights, redistricting, and campaign finance. Course asks how the law shapes and limits our ability to choose our elected leaders, and in turn, how the law is shaped by political forces. (Also offered as Legal Studies 133. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

140A. Politics of Advanced Industrialized Societies. S

Explores the political and economic systems of advanced industrialized societies. In addition to specific comparisons between the countries of western Europe and the United States, covers important themes and challenges, including immigration, globalization, and the crisis of the welfare state. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority period. *E. Pasotti*

140B. Comparative Post-Communist Politics. F

Comparative study of revolutionary transformations of East European, Soviet, and former Soviet nations to post-Communist political orders. Focus on reemergence of political society, social and economic problems of transition, and maintenance of many cultural norms and authority patterns associated with previous regime. *M. Urban*

140C. Latin American Politics. W

Overview of major approaches to the study of Latin American politics. Introductory survey of historical and contemporary democratic, populist, authoritarian, and revolutionary regimes. Special attention to local, national, and global forces shaping development strategies and public policies; changing institutional arrangements and shifting discourses of domination; and social movements and strategies of resistance among subaltern social groups and classes. Students cannot receive credit for this course and course 241. Prerequisite(s): course 140C. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Students with equivalent course work may enroll with permission of instructor. (General Education Code(s): E.) *K. Eaton*

140D. Politics of East Asia. *

Explores dynamics of political and economic development in Northeast and Southeast Asia following WWII. Students apply theories of comparative politics to

empirical case studies, integrating statist, social, and cultural factors into their understanding of development. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. (General Education Code(s): E.) *A. Clear*

141. China. W

Politics and foreign policy of the People's Republic of China since 1949. Emphasis on unification, political movements, and decision; social policy; collectivization, decollectivization, and economic reform; foreign and military policy. Democratization, suppression of the Tiananmen demonstrations, and post-Tiananmen political and cultural policy. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. (General Education Code(s): E.) *B. Read*

142. Russian Politics. W

Historical-political survey of Russia within the U.S.S.R. is followed by examination of the 1991 revolution, the attempt to recover a national identity and establish a unified Russian state. Highlighted in this course are cultural and political factors central to the Russian experience: personalistic modes of political organization, a remote and corrupt state apparatus, collectivist forms of thought and self-defense. *M. Urban*

146. The Politics of Africa. *

Comparative study of contemporary sub-Saharan African states. Selected issues and countries. Internal and external political institutions and processes are studied in order to learn about politics in contemporary Black Africa and to learn more about the nature of politics through the focus on the particular issues and questions raised by the African context. Enrollment restricted to politics majors during priority enrollment only. (General Education Code(s): E.) *The Staff*

148. Social Movements. *

Overview of social movements by analysis of specific theories and examples. Course connects the study of theories and movements to larger political processes. Topics may include: New Social Movement theory; gender and social movement; democratic, historical, transnational, global and/or local social movements. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

149. Democratic Transitions. *

Explores democratization processes from a variety of historical and geographical perspectives. Examines the role of foreign influences, economic development, civil society, elites, and institutions in the transition and consolidation of democratic systems. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *E. Pasotti*

150. Democratization, Citizenship, and Human Rights in South America. *

Examines military regimes, transitions to civilian rule, and politics of democratization in contemporary Brazil, Argentina, and Chile. Focus on the contradictions and legacies of transition politics, the challenges of democratizing political institutions, and the political and social consequences of neoliberalism. Emphasis on human rights, citizens' movements (especially feminisms), changing dynamics of civil society, and contemporary efforts to deepen democracy and extend meaningful citizenship to subaltern social groups and classes. Prerequisite(s): course 140C or permission of instructor. *The Staff*

156. Asian Women in Politics. *

Considers major theoretical themes from comparative politics in East Asia and through the lens of gender politics. Each week introduces the basic history and local politics of a different Asian country, highlighting political issues relating to women in that particular country, and then examines how Asian women challenge our theories about politics. (General Education Code(s): E.) *A. Clear*

160A. International Politics. F

Upper-division introduction to international relations, international organizations, international political economy, foreign policy, conflict, and war. Explores a range of theories, issues and cases that are of interest to students of international affairs and are helpful in understanding recurring patterns of global conflict and cooperation. Addresses the nexus between domestic politics and the foreign policy of states. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Lipschutz*

160B. Global Organization. *

Addresses whether and how global organizations are changing the international system. Examines multilateral institutions, regional organizations, and nonstate actors. Overriding aim is to discern whether these global organizations are affecting the purported primacy of the state. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *A. Clear*

160C. Security, Conflict, Violence, War. W

Genesis and theories of conflict and war and their avoidance (past, present, future). Relationship between foreign policy and intra- and interstate conflict and violence. National security and the security dilemma. Non-violent conflict as a normal part of politics; violent conflict as anti-political; transformation of conflict into social and interstate violence. Interrelationships among conduct of war, attainment of political objectives, and the end of hostilities. Civil and ethnic wars. Political economy of violence and war. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

162. Political Integration in Europe, The Atlantic Community and Africa. F

Analyzes concepts, movements, and institutions fostering transnational community. Compares and contrasts functional and federal approaches; the roles of the European, Atlantic Union, and Pan-African Movements; and explores efforts at socio-economic transformation via institutions such as the European Union, Council of Europe, NATO, OSCE, and African Union. Enrollment restricted to politics and politics/Latin American and Latino studies combined majors during priority enrollment. *J. Marcum*

163. U.S. Foreign Policy. *

Provides overview of U.S. foreign policy formulation: considers how U.S. political culture shapes foreign policy; examines governmental actors involved: the president, executive branch agencies, and Congress; then considers non-governmental actors: the media, interest groups, and public opinion. (Formerly How U.S. Foreign Policy Gets Made.) Enrollment restricted to politics and politics/Latin American and Latino studies combined majors. *The Staff*

171. Law of War. *

Examines legal regulation of international violent conflict. Students examine development of normative standards within international law and creation of institutions to both adjudicate violations and regulate conduct. (Also

offered as Legal Studies 171. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *The Staff*

173. International Law. W

Origins and development of international law: international law is examined both as a reflection of the present world order and as a basis for transformation. Topics include jurisdiction and sovereignty, treaties, use of force, commercial law, and human rights. (Also offered as Legal Studies 173. Students cannot receive credit for both courses.) Enrollment restricted to politics and Latin American and Latino studies/politics majors during priority enrollment period. *The Staff*

174. Global Environment Politics. F

Focus on global environmental "problematique" and how it is being played out in a variety of political arenas. Includes technical overview of global environmental movement; perspectives on alternative political approaches to environmental problems. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Lipschutz*

176. International Political Economy. *

Surveys and critically examines long-standing theoretical debates within international political economy (liberalism, mercantilism, Marxism) with context of important historical and contemporary international political economy issue areas (international monetary systems, organization of international trade, regulation of foreign direct investment, development policies, etc.). Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Schoenman*

177. The United States and the World. *

Examines political, economic, and cultural relationship between the U.S. and the rest of the world, including historical background and foreign policy. Special focus on U.S. involvement in the Middle East and Persian Gulf and the politics of economics of that region. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Lipschutz*

178. U.S. Foreign Economic Policy. *

Theoretical and historical survey of U.S. foreign economic policy. First part explores theoretical frameworks and covers historical events in the U.S.'s relationship with world economy. The second part focuses on postwar foreign economic policy; surveys different theoretical approaches to U.S. foreign policy; and examines fundamental developments and issues in trade, monetary, development, and investment policies. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Schoenman*

179. The Atomic Enterprise: Nuclear Physics, History, Strategy, Policy. S

Informs and educates about "The Atomic Enterprise," that panoply of science, technology, projects, events, policies, health effects, industry, and controversies related to the discovery, development, deployment, and domestication of nuclear fission and fusion. Enrollment restricted to politics or politics/Latin American and Latino studies majors during priority enrollment only. Enrollment restricted to politics and Latin American and Latino studies/politics combined majors during priority enrollment only. *R. Lipschutz*

190. Senior Comprehensive Seminar.

These courses, offered at different times by different instructors, focus on current problems of interest across the discipline. Courses offer a flexible framework within which those mutually interested in specific issues can read, present papers, and develop their ideas. Students who do not meet the restrictions and prerequisites may contact the instructor for permission to enroll.

190A. State and Revolution. S

Investigates the process of rapid and fundamental political change from the standpoint of both the structures of states in which revolutions have occurred and the structures of states issuing from revolutions. A number of cases are examined, but particular emphasis is given to the "classic" revolutions in France (1789) and Russia (1917). Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors; major restrictions lifted during open enrollment. Enrollment limited to 20. *M. Urban*

190B. The Juridical and the Political. W

What kinds of contest and decision are intrinsic to political order, and which are inimical to it? How has liberalism succeeded and failed in sustaining contest and decision? Students examine works written prior to the liberal period (Hobbes), in response to it (Hegel and Schmitt) and finally, a 20th-century liberal revival (Rawls), and discuss rights, conscience, political obligation, war, and the state. (Formerly *The Concept of the Political*.) Prerequisite(s): two of the following: course 103, 105A, 105B, 105C, 105D, 107, 109, or 115. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *D. Mathiowetz*

190C. U.S.-Russian Relations. *

Examines the cold war and its aftermath. Focuses on interstate conflict and its roots in domestic politics. Topics include issues of national security, military competition, transnational movements, regional and global hegemony. Prerequisite(s): one of the following: 140B, 141, or 142. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *M. Urban*

190D. Early Anarchist and Socialist Thought. *

Studies in 19th- and early 20th-century anarchist and socialist thought. Themes covered include property, labor, marriage, and the state. Readings drawn from Bakunin, Goldman, Fourier, Kropotkin, Perkins-Gilman, Proudhon, and Stirner. Prerequisite(s): two of the following: courses 103, 105A, 105B, 105C, 105D, 109, or 115; or by permission of instructor. Enrollment restricted to senior politics majors. Enrollment limited to 20. *M. Thomas*

190E. European Integration. *

Focuses on the origins and development of the European Union. Addresses historical and contemporary issues, including the political, economic, social, and cultural dimensions of European integration and expansion. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *R. Schoenman*

190G. Issues in International Law. *

Explores theory and reality of international law; how it determines or governs or modifies policies of government. Emphasis on contemporary political and economic forces and international law in nuclear

age, competing areas for new law, law of seas, human rights, new international economic issues, the environment. Enrollment restricted to senior legal studies, politics, and Latin American and Latino studies/politics combined majors during priority enrollment only; major restrictions will be lifted during open enrollment. Enrollment limited to 20. *The Staff*

190H. The Substance of Democracy. *

What is democracy? Why do we care about it? How can we identify it? Through political science, law, and philosophy, the course explores these questions and the issues of patronage, media manipulation, lobbying, campaign finance reform, and participation. Enrollment restricted to senior politics and combined politics/Latin American and Latino studies majors. Enrollment limited to 20. *E. Pasotti*

190J. Politics and Inequality. *

Considers causes and consequences of inequality in modern societies. Emphasizes empirical analysis of contemporary forms of class, racial, and gender inequality and examination of normative theories of distributive justice. Major restrictions lifted during open enrollment. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *M. Brown*

190K. Political Economy of Welfare States. *

Explores origins and development of contemporary welfare states in Europe and the U.S. Considers welfare state development and politics in relation to dynamics of capital accumulation, class and racial conflict, and patterns of party politics. Assesses distributional impacts of policies. Prerequisite(s): One of the following courses: 104A, 104B, 120A, 120B, or 120C. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only; major restrict Enrollment limited to 20. *M. Brown*

190L. Poverty Politics. S

Examines theoretical, historical, and contemporary sources of poverty, politics, and policies in the U.S. Explores competing theories of the causes of poverty and the consequences of social provision. Focuses on successive historical reform efforts and contemporary dilemmas of race, gender, low-wage labor, and the politics of welfare reform. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *E. Bertram*

190M. American Politics Through American Literature. *

Most major American writers offer perspectives outside "official" mainstream political culture; the raising of countervoices; concern about common, public lives, not just personal experience; exploring persistent tensions (dualisms) and deeper meanings, how we really live, how it is concealed from understanding, and political/moral costs. Prerequisite(s): course 101, 105A, 105B, 105C, 120B, or 120C. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *J. Schaar*

190N. Congress: The Politics of Representation and Legislation. W

Examination of U.S. Congress in theoretical, comparative, and historical perspective. Topics include tension between representative and legislative processes, parliamentary versus presidential systems, party organization versus the new entrepreneurship.

Special attention given to nature and consequences of bicameralism. Prerequisite(s): course 120A. Enrollment restricted to senior legal studies, politics, and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *D. Wirls*

190O. Women and Politics: Electoral Influence and Policymaking. *

Focuses on the impact women have on the political process in the U.S. Examines women's mass-level political participation with focus on the gender gap; women as candidates, women officeholders and their impact, and expectations for the future. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *The Staff*

190P. Race: History of a Concept. *

Examines how we came, by the late 19th century, to classify humanity into racial categories. In an effort to trace emergence of this very modern phenomenon, explores historical shifts that informed Europe's representation of cultural difference from the writings of ancient Greeks to the social Darwinism of 19th-century Britain. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment. Enrollment limited to 20. *V. Seth*

190Q. Theorizing Modernity. *

Introduces central categories and material implications that underwrite discourses on modernity since the late 18th century. Students read across the disciplines in fields such as political theory, postcolonialism, history, science studies, anthropology, and feminist criticism. Prerequisite(s): any two of the following courses: 105A, 105B, 105C, 105D. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment. Enrollment limited to 20. *V. Seth*

190R. Critical Development. *

Interrogation of the idea of development and historical examination of the development of the discourse of development. Explores the ways in which the discourse shapes the practice of development, with a focus on issues of democracy and civil society, humanitarian intervention, gender and agriculture. Enrollment restricted to senior politics and Latin American and Latino studies/politics majors during priority enrollment only. Enrollment limited to 20. *A. Clear*

190S. Empire and After. *

Examines the literature on American empire, beginning with the founding parents (e.g., Jefferson), continuing through the revisionist literatures (e.g., Williams) and more recent work (e.g., Hardt and Negri), and ending with contemporary critiques and predictions. Enrollment restricted to senior politics majors. Enrollment limited to 20. *R. Lipschutz*

190V. Problems in Latin American Politics. *

Research seminar allows advanced students to engage in current scholarly debates in the sub-field of Latin American politics. Topics and countries covered vary from year to year but may include civil society, citizenship and cultural politics in Latin/o America, comparative perspectives on democratization, politics and culture in Brazil, feminisms and women's movements in Latin America, the politics of race and ethnicity in the Americas, and human rights and social justice in a neoliberal era. Prerequisite(s): course 140C. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during

priority enrollment only. Students with equivalent course work may enroll with permission of instructor. Enrollment limited to 20. *K. Eaton*

190W. Living in the Aftermath of Evil. F

Draws on a variety of sources to understand metaphors of war and peace as potentially appropriate attitudes toward evil and as potentially rational compromises with evil; investigates respects in which constitutional regimes of post-traumatic societies can be understood as "peace programs" that preserve and transcend the identities of the victims and perpetrators of past atrocities while creating a new identity based on their common survivorship; explores the constraints placed on "nation in recovery" by the public commitment to create an official version of a past that must be remembered so that it will not be repeated. Prerequisite(s): two of the following: course 105A, 105B, 105C, 106, and 107. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *R. Meister*

190X. Global Civil Society—Theories, Debates, Practices. *

The process of globalization, the enormous growth in numbers of transnational social movements and nongovernmental organizations, and the broad reach of transnational capital and corporations has generated considerable academic and policy interest in future of global governance and role of "global civil society" in it. This senior seminar provides broad view of theory and debates behind global civil society and case studies of specific transnational networks, movements, and coalitions. Prerequisite(s): One of course 160, 160A, 160B, 162, or 173. Enrollment restricted to senior politics and Latin American and Latino studies/politics combined majors during priority enrollment only. Enrollment limited to 20. *R. Lipschutz*

193. Field Study in Politics. F,W,S

Individual studies undertaken off campus with direct faculty supervision. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Various topics to be announced before each quarter. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195A. Senior Thesis. F,W,S

Preparation of a senior thesis over two or three quarters, beginning in any quarter. The grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Thesis. F,W,S

Preparation of a senior thesis over two or three quarters, beginning in any quarter. The grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students submit petition to sponsoring agency. *The Staff*

195C. Senior Thesis. F,W,S

Preparation of a senior thesis over two or three quarters, beginning in any quarter. The grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students submit petition to sponsoring agency. *The Staff*

198. Independent Field Study. F,W,S

Individual studies undertaken off-campus for which faculty supervision is not in person (e.g. supervision is by correspondence). Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Individual studies undertaken off-campus for which faculty supervision is not in person, but by correspondence. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

A student normally approaches a member of the staff and proposes to take a course 199 on a subject he or she has chosen which is not offered in other politics courses. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

A student normally approaches a member of the faculty and proposes to take a course 199 on a subject he or she has chosen which is not offered in other politics courses. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

200A. Interpretive Problems in Political Theory: Language and Power. *

Examines intersections of philosophy of language, language philosophy, political theory, and politics. How can we read texts and discourses in a manner both historically and textually grounded? Must these readings be compatible with a democratic ethos? If so, how? (Formerly Interpretive Methods in Political Theory: Language and Politics.) Enrollment restricted to graduate students. Enrollment limited to 15. *D. Mathiowetz*

200B. Social Forces and Political Change Core Seminar. F

Concerns transformation of social forces into political ones. Focuses on formation, articulation, mobilization, and organization of political interests and identities, their mutual interaction, and their effects on state structures and practices and vice versa. Major themes are 1) social bases of political action: class, gender, race, and other determinants of social division and political identity and 2) relevant forms of political agency and action, including development of political consciousness and representation of interests and identities in the public sphere. Enrollment restricted to graduate students. Enrollment limited to 15. *B. Read*

200C. States and Political Institutions Core Seminar. *

Introduces study of political institutions as instruments of collective decision making and action. Explores alternative theoretical approaches to development of political institutions, state and political economy, and security dilemmas. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Brown*

200D. Political Economy Core Seminar. W

Introduction to the theories and methodologies of political economy. Focuses on the relationship between states and markets and considers the politics of economic choices and institutions germane to both national and global political institutions. Addresses origins and development of markets and capitalism; historical evolution of states and their economies; relationship between labor, capital, production, and consumption; regulation of production; macroeconomics and management of econo-

mies; and issues of national and global social welfare. Enrollment restricted to graduate students. Enrollment limited to 15. *K. Eaton*

201. Logics of Inquiry. W

Investigates approaches to study of politics and to enterprise of social science in general. Works from positivist, interpretive, historical, and critical approaches provide examples held up to critical and epistemological reflection. Enrollment restricted to graduate students. Enrollment limited to 15. *E. Pasotti*

203. Making of the Modern. F

Introduces, at the graduate level, some of the central conceptual categories and material implications that underwrite the world of the modern. Explores concepts including the individual, historicism, contract, and objectivity. Enrollment restricted to graduate students. Enrollment limited to 15. *V. Seth*

205. Political and Social Thought: Politics of Recognition. *

Investigates issues about identity and recognition as basis for claims about institutional legitimacy and social struggle. Paradigm is Hegel's account of relation of master and slave in *Phenomenology of Spirit*. Contemporary political philosophy examines differing accounts of reason, power, resistance, liberation, morality, difference, and the other. Concludes with discussion of identity and interest politics, multiculturalism and assimilation, and moral bases of struggle, reconciliation, and compromise in the political arena. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Meister*

211. Marxism. *

Examines how Marx arrived at his substantive political standpoint through a critique of the modes of theory through which state and society are interpreted from within. Also considers how far it is possible to apply the methods Marx used, in learning from the sources available in our own contemporary material, and whether this process of interpretation will lead us to similar conclusions. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Meister*

214. Thinking Green: Politics, Ethics, Political Economy. *

Green political thought, philosophy, debates, and practices; history of ecological thought and comparative study of competing ideas and proposals. Critical examination of neo-liberal environmentalism. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Lipschutz*

221. Politics and Inequalities. *

Considers origins and consequences of inequality in modern societies, focusing on intersection between class, race, and gender inequality. Examines discourse of equality, in particular, the relationship between democratic politics and equality and role of political institutions in promoting or diminishing inequality. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Brown*

232. United States Political History. F

Covers several important themes and sets of readings from the literature on American political development. Topics include the origins and development of American political institutions, the evolution of democratic mechanisms, the rise and fall of social movements, and debates about the sources of policy regimes and political change, including the role of war. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Brown*

233. Interrogating Race. *

Critically examines alternative theoretical and methodological approaches to study of race and racism. Considers alternative explanations for origins and persistence of racism and racial inequality and suggests the relevance of a socio-political understanding. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Brown, P. Frymer*

241. Culture and Politics in Latin America. *

Interdisciplinary analysis of the relationship between culture and politics in Latin America, drawing on current critical debates in anthropology, history, cultural studies, feminist and poststructuralist theories, as well as political science. Students cannot receive credit for this course and course 140C. Enrollment restricted to graduate politics majors. Enrollment limited to 15. *The Staff*

245. Latin American Politics. *

Surveys the Latin American political literature by studying: 1) critical moments in political development (e.g., state formation, democratization); 2) important political institutions (e.g., presidentialism, party, and electoral systems); and 3) influential political actors (e.g., unions, business associations, social movements). Enrollment restricted to graduate students. Enrollment limited to 15. *K. Eaton*

251. Discourse. *

Utilizing a variety of approaches—discourse analysis, semiotics, critical theory, and linguistics—analyzes how language constructs the political world. Focuses on the symbolic mediation, normalization, and reproduction of power and subjugation present in the discourses through which they are apprehended and expressed. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Urban*

255. Comparative Anti-Colonialisms. S

Political thought of anti-colonial movements in comparative, historical perspective, including 18th- to 20th-Century European colonies of America and Asia. Focuses both on the contemporary political thought of these movements as well as on historiographical approaches of secondary literature. Enrollment restricted to graduate students. Enrollment limited to 15. *M. Thomas*

271. Transnationalism. *

Focuses on basic comparative politics concepts—such as the state, regime transition, economic development, and social movements—and then considers how the global context challenges these very same political phenomena. Explores the ontological and methodological repercussions of the nexus between the global and the domestic. Enrollment restricted to graduate students. Enrollment limited to 15. *A. Clear*

272. Critical Interventions in IR Theory and Global Political Economy. *

Seminar examines selections from the canonical literature in international relations theory and global political economy through a number of critical lenses, including constructivist, feminist, historical materialist, and subaltern approaches. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Lipschutz*

275. Network and Organization Theory Approaches to the Study of Capitalism. *

Examines genesis of new institutions within the force of social ties and networks. Studies how social and organizational relationships achieve individual or group goals in political and economic life, and influence institutional design. Considers when and what ties contribute to governance and economic performance, and when informal

and formal organizations constitute an obstacle. Enrollment restricted to graduate students. Enrollment limited to 15. *R. Schoenman*

291. Teaching Assistant Seminar (2 credits). F

Two-hour weekly seminar required of teaching assistants in which pedagogic and substantive issues will be considered. The experience of performing teaching assistant duties constitutes subject matter for discussion. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

293. Field Study. F,W,S

Individual study undertaken off campus with direct faculty supervision. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

295A. Research Colloquium (2 credits). S

Weekly venue for Ph.D. students to present current research, exchange information on sources and resources, discuss and critique epistemologies and methods, and to formulate topics for QE field statements and the dissertation. There are no assigned readings. May be repeated for credit twice. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *K. Eaton*

295B. Advanced Research Seminar. S

Weekly seminar for Ph.D. students in which to develop and write extended research papers on selected topics, to present current work, to discuss methods, data sources, and fieldwork, and to receive critiques and assessments from fellow students. May be repeated for credit twice. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *K. Eaton*

297. Independent Study. F,W,S

A student approaches a member of the staff and proposes to take a course 297 on a subject he or she has chosen that is not covered in other politics graduate courses or plans a graduate independent study that includes an undergraduate course. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Enrollment restricted to graduate students and permission of instructor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Porter College

College Office
(831) 459-2071
<http://www2.ucsc.edu/porter>

For college description and list of faculty, see page 86.

Lower-Division Courses

12. The ArtsBridge Experience (2 credits). *

Weekly meetings on pedagogy in the arts, lesson planning for arts teaching in schools, and submission of teaching portfolio core of this class. Prerequisite(s): permission of instructor; student must be an ArtsBridge scholar. May be repeated for credit. *M. Foley*

14. Jazz Vocal Ensemble (2 credits). *

Study of vocal techniques in the context of ensemble rehearsals, often culminating in public performance. Familiarity with musical notation recommended. Admission by audition. May be repeated for credit. (General Education Code(s): A.) *The Staff*

19. Chicana/Latina Identity (2 credits). *

An exploration of Chicana/Latina identity within the context of developmental theories and heterogenous cultural influences on identity formation, including the acculturation process. Students explore their own identities within the previously stated context. Enrollment limited to 20. *The Staff*

20. Dance/Theater Practicum.

The practice of dance/theater in a particular world area (i.e., Philippines, Mexico, U.S.). Students learn the dance or theater art of one world area and study the associated cultural background.

20A. Filipino Dance Practicum (2 credits). *

Students are introduced to the different folk dances of the Philippine Islands. Folk dances of the tribal mountain region, of the Spanish Era in the Philippines (Maria Clara Era), and dances of the regional and rural countryside are emphasized. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *W. Manuntag*

20C. Korean Dance Practicum (2 credits). *

Students are introduced to the different dances of Korea related to folk tradition. Movement concepts of music and the relation to culture are explored through demonstration, practice, and performance. Enrollment limited to 15. Offered in alternate academic years. (General Education Code(s): A.) *The Staff*

20D. Dance Improvisation (2 credits). *

Dance practicum emphasizing spontaneous movement in response to diverse media including visual art and music. Special emphasis given to the conceptual approaches taken by American artists such as Merce Cunningham, John Cage, and Robert Rauschenberg. Enrollment limited to 25. (General Education Code(s): A.) *The Staff*

21. Music Practicum.**21A. Korean Music and Culture (2 credits). ***

Introduction to the farmers band tradition. Theory and practice of drumming are emphasized, resulting in a group performance. Enrollment limited to 20. Offered in alternate academic years. (General Education Code(s): A.) *The Staff*

21C. Gospel Choir (2 credits). W,S

Instruction in vocal performance in the tradition of gospel choirs. Music is transmitted aurally rather than by notation. The ensemble prepares a range of traditional and contemporary gospel music for performance. Ensemble performs publicly at least once each quarter. Enrollment limited to 60. May be repeated for credit. (General Education Code(s): A.) *V. Fiddmont*

22. Art Practicum (2 credits).

The practice of art in a particular world area (i.e., Japan, Pacific Islands, U.S.). Explores the art and craft of one world area and studies the associated cultural background. Enrollment limited to 15. (General Education Code(s): A.)

22A. Day of the Dead (2 credits). F

Day of the Dead: Creating an Exhibition—an exploration of art created to celebrate death in Mexican, Chicano, and American culture. Culminates in the creation of a Day of the Dead ceremony and community altar including students' individual art pieces. Enrollment limited to 25. (General Education Code(s): A.) *The Staff*

22F. Vietnamese Festivals (2 credits). *

Vietnamese festivals and the arts they generate, from carving to water puppetry, will be explored for cultural,

aesthetic, and iconographic principles, through viewing, discussion and a creative project. Enrollment limited to 20. (General Education Code(s): A.) *The Staff*

22G. Literary Magazine Publishing (3 credits). S
Learn about and practice basics in publishing a national literary magazine with focus on poetry and the arts. Three-part focus: soliciting/editing, design/publishing, and publicizing/distributing. Students decide which poems published and awarded prizes in the "Viz. 25 and Under Awards" section. Audition for admission at first class with demonstrated experience in related field: creative writing, desk top publishing, art, graphic design, business, etc. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *R. Hamilton*

23. Film/Theater Practicum.

The practice of film/theater from the perspective of a particular culture, genre, or technical approach.

23A. Film Practicum: Talking in Pictures (2 credits). *

Introductory survey of the language of film and television. Considers the roles these media play in the shaping of cultural identity. Creative projects in the conceptual preparation for the making of films and videos. Enrollment limited to 25. (General Education Code(s): A.) *The Staff*

23B. Personal Narratives in Theater and Film (2 credits). W

Focuses on filmmakers and monologue performers as they come to terms with their identity in autobiographical works. Students write responses to texts and create their own brief personal narratives. Enrollment limited to 25. (General Education Code(s): A.) *R. Giges*

23C. Documentary/Mockumentary Films (2 credits). **

The mockumentary grows out of the documentary tradition, but instead of pretending to truthfully capture reality, it blatantly distorts, revealing the subjectivity inherent in cinematic representation. Includes ethnographic music, political and Hollywood mockumentaries, and critical readings on documentary film. Enrollment limited to 25. (General Education Code(s): A.) *R. Giges*

25. Introduction to the Theory and Practice of Musical Criticism (2 credits). *

Introduces students to the theory and practice of musical criticism through the attendance at performances, analysis of composition, and staging and writing of critiques. Enrollment limited to 17. *C. Heusch*

28. Sound Art (2 credits). S

Several composers and performers of contemporary "art music" discuss the processes by which works are conceived in imagination, transcribed in notation, and realized in sound. After a brief introduction to contemporary music aesthetics, students attend a series of related presentations, seminars, and concerts. Enrollment limited to 18. (General Education Code(s): A.) *The Staff*

32A. Queering the Arts (2 credits). *

Exploration of the arts as a way to understand and experience how queerness has been expressed, repressed, denigrated, and celebrated in visual arts, music, film, poetry, and dance. Enrollment limited to 30. (General Education Code(s): A.) *The Staff*

33. Seminar in Arts (2 credits). F

Theoretical and historical aspects of the arts from one culture or world area are explored through seminar dis-

cussion, library research, and film/video presentations. Enrollment limited to 20. (General Education Code(s): A.) *The Staff*

33A. African Global Art and Music (2 credits). *

The theme of "Changing the Global Community Through the Arts" explored in African global art and music through readings, listening sessions, and interactions with academics and performers. Culmination will be the African Global Festival and Symposium in April. Enrollment limited to 25. (General Education Code(s): A.) *E. Cameron*

34B. Fractals, Chaos Theory, and the Arts (2 credits). S

A consideration of chaos theory and fractal geometry as applied by 20th-century artists in all media. All necessary math and computer skills are covered. Students complete essays or art projects. Enrollment limited to 25. (General Education Code(s): A.) *R. Abraham*

35. Experiencing Live Performance (2 credits). *

Students' attendance at live regional theater performances informed by artists' talks, class lectures, and readings. Students participate in informal performance workshops and write short critical essays. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *The Staff*

35A. Viewing Art in the Bay Area (2 credits). *

Field trips to museums and commercial galleries. Some reading and brief written reports are required; each field trip subject to discussion in class the week following. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *The Staff*

38. Working in . . . Series.

Writers, directors, technical workers, visual artists, and professionals in a diverse range of media discuss current work, paths that led to their creative endeavors, and constraints to working in the industry. *The Staff*

38B. Working in TV and Film (2 credits). W

Writers, directors, and technical workers in areas of TV and film discuss current work, paths that led to their creative endeavors, and constraints of working in the industry. Students research aspects of film and TV professional work. Cannot be repeated for credit. (General Education Code(s): A.) *L. Steck*

39. Jewish Personal Narratives on Film (2 credits). S

Examines documentaries made by Jewish filmmakers who integrate themselves as characters into their films. Students investigate this unique documentary form, while studying the cultural themes that surface in each narrative. Enrollment limited to 25. (General Education Code(s): A.) *R. Giges*

80A. Introduction to University Discourse: Writing Across the Arts. F

Explores rhetorical principles and conventions of university discourse, providing intensive practice in analytical writing, critical reading, and speaking. Study, discuss, and write about social, political, and aesthetic issues raised by selected works of literature and art in a variety of media. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. (General Education Code(s): T4-Humanities and Arts, C1.) *The Staff*

80B. Rhetoric and Inquiry: Writing Across the Arts. F

Explores the intersections between rhetoric (persuasion) and inquiry (investigation) and hones strategies for effective reading, writing, speaking, and research. Read, discuss, research, and write about social, political, and aesthetic issues raised by selected works of literature and art in a variety of media. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. (General Education Code(s): T4-Humanities and Arts, C2.) *The Staff*

80E. Arts Education in the Community. W

Organized in small teams, participants engage with students from public elementary classrooms to develop fully-staged group performance projects by end of term. Students are guided by instructor's models of teaching techniques, designed to stimulate the imagination, and by diverse readings. Enrollment limited to 30. (General Education Code(s): T4-Humanities and Arts, A.) *T. Beal*

80G. Making Poetry: Readings/Writing (2 credits). *

Guest poets read work and discuss their approaches to writing. Students develop their own poems and the class culminates in a poetry reading of student work. Enrollment limited to 25. (General Education Code(s): A.) *The Staff*

80K. Ways of Knowing. W

Creativity in different disciplines is developed via different ways of knowing. Musical, visual, scientific, and spatial literacy demand understanding which is not primarily logocentric. Explores how practitioners of arts and science develop their work and conceptualize its execution. (General Education Code(s): T6-Natural Sciences or Humanities and Arts.) *J. Todd*

80L. Documenting Oral History. F

Students learn basic techniques of interview and camera work to document on film oral histories collected from community elders. Students develop their skills in writing, theater, visual art, music, or film to reinterpret oral histories as artwork. Enrollment limited to 30. (General Education Code(s): T5-Humanities and Arts or Social Sciences, A.) *T. Beal*

80W. Writing Across the Arts. F

Explores the intersections between rhetoric (persuasion) and inquiry (investigation) and hones strategies for effective reading, writing, speaking, and research. Students read, discuss, research, and write about social, political, and aesthetic issues raised by selected works of literature and art in a variety of media. Prerequisite(s): satisfaction of the Entry Level Writing Requirement, and C1 and C2 requirements. Enrollment restricted to college members. Enrollment limited to 22. (General Education Code(s): T4-Humanities and Arts, W.) *D. Jones*

83. Pacific Rim Film Festival: Viewing Across Cultures (2 credits). F

Involves viewing Asian and Pacific films at the annual Pacific Rim Film Festival, participating in post-screening discussions with area experts, and writing on the issues of cross-cultural viewing/reading of film. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *M. Foley*

99. Tutorial.

Various topics to be arranged. Students submit petition to sponsoring agency. *The Staff*

99F. Tutorial (2 credits).

Various topics to be arranged. Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

120. Advanced Dance/Theater Practicum (2 credits). *

The practice of dance/theater in a particular world area or culture. Students learn the art of one world area or era and the associated cultural background. Prerequisite(s): audition; prior training in the discipline is required. Enrollment limited to 15. May be repeated for credit. (General Education Code(s): A.) *The Staff*

121. Advanced Music Practicum (2 credits).

The practice of music in a particular area of the world at an advanced level. Students learn the music of one world area or culture over the quarter and study the associated cultural background. Enrollment limited. May be repeated for credit. (General Education Code(s): A.) *The Staff*

121C. Opera Workshop/Music Practicum (2 credits). W

Rehearsal of the principal vocal parts of an opera in preparation for a full production. Consideration of the dramatic aspects of each role and the interrelationships of the characters. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *N. Paiement*

121D. Sundanese Gamelan and Dance Theater (2 credits). F

Practical study of the musical traditions of the Sundanese people of Indonesia with attention to technique and cultural features leading to the performance of a dance theater performance. Enrollment limited to 15. May be repeated for credit. (General Education Code(s): A.) *U. Sumarna*

126. South Asia Seminar (2 credits). *

South Asian issues in arts, technology, culture, and history will be presented in weekly seminar. Students will attend lectures, read supplementary articles, and write a short paper on a South Asian topic. Enrollment limited to 15. *M. Foley*

141. New Works Research Laboratory. *

Artists from different disciplines (i.e., art and music, design and creative writing, performance art and dance, etc.) collaborate with students to research and create new pieces. Students are involved in phases of the development from the conception to presentation of the work. Enrollment limited to 20. May be repeated for credit. *The Staff*

180. Writing Across the Arts: Pedagogical Practicum. F

Upper-division students participate in Porter core course, joining in seminars and leading small group sections exploring social, political, and aesthetic issues raised by selected works of literature and art in a variety of media. Participate in weekly seminar dealing with pedagogical practice preparing students to raise issues related to texts, critical thinking, writing, and the artistic process. Enrollment limited to 18. *The Staff*

194. Group Tutorial.

A program of independent study arranged between a group of students and a faculty instructor. *The Staff*

199F. Tutorial (2 credits).

Individual projects carried out under the supervision of a Porter faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Portuguese

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Lecturer

ANA MARIA C. SEARA
Portuguese language; literature, film, and music of Brazil and the Portuguese-speaking world; acquisition and teaching of foreign, second, and heritage languages

Program Description

Students interested in acquiring proficiency in Portuguese may choose to enroll in either of two accelerated introductory tracks: courses 1A–B are designed as a two-quarter sequence for students who have no previous experience with the Romance languages; courses 60A–B are a two-quarter sequence designed for students who have a strong background in the Romance languages (typically Spanish) or some previous rudimentary knowledge of Portuguese. Both sequences are accelerated. A second-year Portuguese sequence, also accelerated, courses 65A–B, follows the first-year sequence, and is offered over two quarters. The completion of this sequence fulfills the two-year language requirement for study abroad programs.

The program is aimed at enabling students to gain proficiency in listening comprehension, speaking, reading, and writing. Instruction takes place in Portuguese from the beginning and draws heavily on Brazilian culture through popular music and cinema.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program.

Study Abroad

Students may apply to spend time either in Rio de Janeiro, Brazil, or in Salvador (Bahia) through the UC Education Abroad Program (EAP). Courses taken abroad can, with approval of an adviser, be applied to major requirements. For more information on the program, see UC Education Abroad Program, page 40. For information on credit applied to a major, contact the appropriate department.

Lower-Division Courses

1A. Intensive Elementary Portuguese. F

Intensive instruction in elementary Portuguese, emphasizing oral proficiency as well as reading and writing skills. Taken together, courses 1A and 1B are equivalent to first-year instruction. Enrollment limited to 25. *The Staff*

1B. Intensive Elementary Portuguese. W

Sequential to course 1A, completes first-year accelerated instruction. Intensive instruction in elementary

Portuguese, emphasizing oral proficiency as well as reading and writing skills. Taken together, courses 1A and 1B are equivalent to first-year instruction. Prerequisite(s): course 1A. Enrollment limited to 25. *The Staff*

60A. Advanced Beginning and Intermediate Portuguese. F

This sequence is designed for students with an equivalent of four quarters of college level study of Spanish, French, Italian, or Catalan or for native speakers of these Romance languages (including heritage speakers of Portuguese). Prepares students in all language skills. Prerequisite(s): Spanish 4 or Spanish for Spanish Speakers 64 or French 4 or Italian 4 or placement by examination. *The Staff*

60B. Advanced Beginning and Intermediate Portuguese. W

Sequential to course 60A, completes first-year accelerated instruction of Portuguese for speakers of Spanish and other Romance languages. This sequence is designed for students with an equivalent of four quarters of college level study of Spanish, French, Italian, or Catalan or for native speakers of these Romance languages (including heritage speakers of Portuguese). Prepares students in all language skills. Prerequisite(s): course 60A or placement by examination. (General Education Code(s): IH.) *The Staff*

65A. Intermediate Portuguese. S

A systematic grammar review is combined with literacy and cultural readings, while communicative exercises focus on improving students' ability to understand and hold sustained conversations. Students expand their vocabulary and knowledge of Brazil and other Portuguese-speaking cultures through films, popular music, and other cultural authentic materials. Fulfills EAP language requirement for study abroad in Brazil. Prerequisite(s): course 1B or 60B, or by instructor approval. (General Education Code(s): IH.) *The Staff*

65B. Intermediate Portuguese. F

Sequential to course 65A, completes second-year accelerated instruction. A systematic grammar review is combined with literacy and cultural readings, while communicative exercises focus on improving students' ability to understand and hold sustained conversations. Students expand their vocabulary and knowledge of Brazil and other Portuguese-speaking cultures through films, popular music, and other cultural authentic materials. Fulfills EAP language requirement for study abroad in Brazil. Prerequisite(s): course 65A or by instructor approval. (General Education Code(s): IH.) *The Staff*

99. Tutorial. F,W,S
Students submit petition to sponsoring agency. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Psychology

273 Social Sciences 2 Building
(831) 459-2002
<http://psych.ucsc.edu>

Faculty and Professional Interests

Professor

NAMEERA AKHTAR

Cognitive and social cognitive processes in early language development, infants' social understanding

MARGARITA AZMITIA

How culture, peers, family, and schools provide a context for children's and adolescents' development. Special emphasis on how close relationships influence the educational pathways and identity development of ethnically and socioeconomically diverse populations

BRUCE BRIDGEMAN

Physiological mechanisms of visual perception and cognition, computer simulation of cognitive processes, space perception, eye movements

MAUREEN A. CALLANAN

Cognitive and language development in the social context of family activities, development of word meanings and concepts, the construction of causal explanations in parent-child conversations

MARTIN M. CHEMERS

College student adjustment and performance, leadership, team and organizational effectiveness, cultural and personality characteristics of leaders, college student adjustment and performance

CATHERINE R. COOPER

Cultural perspectives on child and adolescent development; linkages among families, peers, schools, and work; issues of diversity, ethnicity, and gender in identity; research, practice, and policy in university outreach programs; linking qualitative and quantitative research

FAYE J. CROSBY

Gender, social identity, and social justice, especially affirmative action

JEAN FOX TREE

Psycholinguistics: production and comprehension of spontaneous speech, disfluencies and discourse markers in speech, listeners' interpretations of speech

RAYMOND W. GIBBS JR.

Language, thought, and embodiment; special emphasis on metaphor, pragmatics, and cognitive science

PER F. GJERDE

Cultural psychology with emphasis on East and Southeast Asia, familial influences on socialization, personality development and assessment, depression in adolescents and young adults, longitudinal research, developmental psychopathology, adult attachment

CRAIG W. HANEY

Applications of social psychological principles to legal settings, assessment of the psychological effects of living and working in institutional environments, social contextual origins of violence, development of alternative legal and institutional forms

AIDA HURTADO

Social identity, feminist theory, social psychology of education, survey methodology

CAMPBELL LEAPER

Social construction and socialization of gender in childhood, adolescence, and adulthood; self-concept and social identity; language and social interaction; social relationships, gender bias in the schools and academic achievement; images of gender in the media; perceptions and consequences of sexism

DOMINIC W. MASSARO

Understanding language, speech perception and reading, language learning and speech technology, pattern recognition, psychology of interactive media, psychology of art and new media, human-machine interface

ANTHONY R. PRATKANIS

Social influence; attitude structure, function, and change

BARBARA ROGOFF

Human development in sociocultural activity; informal and formal arrangements for learning; adult/child and peer communication in families and schools in diverse cultural communities (especially in Guatemala, Mexico, and the U.S.); learning through observation and collaboration

AVRIL THORNE

Personality development in adolescence and young adulthood, especially in the context of interactions with family members and friends; autobiographical memories; storytelling and the development of a sense of self; the allowances of introverted and extraverted friends

Associate Professor

HEATHER E. BULLOCK

Poverty and economic inequality, welfare policy, feminist psychology, discrimination

DAVID M. HARRINGTON

The ecology of creativity, longitudinal studies of creatively active adolescents, personality development, personality and situational assessment, research methods and data analysis

ALAN H. KAWAMOTO

Empirical and computer simulation approaches to the study of perceptual and cognitive processes, psycholinguistics, problem solving

TRAVIS L. SEYMOUR

Role of immediate memory, consciousness, and executive control on the human performance of laboratory and applied tasks; cognitive processes amenable to strategic control and how they influence the way in which we maintain situational awareness; high levels of performance in complex and cognitive tasks

AARONETTE WHITE

Adult feminist-identity development; personality correlates of feminist activism; feminist masculinities studies; feminist perspectives on peace and violence; narrative psychology and adult personality change; black feminist political psychology in the U.S. and abroad; critical psychology

MARGARET L. WILSON

Embodied cognition, broadly defined. Specific interests include person perception, imitation, visual cognition, working memory, sign language, and the evolution of cognition

EILEEN L. ZURBRIGGEN

Connections between power and sex; sexual aggression and abuse; sexual decision making; sexuality and media, the sexualization of girls; motivation, especially power and affiliation-intimacy motives; authoritarianism; implicit measures in social and personality psychology

Assistant Professor

SHELLY A. GRABE

Cultural objectification of women and women's bodies as a pervasive global phenomenon played out in different ways across different cultures; how "embodied oppression" affects women's psychological well-being and empowerment

PHILLIP L. HAMMACK

Cultural psychology, culture and identity, conflict and intergroup relations, political violence, narrative, sexual identity

REGINA D. LANGHOUT

School-community-university collaboration; how schooling and neighborhood experiences are informed by social class, race, and gender; participatory action research

SU-HUA WANG

Cognitive development, infant cognition, mental representations, theory of mind, how experience shapes early learning, parental child-rearing beliefs, cross-cultural perspectives on self-esteem

Lecturer

DAVID A. "TONY" HOFFMAN

Child and adolescent development, developmental psychopathology, child and adolescent assessment, school psychology, pediatric psychology, children and war, children in high risk situations

RALPH H. QUINN

Clinical psychology, moral development, psychology and religion, existential-humanistic psychology

DONALD T. SAPOSNEK

Childhood psychopathology, special needs children, parenting and family interactions, socialization of children, children and divorce, family mediation, conflict resolution

VERONICA K. TONAY

Clinical psychology, psychotherapy outcome, community mental health, dreams, personal narratives, creativity

Emeriti

ELLIOT ARONSON, Emeritus

G. WILLIAM DOMHOFF, Emeritus

MICHAEL KAHN, Emeritus

PAVEL MACHOTKA, Emeritus

MELANIE J. MAYER, Emeritus

BARRY MCLAUGHLIN, Emeritus

THOMAS F. PETTIGREW, Emeritus

M. BREWSTER SMITH, Emeritus



DANE ARCHER, Professor Emeritus, Sociology

SRI KURNIAWAN

Human-computer interaction; human factors and ergonomics; accessibility; assistive technology; usability; empirical studies; user-centered design

JEROME NEU, Professor, Humanities

Philosophy of mind, emotions and culture, philosophy of law, psychoanalytic theory

ROLAND G. THARP, Professor Emeritus,

Education and Psychology

Program Description

Psychology majors at UCSC are introduced to theory and scientific research in the field. Students begin with lower-division courses that include introductory psychology, precalculus, statistics, research methods, and introduction to developmental psychology. Majors subsequently take seven upper-division courses in four major areas of psychology: cognitive, social, developmental, and personality psychology, and one upper-division course outside the major from an approved list.

Cognitive psychology focuses on topics such as sensation and perception; brain and behavior; human information processing; decision-making; learning and memory; thinking, feelings, and emotions; and psycholinguistics. Social psychology addresses topics

such as persuasion and influence, motivation, group processes, intergroup relations, psychology and law, and social justice. Developmental psychology is concerned with processes of cognitive, language, social, emotional, and personality development across the life span. Additionally, both developmental and social psychology are concerned with issues of diversity including ethnicity, culture, gender, income, and family structure. Personality psychology focuses on person-centered processes including creativity, attachment, depression, and life stories.

In addition to the general psychology major, an intensive major and a minor (described below) are also available. (Students primarily interested in clinical and counseling psychology should realize that training in these areas does not occur at the undergraduate level but requires professional training through an advanced degree. UCSC does not offer advanced degrees in clinical psychology or counseling.)

Students are encouraged to carry out research projects. Interested psychology majors will find research opportunities in courses, as research assistants in faculty members' research programs, or through faculty-sponsored independent study. This research may be carried out in specialized research laboratories or in the field. Students usually join an ongoing project in which a faculty member is engaged. Students who are especially interested in a career involving empirical research should become involved in a professor's ongoing research by their junior year. Some recent research topics include "Making Decisions," "How Do You Organize Your World?" "I'm Every Woman: A Look at Female Perspectives," "Family Story Telling," and "Friendship and the College Transition."

Preparation for the Major

Students interested in pursuing the psychology major should officially declare the pre-psychology major after attending the required pre-psychology orientation. Quarterly orientation schedules are posted on the Psychology Department web site, <http://psych.ucsc.edu>. After completing the lower-division required courses, students may then declare the psychology major.

High school students considering psychology as their university major find that the best preparation is a solid general education in English, mathematics through pre-calculus, natural sciences, social sciences, and writing.

Transfer Students

Junior transfer students should express an interest in psychology on their UCSC application for admission.

It is expected that prospective transfer students will have completed most, if not all, of the lower-division requirements. The psychology faculty recommends that all lower-division requirements be completed by the end of the sophomore year.

Several measures are taken to control over enrollment in the psychology major. At the time of transfer, students must have a 3.0 or higher grade-point average in all UC-transferable course work, with at least a 3.1 in all psychology courses. Junior-level students with 120+ quarter credits will not be admitted into the pre-major. This occasionally affects transfer students who have many credits on their records. It can also affect students who want to change their major in mid-junior year. Senior-level students with 135+ quarter credits will not be admitted into the major. This affects seniors who want to add a minor or double major in psychology (it does not affect those who have already declared a pre-psychology major). Students who want to fulfill requirements with courses taken at other colleges must

petition for the substitution of their transfer courses at an orientation session or at an appointment with the department adviser. Students planning to transfer to UCSC should check with the advising office of their present college, or refer to www.assist.org.

Transfer students are strongly encouraged to speak with an academic adviser at the Psychology Department office prior to enrolling in classes in order to determine their status and begin the actual declaration of major process.

General Psychology Major

Thirteen courses are required for the general major: five lower-division courses in preparation for the major and eight upper-division courses. The lower-division courses are prerequisites for virtually all of the upper-division courses and should be completed as early as possible, or by the end of the sophomore year. Some upper-division courses have additional prerequisites. Once the lower-division courses have been completed, a student may petition to declare the psychology major.

Lower-Division Requirements

Psychology

- 1 *Introduction to Psychology* (or equivalent)
- 2 *Introduction to Psychological Statistics* (or equivalent)
- 3 *Research Methods in Psychology*
- 10 *Introduction to Developmental Psychology*

Mathematics 3 *Precalculus* (or equivalent)

Psychology 20, 40, and 60 are strongly recommended.

Upper-Division Requirements

Students must complete at least eight upper-division courses (a minimum of 40 credits), including appropriate substitutions noted below, two from each of any three of the following subfields, one course from the remaining subfield, and one course outside the major for a total of eight upper-division psychology courses:

Developmental (courses numbered 100–119)

Cognitive (courses numbered 120–139)

Social (courses numbered 140–159)

Personality (courses numbered 160–179)

Upper-division courses and their catalog descriptions are grouped within each of the subfields. At least one upper-division seminar course must be completed; these courses are identified within their catalog description by the phrase "satisfies seminar requirement." No more than two psychology courses numbered 193, 194, and 195 may be used toward the upper-division requirements; however, these 190 series courses cannot be substituted for 100-179 courses in the same subfield as each other, or in a subfield in which the student has not taken a course in the 100-179 series. The eighth upper-division requirement must be a five-unit UCSC course outside of psychology chosen from a list of courses approved by the subfield in which students may have taken only one upper-division course. If students have taken two upper-division psychology courses in each of the four subfields, their required outside course can be chosen from a list approved by any of the four subfields. These lists of approved non-psychology courses are posted on the Psychology Department web site. At least five of the eight courses must be taken through the psychology program at UCSC, not transferred from elsewhere; this requirement occasionally affects the plans of transfer students arriving at UCSC with many psychology courses on their transcript. An exception will be made so that students can receive credit for up to three preapproved EAP courses toward their upper-

division major requirements. Students requesting this exception would be required to take at least five of their eight upper-division courses through the psychology program at UCSC. After all substitutions have been made, students must satisfy the fundamental requirement that they take at least one upper-division UCSC psychology course from each of the four subfields.

The Psychology Department recommends that students take substantive courses in related disciplines such as anthropology, biology, community studies, computer science, education, linguistics, philosophy, and sociology.

Program Planning Notes

Because some upper-division courses have additional prerequisites, students should read the descriptions of the upper-division courses carefully, noting the prerequisites for courses of interest to them.

Psychology Major Planners

Following are two recommended academic plans for students to complete during their first two years as preparation for the psychology major. Plan One is a suggested guideline for students who are committed to the major early in their academic career. Plan Two is for students who are considering the major or who need more preparation. Students should note that Mathematics 3 is a requirement for the major and a prerequisite for Psychology 2. Courses 20, 40, 60, and Biology 70 are recommended electives and are prerequisites for some upper-division psychology courses.

Plan One			
YEAR	FALL	WINTER	SPRING
1st (frsh)	Math 3 Psyc 1	Psyc 2	Psyc 3
2nd (soph)	Psyc 10 Biol 70 (recommended)	Psyc 40 (recommended) (Begin upper-division course work)	Psyc 60 (recommended)

Plan Two			
YEAR	FALL	WINTER	SPRING
1st (frsh)	Math 3 Psyc 1	Psyc 1	Psyc 10
2nd (soph)	Psyc 60 Biol 70 (recommended)	Psyc 2	Psyc 3 Psyc 40

The Intensive Psychology Major

The intensive major is an option that any psychology major may choose to undertake. The intensive major would be advantageous for a student intending to go on to a graduate program in any area of psychology. Students intending to take the intensive major should declare this on their proposed study plan during the junior year, outlining their plan for completing the requirements. The intensive major requires 18 courses.

Requirements for the Intensive Major

Lower-Division Requirements

Psychology

- 1 *Introduction to Psychology* (or equivalent)
- 2 *Introduction to Psychological Statistics* (or equivalent)
- 3 *Research Methods in Psychology*
- 10 *Introduction to Developmental Psychology*

Mathematics 3 *Precalculus* (or equivalent)

Once these lower-division courses have been completed, a student may petition to declare the psychology major.

Upper-Division Requirements

- Thirteen upper-division courses are required for the intensive major. These courses must include two courses from each of the following four subfields, one of which must be a seminar:

Developmental (courses numbered 100–119)

Cognitive (courses numbered 120–139)

Social (courses numbered 140–159)

Personality (courses numbered 160–179)

- Psychology 181 *Psychological Data Analysis*, or an equivalent course approved by the department
- Two quarters of Psychology 194 *Advanced Research* or 195 *Senior Thesis*
- Two upper-division courses from one or more related areas outside of psychology from lists of courses pre-approved by the Psychology Department and posted on the department's web site, <http://psych.ucsc.edu>. These two courses will not count toward the eight upper-division requirements listed above. (These courses may not include psychology courses cross-listed with other programs or taught by psychology faculty.) These courses also cannot be counted twice in cases of double majors or minors.

Minor in Psychology

To obtain a minor in psychology, a student must complete the following courses:

- Psychology 1 (or equivalent), 2 (or equivalent), 3, and 10
- Mathematics 3 (or equivalent)
- five (25 units) upper-division courses in psychology. These courses must be from at least two of the four subfields: developmental, cognitive, social, and personality.

Once these lower-division courses have been completed, a student may petition to declare the minor in psychology.

No more than one psychology course numbered 191–199 may be used toward the upper-division requirements. At least three of the upper-division psychology courses (100–199 range) must be taken through the psychology program at UCSC, not transferred from elsewhere; this requirement occasionally affects the plans of transfer students arriving at UCSC with many psychology courses on their transcript.

Comprehensive Requirement

UCSC requires that every student satisfy a senior exit/comprehensive requirement prior to graduation. Psychology students will satisfy this requirement by receiving a passing grade in one of our seminars. Passing a seminar course is also required for the major. Courses that meet this requirement are designated as seminars in the campus catalog as “satisfies seminar requirement.”

Academic Advising

Students are encouraged to approach faculty in their area of interest for further advising no later than the first quarter of their junior year to discuss an upper-division program of study and to plan for graduate training in psychology. As a supplement to academic advising offered by faculty members, the Psychology Department has an advising office located at 273 Social Sciences 2 Building, (831) 459-2002. The adviser assists

students in obtaining information regarding major requirements and petitions, course planning, substitution of transfer courses for advance enrollment, careers, and graduate schools. Students can also get advice about the Graduate Record Examination and assistance in initiating a senior thesis and independent studies. Students are encouraged to take advantage of the advising office throughout their college career.

Disqualification from the Major/Minor

Students who receive a No Pass, D, and/or F twice in any one of courses Psychology 1, 2, 3, 10, or Mathematics 3 (or equivalent), or who receive a No Pass, D, and/or F in three or more of these courses combined, will be considered to be not making normal progress in the major or minor and will be subject to disqualification from the major or minor. Students who feel that there were extenuating circumstances surrounding their failure of a course for the second time or their failure in three courses may appeal their disqualification from the major or minor and/or later petition the department for reinstatement. For further information regarding the disqualification process, contact the Psychology Department office.

Senior Thesis

Students with adequate substantive and methodological preparation and a consistent record of strong academic performance may be eligible to apply to write a senior thesis. Students should initiate plans for a thesis no later than the first quarter of their senior year. Most faculty prefer to sponsor senior theses that are integrated with faculty research, so students are encouraged to talk with faculty before choosing a senior thesis topic. Information and applications are available in the department office, 273 Social Sciences 2.

Honors

Honors in the psychology major are awarded to graduating seniors whose academic performance is judged to be consistently excellent by a committee of psychology faculty. Highest Honors in the major are reserved for students with consistently excellent academic performance and an honors-level senior thesis.

Psychology Field-Study Program

The psychology field-study program provides qualified students an opportunity to apply classroom learning to direct experience in a community agency. Each year about 200 students develop new skills and clarify personal and professional goals by working as interns in schools, corporations, law enforcement agencies, research organizations, mental health services, and other social service agencies where they are supervised by professionals. Psychology faculty members sponsor the students' field study helping them to integrate their field experience with course work and guiding them in related academic projects.

The two-quarter program is open to junior and senior psychology majors who must apply at least one quarter in advance. There are preparation seminars and individual meetings to help students develop a learning plan, select a placement, and choose an academic project. Application information can be obtained at the psychology field-study bulletin board, second floor of Social Sciences 2, and at: http://psych.ucsc.edu/field_study.

Graduate Program

The psychology program offers three areas of specialization leading to the doctoral degree: cognitive,

developmental, and social psychology. The program does not offer courses, training, or supervision in clinical psychology. The program prepares students for research, teaching, and administrative positions in colleges and universities as well as for positions in schools, government, and other public and private institutions. Each student is primarily associated with one of the three research areas and participates in the courses and research forums sponsored by the faculty in that area. The program requires full-time enrollment as a graduate student. Although applicants for a master's degree are not accepted, students in the Ph.D. program may obtain an M.S. degree by fulfilling specific requirements.

Graduate work in cognitive psychology trains students in the traditional methods of experimental psychology while mastering contemporary knowledge of cognitive psychology. The cognitive faculty have specific expertise in psycholinguistics, memory, and perception. Research interests of the faculty include human information processing, cognitive and social processes in learning and memory, language and discourse comprehension, reading, speech perception and production, computer simulation and mathematical modeling of cognitive processes, spatial vision, and visual psychophysics.

Graduate work in developmental psychology is concerned with the integration of individual, interpersonal, and cultural processes of development. Our faculty study these developmental processes in diverse communities and institutions, including families, peer groups, schools, museums, and close relationships. We use a mixture of quantitative and qualitative methods. This integrative training is supported by an NIH training grant that provides funding for graduate students and post-doctoral trainees. Some research interests of the faculty include: learning by observing, overhearing, and participating; infants' and children's cognitive and language development; conversation, narrative, and memory sharing; academic achievement and career aspirations; family/peer/school links; gender development and discrimination; personality development; personal and social identities; intergroup relations; ethnicity, culture, and development; social policy and educational practice.

The social psychology graduate program at UCSC has a unique mission and focus. We use Kurt Lewin's model of “full-cycle” (theory-application-action) social psychology to study a broad range of topics related to social justice. Our students learn to apply psychological theories and data to the analysis and solution of a wide range of social problems. Knowledge gained in action-oriented research leads, in turn, to the development of new theory. We examine justice-related issues in different cultural, political, and policy contexts, through a variety of research methods. Our students are trained in laboratory, field, and survey methods, encouraged to attend to issues of race, class, sexuality, ethnicity, gender, and physical ableness, and steeped in critical theoretical perspectives such as feminist theory. Our graduates go on to successful careers in academia as well as in community, government, and non-profit settings. Our approach to research and training, combined with the quality and competencies of our faculty, make our program among the nation's best for the psychological study of social justice issues. Current faculty research interests include educational access, sexuality, poverty and economic justice, psychology and law, aggression and trauma, peace psychology, intergroup relations, social identity, social policy analysis, structural inequality, intersectionality, and feminisms.

Students in all three research areas acquire teaching experience as teaching assistants for a minimum of two courses during their graduate career.

Graduate students in psychology may obtain a notation on the psychology Ph.D. diploma indicating that they have specialized in feminist studies and/or Latino American and Latino Studies (LALS) if they meet requirements spelled out by a committee composed of psychology and feminist studies faculty, or psychology and LALS faculty.

Details on the policies for admission to graduate standing and requirements for the Ph.D. degree, as well as the online application can be found on the Division of Graduate Studies web site. The department's graduate program brochure, and faculty research are available on the department web site.

Students enrolled in the psychology graduate program will complete a first-year and second-year research project. All graduate students must enroll and participate in the colloquium series each quarter (Psychology 230 for cognitive, Psychology 242 for developmental, and PSYC 231 for social.) First-year students must take two courses in statistics (Psychology 204 and Psychology 214A) and a two-quarter proseminar sequence during fall and winter quarters. (Psychology 224A and 224B for cognitive, Psychology 244A and 244B for developmental, and Psychology 211A and 211B for social.) Each student is also required to serve as a teaching assistant for at least two courses during his or her graduate career (one of which must be Psychology 10 for developmental and Psychology 40 for social).

Additional requirements for the cognitive area include: three advanced cognitive graduate courses, a graduate course in developmental psychology, a graduate course in social psychology, and a substantive advanced course in a discipline other than psychology.

Additional requirements for the developmental area include: Psychology 225A, Psychology 225B, Psychology 246, one other advanced developmental graduate seminar course, a graduate course in cognitive psychology, a graduate course in social psychology, and a substantive advanced course in a discipline other than psychology. Developmental graduate students are also required to complete a professional practicum between the end of their second year and end of their third year.

Additional requirements for the social area include: Psychology 210, Psychology 248, one other advanced social graduate seminar, a graduate course in cognitive psychology, a graduate course in developmental psychology, and a substantive advanced course in a discipline other than psychology.

After satisfying the formal course and research requirements, psychology graduate students must take an oral examination to qualify as a candidate for the Ph.D., usually by the end of their third year. The qualifying exam is intended to assess a student's knowledge of psychology and competence to conduct the dissertation research. For the qualifying exam, students write a major paper that reflects a conceptual analysis of their main research area, prepare a list of readings representative of their expertise in three areas of psychology, and satisfactorily complete an oral qualifying exam.

Within two quarters of advancing to candidacy, students will prepare a written dissertation proposal that should demonstrate the student's in-depth knowledge of some research topic, along with a detailed outline of the empirical research to be conducted for the dissertation. The student's dissertation committee reviews the proposal, and the student will orally defend the proposal for approval by the committee. After the final draft of the dissertation has been completed and submit-

ted to the faculty committee members, students must defend their thesis in an oral exam. The Ph.D. degree is awarded upon successful completion and submission of the dissertation.

Lower-Division Courses

General

1. Introduction to Psychology. F,W,S

Introduces prospective majors to the scientific study of behavior and mental processes and also provides an overview for non-majors. Emphasizes social, cognitive, developmental, and personality psychology and their interrelations. (General Education Code(s): IS.) (F) *M. Callanan*, (W) *A. Kawamoto*, (S) *F. Crosby*

2. Introduction to Psychological Statistics. W,S

An introduction to elementary statistical principles and techniques relevant to psychological research. Topics covered include basic parametric and nonparametric statistics, analysis of variance, and simple factorial designs. This course is prerequisite to course 181. Prerequisite(s): course 1, and Applied Mathematics and Statistics 3 or Mathematics 3 or 11A or satisfactory placement score on math placement exam or CEEB Advanced Placement Calculus AB exam. (General Education Code(s): Q.) *The Staff*

3. Research Methods in Psychology (7 credits). F,S

An introduction to research methods used to investigate human psychology. Course emphasizes critical thinking, designing and conducting research, analyzing and interpreting data, and writing a professional research report. Prerequisite(s): course 2 or Applied Mathematics and Statistics 5. Enrollment restricted to prepsychology majors; minors by permission of instructor. (F) *F. Crosby*, (S) *D. Massaro*

10. Introduction to Developmental Psychology. F,W,S

Psychological development from birth to adolescence, with primary emphasis on infancy and childhood. A broad introduction to the field of developmental psychology. Prerequisite(s): course 1. Enrollment restricted to pre-psychology majors. (F) *M. Azmitia*, (W) *S. Wang*, (S) *N. Akhtar*

20. Introduction to Cognitive Psychology. F

Introduces basic concepts in cognitive psychology. Topics include thinking, consciousness, perceiving, language, remembering, reasoning, problem solving, and decision-making. Prerequisite(s): course 1. *T. Seymour*

40. Introduction to Social Psychology. F,S

An analysis of contemporary research in social psychology and of what that research can teach us about the world we live in. Problems of conformity, propaganda, prejudice, attraction, and aggression. Focuses on a person's relationship with other people—how he or she influences them and is influenced by them. Prerequisite(s): course 1. (F) *A. Pratkanis*, (S) *The Staff*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division or graduate students under faculty supervision. (See course 192.) *The Staff*

60. Introduction to Personality Psychology. W,S

An overview of major personality theories from Freud to the modern day, and an introduction to contemporary personality research and assessment. Prerequisite(s): course 1. (W) *P. Gjerde*, (S) *A. Thorne*

65. Introduction to Humanistic Psychology. S

Humanistic psychology is seen here as those contemporary aspects of the field which are explicitly directed toward life-enrichment for members of the culture. The course does not attempt a complete survey of these aspects, but rather explores some of them in depth and attempts to begin working toward an overall theory of the humanistic movement. (General Education Code(s): IS.) *R. Quinn*

80A. Psychology and Religion. F

Topics covered include myth and the unconscious, the varieties of religious experience, dualism, women and religion, the role of authority, transpersonal experience, conversion, disaffiliation, self and community. (General Education Code(s): T3-Social Sciences.) *R. Quinn*

80B. Human Sexuality. W

A study of human sexuality emphasizing its psychological aspects. Sexual development, sexual orientations, biological influences, sexual attitudes and behavior, gender and gender roles, sex therapy, sexual coercion and abuse, sexually transmitted diseases, and the development of sexual relationships. (General Education Code(s): T3-Social Sciences.) *V. Tonay*

Upper-Division Courses

Developmental

100. Topics in Developmental Psychology.

These topics, offered at different times by different instructors, examine selected topics in developmental psychology. *The Staff*

101. Development in Infancy. W

Focuses on psychological development in infancy. Presents research on perceptual, cognitive, and social-emotional development during the first two years of life. (Formerly course 107.) Prerequisite(s): courses 3 and 10. *N. Akhtar*

102. Adolescent Development: Adolescence into Young Adulthood. F

Focuses on individual and relational development from early adolescence into young adulthood. Emphasis on the mutual influences of family relationships and adolescent development, and on the interface of family, peer group, and school experience in cultural contexts. Prerequisite(s): courses 3 and 10. *The Staff*

103. Adult Development and Aging. S

An introduction to cultural, biological, interpersonal, and cognitive processes that influence adult development and aging. We discuss how each of these processes promotes stability and change during adulthood. (Formerly course 109.) Prerequisite(s): courses 3 and 10. *M. Azmitia*

105. Children's Thinking. S

Cognition in children from infancy through adolescence. Basic and current research on children's understanding of the social and physical world. Focus on major theoretical perspectives: Piaget's constructivist approach, information processing approach, and sociocultural approach. (Formerly course 117.) Prerequisite(s): courses 3 and 10. *The Staff*

106. Social and Emotional Development. W

An examination of contemporary theory and research on social and emotional development from infancy through childhood. Prerequisite(s): courses 3 and 10. *C. Leaper*

110. Culture and Human Development (6 credits). W

Examines theory, research, and methods of studying the inherent cultural basis of human development and variations and similarities in human lives and activities in different communities worldwide. The approach draws on ideas and observations from psychology, anthropology, linguistics, sociology, and history. Course includes lab exercises using interview and observation methodologies and presentations of library research. (Formerly course 113.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements and one of the following: course 1; Anthropology 1 or 2; Education 92A, 92B, or 92C; Latin American Studies 1; or Sociology 1. (General Education Code(s): W, E.) *B. Rogoff*

115. Lifespan Developmental Psychopathology. *

Examines theory and research on developmental psychopathology. Emphasizes the origin and longitudinal course of disordered behavior. Explores the processes underlying continuity and change in patterns of adaptation and age-related changes in manifestations of disorders. (Formerly course 119.) Prerequisite(s): courses 3, 10, and 170. *P. Gjerde*

118. Special Topics in Developmental Psychology.**118A. Children and War. ***

Examine development and behavioral ecology of children affected by war. Discuss development of displaced children, abandoned children, orphaned children, children living in protracted conflict, and child soldiers. Review child protection strategies and psychosocial intervention. (Formerly course 118.) Prerequisite(s): courses 3 and 10. *D. Hoffman*

119. Senior Seminars in Developmental Psychology.**119A. Development as a Sociocultural Process. ***

Examines theory and research in sociocultural approaches to how people (especially children) learn and develop through participating in activities of their communities with other people. Emphasizes the organization of social interactions and learning opportunities, especially in communities where schooling has not historically been prevalent. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100L.) Prerequisite(s): satisfaction of Entry Level Writing, Composition requirements; course 1, Anthropology 1 or 2, Education 92A, 92B, or 92C, Latin American and Latino Studies 1, or Sociology 1. Enrollment restricted to seniors or permission of instructor. Enrollment limited to 30. (General Education Code(s): W.) *B. Rogoff*

119B. Cultural Psychology. F

Critically analyzes relations among culture, ethnicity, identity, and the nation-state in a world characterized by globalization, migration, and social change. Examines the relevance of these features for the development of children and youth through examples from both Western and non-Western "cultures." Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100D.) Enrollment restricted to senior psychology and anthropology majors. Enrollment limited to 30. (General Education Code(s): E.) *P. Gjerde*

119C. The Social Context of Children's Cognitive Development. *

Focuses on the contribution of cultural and social relationships (e.g., parent-child, peers, siblings) to

cognitive development. Special emphasis on the mechanisms through which relationships influence cognition and the features of social interactions that promote and inhibit development. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100C.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, course 117 preferred. Enrollment restricted to senior psychology majors or permission of instructor. Enrollment limited to 30. (General Education Code(s): W.) *M. Azmitia*

119D. Cultural Perspectives on Adolescent Development. W

Examines cultural influences on adolescence from the perspective of current interdisciplinary theory and research, focusing on identity, changes from early adolescence to adulthood, linkages from family to community experiences, gender, immigration, biculturalism, and implications for social policy. Includes research practicum. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100J.) Enrollment restricted to senior psychology majors or permission of instructor. Enrollment limited to 30. *C. Cooper*

119E. The World of Babies. *

Focuses on how infants learn about intuitive physics, naive psychology, and shared culture. Also discusses possible ways to facilitate this learning. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100B.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *S. Wang*

119F. Language Development. F

An introduction to language development in children. Explores current theory and research in language development; focuses on the preschool years. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 103.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *N. Akhtar*

119G. Development of Thought and Language. *

Explores the dynamic interface between thought and language throughout development. Focuses on early expression and understanding of meaning in infants and young children and on analysis of everyday conversations and activities of children as a window on developing understandings of the world. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100K.) Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements. Enrollment restricted to senior psychology majors. Enrollment limited to 30. (General Education Code(s): W.) *M. Callanan*

119H. Developmental Psychology Research and "Real World" Problems. F

Explores ways that research in developmental psychology can be used to address "real-world" problems facing children. With an analytical focus on evidence and generalizability, we will investigate research-policy connections in topics of popular interest (e.g., child custody, poverty). Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100R.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to senior psychology majors. Enrollment limited to 30. (General Education Code(s): W.) *M. Callanan*

119I. Special Topics in Narrative Development. F

Examines a special topic of current interest in developmental psychology centering on features of development that unfold during free-flowing discourse, e.g., interviews, conversations, and reminiscences. Topics may include the development of self-narratives, personal memories, family stories, attachment, identity, or achievement. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100N.) Enrollment restricted to senior psychology majors. Course 60 recommended. Enrollment limited to 30. *A. Thorne*

119J. Current Topics in Personality and Developmental Psychology. W

Examines a special topic of current interest in personality and/or developmental psychology, such as attachment, self-images, self-narratives, motivation, longitudinal studies, systematic descriptions of contexts, and special topics in adolescence. Emphasizes conceptual and methodological issues. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 115.) Prerequisite(s): course 60. Enrollment restricted to senior psychology majors. Enrollment limited to 30. *D. Harrington*

119L. Biological Foundations of Life Span Development. F

Focuses on the biological foundations of cognitive and social development in childhood, adolescence, and old age. Topics include theory of mind and autism, planning, problem-solving, and emotional regulation in adolescence, and cognitive growth and decline in old age. Satisfies the senior seminar requirement. Satisfies the comprehensive requirement. Enrollment restricted to senior psychology majors. Enrollment limited to 30. *M. Azmitia*

119M. Identity Development in Social and Cultural Contexts. *

Senior seminar that focuses on identity development in adolescence and young adulthood. Discusses theory and research on the development of personal and social identities and the sociocultural contexts in which these personal and social identities are negotiated. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 100V.) Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 102 strongly recommended. Enrollment restricted to senior psychology majors or by permission of instructor. Enrollment limited to 30. (General Education Code(s): W.) *M. Azmitia*

120. Visual and Spatial Cognition. *

Focuses on visual and spatial representation as elements of human cognition. Topics include imagery, visual attention, mental models, spatial language, the body schema, near-body space, and brain organization for representing space. (Formerly course 130.) Prerequisite(s): course 3; course 20 or any upper-division cognitive course is highly recommended. *M. Wilson*

121. Perception. S

Basic perceptual psychology, emphasizing the relationships between perception and cognition. Topics include shape, color, and depth; hearing, taste, smell, and touch; and perceiving faces, voices, and language. Prerequisite(s): course 3 or Biology 70. *M. Wilson*

123. Behavioral Neuroscience. W

An examination of the physiological mechanisms of psychological processes, including sensory systems, motor

systems, control systems, and memory and learning. Principles of nervous system organization are discussed at each level. Prerequisite(s): course 1 or Biology 70 and one course in statistics (course 2 or Applied Mathematics and Statistics 5 or 7). *The Staff*

124. Psychology of Reading. S

Focuses on the cognitive processes that underlie reading in adults. Additional topics include different writing systems, learning to read, and reading deficits. Recommended for upper-division students. Prerequisite(s): course 3. *A. Kawamoto*

125. The Psychology of Language. W

A study of human communication as a function of psychological, linguistic, and social factors. Topics covered include language comprehension and production, language and reasoning, and language as a social activity. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; course 3 or 20 or Linguistics 52 or 53 or 55. (General Education Code(s): W.) *J. Fox Tree*

126. Aging and the Human Brain. F

How does the brain change as we age? Course covers new developments in research on cognitive neuroscience and aging, with a focus on the consequences for memory, emotion, and decision-making. Prerequisite(s): course 20, 121, 123, 129 or Biology 70. *The Staff*

127. Computer Mediated Communication. *

Provides an introduction to perception and cognition as it relates to how people communicate with each other using computers and the Internet. Considers both cognitive/perceptual aspects as well as social aspects of communication and how computers enhance/constrain that communication. Prerequisite(s): course 3 or 20 or consent of instructor. Enrollment limited to 40. *A. Kawamoto*

128. Human Factors. W

Human factors psychology studies human-machine interaction and computer usability, and involves diverse topics including displays and controls; human error; decision-making; psycholinguistics; and the role of fatigue, environmental stressors, and social/team factors that directly impact human performance. Prerequisite(s): course 3. *J. Crowson*

129. Human Learning and Memory. *

Examines basic theories, models, methods, and research findings in human memory. Both traditional and nontraditional topics are covered. Students cannot receive credit for this course and course 130A. Prerequisite(s): course 3. *T. Seymour*

130. Deception, Brain, and Behavior. F

Focuses on behavioral and brain manifestations of deception. Topics include developmental changes that allow us to understand and to use deception, physical implications of lying expressed in the face, voice, posture, and brain activity. Also covers mechanical or behavioral techniques used in deceptive behavior, whether in the form of overt behavior or brain activity. (Formerly course 130B.) Prerequisite(s): course 3; course 20 or any upper-division cognitive course strongly recommended. *T. Seymour*

131. Human-Computer Interaction. F

Theory and hands-on practice to understand what makes user interfaces usable and accessible to diverse individuals. Covers human senses and memory and their design implications, requirement solicitation, user-centered design and prototyping techniques, and expert and user evaluations. Interdisciplinary course for social science and engineering majors. Students cannot receive

credit for this course and Computer Engineering 231 or Psychology 223. (Also offered as Computer Engineering 131. Students cannot receive credit for both courses.) Prerequisite(s): course 3 or Computer Science 12B. *S. Kurniawan*

134. Weird Science. S

Explores the relationship between science and pseudoscience from a cognitive psychological perspective, including discussion of collection and selection of data, statistical assessment of data, cognitive illusions, memory distortions, reasoning, and decision-making. Also highlights the dissemination of scientific knowledge. Satisfies seminar requirement. Satisfies comprehensive requirement. Prerequisite(s): course 3 or course 20. Enrollment restricted to senior psychology majors. Enrollment limited to 30. *J. Fox Tree*

135. Feelings and Emotions. F

Focuses on contemporary research in the psychology of human emotions. Special attention given to work in cognitive science, including psychology, linguistics, philosophy, and anthropology, on how emotions are central to understanding human action and mental life. Enrollment restricted to psychology, linguistics, philosophy, and anthropology majors. *R. Gibbs*

137. Mind, Body, and World. *

Psychologists primarily view the mind as being separate from the body, and the body as being separate from the external world. This course questions this widely held position and explores the way that minds arise from individuals' bodily interactions with others and the world around them. Particular attention is paid to the role of human embodiment in language use and everyday cognition. Enrollment restricted to psychology, linguistics, philosophy, and anthropology majors. *R. Gibbs*

138. Psychology of Interactive Media. *

A laboratory course in which students work with state-of-the-art language technologies. The goal is to design, conduct, and analyze experiments in interactive media and human machine interface. Empirical and theoretical literature will be covered as a foundation for the experiments. Prerequisite(s): course 3 or permission of instructor. Enrollment limited to 20. *D. Massaro*

Cognitive

139. Senior Seminars in Cognitive Psychology.

139A. Deafness and Sign Language. *

Explores what we can learn about human cognition by studying the atypical case of sensory loss and language in a different sensory modality. Topics include brain organization, sensory compensation, working memory, visual cognition, and psycholinguistics. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 120D.) Prerequisite(s): course 20 or an upper-division cognitive course strongly recommended. Enrollment restricted to senior psychology majors and minors. Enrollment limited to 30. *M. Wilson*

139B. Consciousness. S

Provides a psychological study of human consciousness. Aim is to explore the following questions: What is consciousness? Where does consciousness come from? What functions does consciousness have in everyday cognition? How do we best scientifically study consciousness? These issues are examined from the perspective of contemporary research in cognitive science. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 120E.)

Enrollment restricted to senior psychology, philosophy, anthropology, and linguistics majors. Enrollment limited to 30. *R. Gibbs*

139C. The Psychology of Lying and Deception. *

Discusses why and how people lie. Using scientific articles, movies, and our everyday lives as source material, explores the nature of lying; then focuses on various approaches to behavioral and mechanical "lie detection." Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 120F.) Enrollment limited to 30. *T. Seymour*

139D. Modeling Human Performance. S

Explores how information processing models distinguish between multiple theories of human memory and performance. Students analyze variety of cognitive tasks and phenomena to produce explicit information processing models. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 120K.) Enrollment restricted to senior psychology majors or relevant mathematical or computer science background with permission of instructor. An upper-division cognitive course is strongly recommended. Enrollment limited to 30. *T. Seymour*

139F. Psychology and Evolutionary Theory. *

Human psychology is examined from the viewpoint of evolutionary theory, including perspectives from ethnology, anthropology, and neuropsychology. Upper-division students from diverse backgrounds are encouraged to enroll. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 133.) Enrollment restricted to junior and senior psychology, anthropology, biology, philosophy, sociology, and feminist studies majors or permission of instructor. Enrollment limited to 30. *B. Bridgeman*

139G. Conversations. F

Explores how conversations work and how speakers accomplish their goals in an interaction. Topics include conversational structure, turn-taking, variation in language use, and the functions of discourse markers (words like "um," "uh," and "you know"). Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 136.) Enrollment restricted to junior and senior psychology and linguistics majors. Enrollment limited to 30. *J. Fox Tree*

Social

140. Topics in Social Psychology.

140A. Women's Lives in Context: Community Practicum (2 credits). *

Provides link between course 140G and community organizations that work with women. Students complete internships with relevant agencies and participate in seminar meetings. Concurrent enrollment in course 140G required. Enrollment limited to 20. *H. Bullock*

140C. Health Psychology. F

Course examines the psychological aspects of health, illness and healing. Focuses primarily on etiology, treatment and prevention; specific topics include stress and the immune response, social support, compliance, health beliefs, and the healing relationship. Prerequisite(s): courses 3 and 40. *J. Kaupp*

140G. Women's Lives in Context. F

Examines contemporary theories, findings, and social issues regarding the psychology of women. Emphasis is placed on understanding how gender, class, race, ethnicity, and sexuality shape women's experiences across the lifespan. Students cannot receive credit for this

course and course 41. Enrollment restricted to junior and senior psychology, feminist studies, sociology, and community studies majors. *S. Grabe*

140Q. Social Psychology of Sex and Gender. F
Considers individual, interpersonal, and cultural influences on gender similarities and differences in thinking, motivation, and behavior. Emphasizes factors related to power and status inequalities between women and men. Prerequisite(s): courses 3 and 40. *C. Leaper*

140T. Psychology of Trauma. F
Overview of psychological theory and research on trauma and traumatic stress, including responses to childhood trauma (especially sexual abuse), combat, and natural disasters. Variety of theoretical frameworks presented, including developmental, cognitive, neuropsychological, clinical, and social/contextual. Prerequisite(s): course 3 or permission of instructor. *E. Zurbriggen*

143. Intergroup Relations. F
Introduces the study of conflict and intergroup relations. Examines historical and cultural foundations of group psychology and social psychological theory and research on conflict between groups, cultures, and nations. Surveys work on multiculturalism, race relations, and global political conflict. Applies social psychological theories to cases of intergroup conflict. Prerequisite(s): course 3 and 40. (General Education Code(s): E.) *P. Hammack*

145. Social Influence. W
An advanced course for upper-division undergraduates interested in the study of the persuasion process. The course investigates common influence tactics and how those tactics are used in various settings. Prerequisite(s): course 3. *A. Pratkanis*

146. The Social Context. *
A systematic analysis of the social and contextual determinants of human behavior, with special attention given to concepts of situational control, social comparison, role and attribution theories, as well as the macrodeterminants of behavior: cultural, historical, and sociopolitical context. Prerequisite(s): courses 3 and 40 or Sociology 136. *The Staff*

147A. Psychology and Law. W
Current and future relationships between law and psychology, paying special attention to gaps between legal fictions and psychological realities in the legal system. Topics include an introduction to social science and law, the nature of legal and criminal responsibility, the relationship between the social and legal concepts of discrimination, and the nature of legal punishment. (Also offered as Legal Studies 147A. Students cannot receive credit for both courses.) Prerequisite(s): courses 3 and 40 are recommended prior to taking this course. Enrollment restricted to psychology, pre-psychology, and legal studies majors. *C. Haney*

147B. Psychology and Law. S
Continuing discussion of current and future relationships between law and psychology and to contrasting psychological realities with legal fictions. Special attention is given to the criminal justice system including the psychology of policing and interrogation, plea bargaining, jury selection and decision making, eyewitness identification, and the psychology of imprisonment. (Also offered as Legal Studies 147B. Students cannot receive credit for both courses.) Prerequisite(s): course 147A. *C. Haney*

149. Community Psychology: Transforming Communities. *
Introduction to community psychology, a discipline that blends social psychology, sociology, and anthropology. Class topics include levels of analysis, ecologies, prevention, intervention, feminism, empowerment, sense of community, coalition building, and social justice and action. Prerequisite(s): course 3. Enrollment restricted to juniors and seniors. *R. Langhout*

153. The Psychology of Poverty and Social Class. S
Examines how social class shapes attitudes, beliefs, and behaviors. Emphasis is placed on structural barriers and their impact on the well-being of low-income groups. Strategies for reducing classist discrimination and improving interclass relations are discussed. Enrollment restricted to anthropology, community studies, economics, legal studies, politics, psychology, sociology, or feminist studies majors. *H. Bullock*

153A. Psychology of Poverty and Social Class Community Practicum (2 credits). *
Provides a link between course 153 and community organizations with an antipoverty mission. Students complete internships with nonprofit agencies and participate in seminar meetings. Prerequisite(s): concurrent enrollment in course 153. Enrollment limited to 20. *H. Bullock*

156. Organizational Psychology. S
The psychology of organized human interaction: individual motivation; social perception; leadership and participation; group, intergroup, and system dynamics; conflict and conflict resolution; cooperation and decision-making. Also considers contemporary issues facing American organizations. (Formerly course 159.) Prerequisite(s): course 3. *M. Chemers*

157. Chicana Feminism. *
Students are introduced to the writings of Chicana feminists to identify the gender issues that produce conflict and cooperation in their communities. The course also makes linkages to gender issues in other U.S. communities of color and Latin America. (Formerly course 157A.) (Also offered as Feminist Studies 151A. Students cannot receive credit for both courses.) Prerequisite(s): course 3 or Feminist Studies 1or 80C. (General Education Code(s): E.) *A. Hurtado*

158. Latinos in the Media. *
Introduces portrayals of Latinos in the U.S. media including magazines, film, and television. Covers the most recent social psychological research on media representations and implications for identity. Prerequisite(s): course 3 or Latin American and Latino Studies 1. (General Education Code(s): E.) *A. Hurtado*

159. Senior Seminars in Social Psychology.

159A. Sexual Identity. F
Surveys contemporary perspectives on the psychology of sexual identity, emphasizing historical and cultural contexts. Considers cultural variations in sexual desire, behavior, and identity; sexual identity and public policy; and queer theory and its relevance to the psychological study of sexual identity. (Formerly course 140H.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *P. Hammack*

159B. Research Seminar in Crime and Media. *
Empirically examines several aspects of the criminal justice system (in particular, jury decision making and media effects on juror fairness and impartiality). In addition to extensive reading, students participate

in research projects. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 140M.) Prerequisite(s): courses 147A and 147B; or Legal Studies 147A and 147B; or concurrent enrollment in course 147B or Legal Studies 147B. Enrollment restricted to senior psychology and legal studies majors. Enrollment limited to 30. *C. Haney*

159C. Social Issues Research. *
Reviews contemporary social issues research. Emphasizes understanding how researchers study social problems and how theory and research can contribute to social change. Examines intersections of psychology and social policy. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 140N.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *H. Bullock*

159D. Psychology of Sexual Aggression. W
An overview of psychological theory and research related to sexual aggression, focusing on both perpetration and victimization. Includes a discussion of the social construction of masculinity and femininity, media representations of sexual violence, and alternative (non-aggressive) visions of sexuality. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 140P) Enrollment restricted to senior psychology or feminist studies majors or permission of instructor. Enrollment limited to 30. *E. Zurbriggen*

159E. Peace Psychology. F
Is war inevitable? What is peace? Is it more than the absence of violence? Explore how psychology—the study of human behavior—can help to decrease violence and enhance cooperation at multiple levels including the personal, interpersonal, community, and international arenas. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 140R.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *A. White*

159F. Culture and Identity. W
Considers the relationship between culture and identity in the "local" context of multiculturalism in America and the "global" context of conflict and identity politics. Examines concept of "culture," "ethnicity," "race," and "identity" in social science literature. Considers issues of power, social justice, and identity pluralism in both domestic and international contexts. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 143A.) Prerequisite(s): course 3. Enrollment restricted to senior psychology majors. Enrollment limited to 30. *P. Hammack*

159G. Social Psychology of Autocracy and Democracy. S
Humans are the only animal capable of living in both authoritarian and democratic regimes. Course explores the nature of these forms of social relationships with a goal of promoting democracy. Topics include: obedience to authority, conformity, self-justification, propaganda, power, and conflict resolution. Satisfies seminar and senior comprehensive requirements. (Formerly course 145D.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *A. Pratkanis*

159H. Community-Based Interventions. F
Topics include: what makes a successful intervention; what happens before the formal intervention begins; the ethics involved with interventions; different methods for assessing interventions; and different praxis models. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 149A.)

Prerequisite(s): course 3. Enrollment restricted to senior psychology majors. Enrollment limited to 30. *R. Langhout*

159I. Social Psychology of Flimflam. F

Why do we believe strange things? This course investigates such flimflams as beliefs in the Loch Ness Monster, quack health care, and racial superiority to illustrate the underlying social psychological principles that lead us to adopt weird attitudes. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 150.) Enrollment restricted to psychology majors. Enrollment limited to 30. *A. Pratkanis*

159J. Social Psychology of Social Justice. S

Why do some situations seem fair and others unfair? Are all people concerned with justice or are some scoundrels? This course looks at the principles of distributive, procedural, and retributive justice and at real world applications of theories. Satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 155.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *F. Crosby*

159K. Advanced Topics in Chicana Feminism. *

Course is a continuation of course 151A which introduces students to the writings of Chicana feminists to identify the gender issues that cause conflict and cooperation in their communities. The seminar format allows students an opportunity for extensive discussion. (Formerly course 157B.) (Also offered as Feminist Studies 151B. Students cannot receive credit for both courses.) Satisfies senior requirements. Satisfies senior comprehensive requirement. Prerequisite(s): courses 1, 40, or 157A or Feminist Studies 1, 80C, 100, or 151A, or consent of instructor. Enrollment restricted to juniors and seniors. Enrollment limited to 30. *A. Hurtado*

159T. Small Groups. F

Course strives toward three goals of varying specificity: knowledge of the psychological literature on small groups, aspects of group functioning, and what theorists have found in group studies; effectiveness in group settings; and behavior in group settings. Students required to set aside one weekend for lab work. Satisfies the seminar requirement. Satisfies the senior comprehensive requirement. Prerequisite(s): course 40. Enrollment limited to senior psychology majors. Enrollment limited to 30. *F. Crosby*

162. The Psychology of Creativity. F

The study of creative people, processes, and places in the arts, literature, science, business, and education. Examines theories, systematic research, and case studies. Social roles, economic factors, child-rearing practices, and educational methods which may influence creativity are also studied. (Formerly course 162A.) Prerequisite(s): course 3, course 60 is recommended as preparation. *D. Harrington*

163. Freud. *

The development of Freud's concept of mind. Extensive reading tracing the origins and development of Freud's theories and concepts (e.g., abreaction, psychic energy, defense, wish-fulfillment, unconscious fantasy, dreams, symptoms, transference, cure, sexuality) and emphasizing the underlying model of the mind and mental functioning. (Also offered as Philosophy 139. Students cannot receive credit for both courses.) Prerequisite(s): Philosophy 91 or 93 or 94. Offered in alternate academic years. *J. Neu*

165. Systems of Psychotherapy. S

A review of methods of psychotherapy, with attention to the underlying assumptions about personality, health, and disease. Prerequisite(s): course 3; course 60 or 170 recommended. *V. Tonay*

166. Personality Assessment. W

How do we really know a person? Course provides hands-on experience with assessing such individual differences as intimacy motivation, dominance, paranoia, and well-being. Students construct their own personality test and learn to critique the kinds of self-report, observational, and interview techniques that are used in organizational and counseling contexts. Prerequisite(s): course 3; course 60 highly recommended as preparation. *D. Harrington*

167. Clinical Psychology. W

Serves as an in-depth introduction to the field of clinical psychology. Covers issues of clinical assessment, interviewing, testing, and a range of therapeutic modalities. Prerequisite(s): courses 3, and 60 or 65; course 170 is recommended as preparation. *R. Quinn*

168. The Study of Dreams. S

An overview of dream studies by several major theorists and researchers of the 20th century, including Freud, Jung, and Hall. An emphasis on studies that reveal cognitive conceptions and personal concerns through quantitative and qualitative analyses of sets of dreams from individuals and groups. Other topics covered more briefly include dream recall, children and dreams, and the role of dreams within cultures. Prerequisite(s): course 3. *G. Domhoff*

169. Community Mental Health. F

Examines theory and research on outreach and prevention for application with various populations in community settings (e.g., victims of violence, immigrants, severely mentally ill); presents characteristics of successful agencies and agency development. Surveys interventions currently used in community mental health. Prerequisite(s): course 3. Courses 60 and 170 recommended. *V. Tonay*

170. Abnormal Psychology. W

Survey of theory and research on the nature of behavioral disorders. Covers psychological, biological, developmental, and socio-cultural approaches. Prerequisite(s): course 1 or 60; course 60 highly recommended as preparation. *D. Hoffman*

171. Childhood Psychopathology. F

A critical and intensive exploration of a wide variety of specific disorders within their biological, developmental, and social contexts. Concepts of psychopathology in childhood, major and minor diagnostic systems, and a variety of theories of etiology are explored. General intervention strategies and a wide range of specific psychotherapy systems for treatment are closely examined and demonstrated. Prerequisite(s): courses 3, 10, and 170. *D. Saposnek*

175. Personality, Relationships, and Emotions. W

Explores the nature, composition, and origins of human personality; the expression of emotions; and the individual as seen in context of relationships with others. Prerequisite(s): course 3. *A. Thorne*

Personality

179. Senior Seminars in Personality Psychology.

179A. Theories of Moral Psychology. W

A seminar course with focus on theories of moral development from the psychoanalytic, social learning, cognitive-developmental, and humanistic

perspectives. Students confront and discuss moral dilemmas from the four perspectives, working toward their own individual theories of pro-social behavior. Course satisfies seminar requirement. Satisfies senior comprehensive requirement. Prerequisite(s): essay required on a moral issue or dilemma relevant to the student's life. (Formerly course 172.) Enrollment limited to 30. *R. Quinn*

179B. Children and Divorce. S

Explores history and psychology of divorce and the short- and long-term effects of divorce on children. Examines wide range of findings that have drawn diametrically opposed conclusions; delves into social attitudes and legal structures that have impeded and enhanced divorce transitions for children and parents; investigates future models for divorcing that are child-friendly and consistent with findings from newly emerging longitudinal research on children and divorce. Satisfies seminar and senior comprehensive requirements. (Formerly course 177.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *D. Saposnek*

179C. Topics in Human Motivation. S

Examines theories of human motivation from perspectives provided by personality, developmental, educational, organizational, cross-cultural and evolutionary psychology. Also examines methods used to measure and study motivational tendencies and processes. Active seminar participation is required. Course satisfies seminar requirement. Satisfies senior comprehensive requirement. (Formerly course 174.) Enrollment restricted to senior psychology majors. Enrollment limited to 30. *D. Harrington*

General, Statistics, and Research Methods

181. Psychological Data Analysis. W

Intermediate statistical methods widely used in psychology (e.g., n-way, ANOVA, ANCOVA, multiple-comparison, repeated-measures, nested-designs, correlational analysis, bivariate regression), corresponding SAS programs, and elements of measurement theory. Prerequisite(s): course 3. (General Education Code(s): Q.) *The Staff*

182. Advanced Research Methods. W

Designed to equip students with the ability to evaluate, conceive, and carry out psychological research. A variety of techniques (observational, ethnographic, and field) examined and experienced. Students carry out research projects. Prerequisite: course 3. Enrollment limited to 30. *R. Langhout*

Senior Seminars and Independent Study

190. Senior Seminars.

Special topics with a format varying each quarter. *The Staff*

191. Teaching College Psychology.

A series designed to provide undergraduates at the upper-division level with an opportunity to participate in planning and teaching college-level psychology. May not be repeated for credit. *The Staff*

191A. Introduction to Psychology. F,W,S

Students lead discussion groups and provide one-to-one tutoring for course 1. Admission requires essay describing interest in becoming a course assistant, copies of psychology evaluations, and a letter of recommendation from a psychology faculty member; completion of some

upper-division psychology courses prior to enrollment in this course. Enrollment restricted to psychology majors. Enrollment limited to 20. (F) *M. Callanan*, (W) *A. Kawamoto*, (S) *F. Crosby*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar (course 42) under faculty supervision. Available only to upper-division or graduate students. Students submit petition to sponsoring agency. *The Staff*

193. Field Study. F,W,S

Series designed to provide advanced psychology undergraduates opportunity to apply what they have learned in the classroom to direct experience in a community agency. Students earn academic credit by working as interns at a variety of psychological settings where they are trained and supervised by a professional within the agency. Faculty also supervise the students' academic work by providing guidance and helping them integrate psychological theories with their hands-on intern experience. A two-quarter commitment. Students submit petition to sponsoring agency. Prerequisite(s): completion of lower-division psychology major requirements. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

193A. Developmental Field Study. F,W,S

Work in a community-based setting while completing self-directed academic work focused in the developmental area under the guidance of a faculty member. Students submit petition to sponsoring agency; applications due one quarter in advance to the Psychology Field Study Office. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

193B. Cognitive Field Study. F,W,S

Work in a community-based setting while completing self-directed academic work focused in the cognitive area under guidance of a faculty member. Students submit petition to sponsoring agency; applications due one quarter in advance to the Psychology Field Study Office. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

193C. Social Field Study. F,W,S

Work in community-based setting while completing self-directed academic work focused in the social area under guidance of a faculty member. Students submit petition to sponsoring agency; applications due one quarter in advance to the Psychology Field Study Office. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

193D. Clinical/Personality Field Study. F,W,S

Work in community-based setting while completing self-directed academic work focused in clinical or personality area under guidance of a faculty member. Students submit petition to sponsoring agency; applications due one quarter in advance to the Psychology Field Study Office. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

194. Advanced Research in Special Topics.

Provides a means for a small group of students to do research on a particular topic in consultation with a faculty sponsor.

194A. Advanced Developmental Research. F,W,S

Provides students with intensive experience conducting current research in developmental psychology. Students submit petition to sponsoring agency. May be repeated for credit. *C. Leaper*

194B. Advanced Cognitive Research. F,W,S

Provides students with intensive experience conducting current research in cognitive psychology. Students submit petition to sponsoring agency. May be repeated for credit. *M. Wilson*

194C. Advanced Social Research. F,W,S

Provides students with intensive experience conducting current research in social psychology. Students submit petition to sponsoring agency. May be repeated for credit. *H. Bullock*

195A. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. When taken as a multiple-term course extending over two or three quarters, the grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students contemplating a senior thesis should have a superior academic record and be well prepared with a suitable background of previous course work or independent study for performing their proposed research. Students must file a petition with the Psychology Office the quarter in which they would like to begin the thesis. Senior thesis petitions are available in the Psychology Department office. Check with office for enrollment conditions. *The Staff*

195B. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. When taken as a multiple-term course extending over two or three quarters, the grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students contemplating a senior thesis should have a superior academic record and be well prepared with a suitable background of previous course work or independent study for performing their proposed research. Students must file a petition with the Psychology Office the quarter in which they would like to begin the thesis. Senior thesis petitions are available in the Psychology Department office. Check with office for enrollment conditions. *The Staff*

195C. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. When taken as a multiple-term course extending over two or three quarters, the grade and evaluation submitted for the final quarter apply to each of the previous quarters. Students contemplating a senior thesis should have a superior academic record and be well prepared with a suitable background of previous course work or independent study for performing their proposed research. Students must file a petition with the Psychology office the quarter in which they would like to begin the thesis. Senior thesis petitions are available in the Psychology Department office. Check with office for enrollment conditions. *The Staff*

198. Independent Field Study. F,W,S

Provides psychology majors with the opportunity to apply what has been learned in the classroom to direct experience in a community agency outside the local community. Students earn academic credit by working as interns at a variety of psychological settings, where they are trained and supervised by a professional on site. Faculty also supervise the students' field study, providing guidance and help integrating psychological theories with their hands-on experience. Two-quarter commitment required. Admission requires completion of lower-division psychology major requirements; students submit petition to sponsoring agency. Applications are due one quarter in advance to the Psychology field study office. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual directed study for upper-division undergraduates. Students must file a petition with the Psychology office the quarter in which they would like to take the tutorial. Petitions may be obtained in the Psychology Department office. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Specialized study with individual faculty as psychology peer advisors. May not be applied toward major requirements. Students submit petition to sponsoring agency. Application and interview required during the previous quarter. Enrollment restricted to junior and senior psychology majors. May be repeated for credit. *The Staff*

199G. Tutorial (3 credits). F,W,S

Specialized study with individual faculty. May not be applied toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

204. Quantitative Data Analysis. W

Intermediate statistical methods widely used in psychology (e.g., n-way, ANOVA, ANCOVA, multiple-comparisons, repeated-measures, nested-designs, correlational analyses, bivariate regression), corresponding SAS programs, and elements of measurement theory. Enrollment restricted to graduate students. Enrollment limited to 20. *The Staff*

210. The Experimental Method in Social Psychology. W

Explores the philosophy and practice of the experimental method in social psychology. Enrollment restricted to graduate students. *C. Haney*

211A. Proseminar: Social Justice and the Individual. F

Provides an introduction to social psychology, focusing on various individual-level social justice topics, including the self, social comparison, individual and collective identity, social historical and social structural determinants of behavior and various policy and social change-related issues. Enrollment restricted to psychology graduate students; undergraduates planning graduate work in social psychology may enroll with permission of instructor. Enrollment limited to 20. *A. Hurtado*

211B. Social Justice, Society, and Policy. W

Provides an introduction to social psychology, focusing on empirical and theoretical developments related to social justice and group and intergroup dynamics. Topics include: prejudice and discrimination, power, collective action, and psychology's relationship to social policy. (Formerly *Proseminar: Groups in Society*.) Enrollment restricted to psychology graduate students. Undergraduates planning graduate work in social psychology may enroll with permission of instructor. Enrollment limited to 20. *H. Bullock*

213. Special Topics in Social Psychology. *

Focuses on particular issues of theoretical and practical importance in social psychology. Topics vary from year to year and often concentrate on issues of social justice, social identity, intergroup relations, and social policy. Enrollment restricted to graduate students. May be repeated for credit. (FWS) *The Staff*

214A. Multivariate Techniques for Psychology. S

Provides introduction to multiple regression (MR) and multivariate analysis of variance (MANOVA) as data analytic methods. Both methodological and statistical

aspects of multivariate data analysis discussed. Practical problems in estimating and testing regression and ANOVA models addressed. Gain experience in carrying out and interpreting analyses using SPSS. Prerequisite(s): course 204. Enrollment limited to graduate students. Enrollment limited to 20. *The Staff*

214B. Advanced Multivariate Techniques for Psychology. *

Provides introduction to factor analysis and structural equation modeling (SEM). Develop skills in defining, estimating, testing, and critiquing models. Topics include rationale of SEM, model identification, goodness of fit, and estimation. Learn how to use relevant software packages (SPSS, LISREL, EQS, and/or AMOS) to conduct exploratory and confirmatory factor analyses, path analyses, and full ("hybrid") analyses with latent variables. Prerequisite(s): course 214A. Offered in alternate academic years. *The Staff*

215. Production and Comprehension of Spontaneous Speech. *

Seminar on the use of collateral signals as backchannels, discourse markers, and enquoting devices, including discussion of historical origins, cross-linguistic borrowing and second-language learning, children's acquisition, and the use of signals as markers of culture and identity. Enrollment restricted to psychology graduate students. *J. Fox Tree*

217. Technology Benefiting Humanity. *

Goal is to understand how people interact with the natural world and how technology benefits this interaction. Enrollment restricted to graduate students. Enrollment limited to 10. *D. Massaro*

218. Speech Perception and Reading. S

An information-processing analysis of speech perception and reading. The stages of information processing in understanding language are studied, with particular emphasis on pattern recognition processes, memory processes, and utilization of context and knowledge in speech perception and reading. Enrollment restricted to graduate students. *D. Massaro*

220. Special Topics in Human Memory. *

Topics announced when offered. Seminars involve discussion and critical evaluation of current, historical, and interdisciplinary readings relevant to topic. Emphasis on development of research ideas. Enrollment restricted to graduate students. Enrollment limited to 12. *The Staff*

221. Visual Perception. *

Seminar to study human perception, its methodology, and driving issues as illustrated by selected research topics (e.g., adaptation to unusual sensory environments). Where possible, parallels with other areas of psychology are drawn. Enrollment restricted to graduate students. Enrollment limited to 15. *B. Bridgeman*

222. Topics in Lexical Organization. *

The recognition of words is a critical step in natural language processing. Discusses a range of contemporary issues related to the representation of a word and the access of this information from the perspective of psychology, linguistics, and artificial intelligence. Enrollment restricted to psychology graduate students; undergraduates who have completed course 124 may enroll with permission of instructor. Enrollment limited to 10. *A. Kawamoto*

223. Human-Computer Interaction. F

Theory and hands-on practice to understand what makes user interfaces usable and accessible to diverse individuals.

Covers human senses and memory and their design implications, requirement solicitation, user-centered design and prototyping techniques, and expert and user evaluations. Individual research project. Interdisciplinary course for social science and engineering graduate students. Students cannot receive credit for this course and course 131. (Also offered as Computer Engineering 231. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *S. Kurniawan*

224A. Proseminar: Cognitive I. F

A proseminar reviewing current topics in cognitive psychology, designed to introduce new graduate students to the field. Enrollment restricted to psychology graduate students. Enrollment limited to 10. *A. Kawamoto, D. Massaro*

224B. Proseminar: Cognitive II. W

A proseminar reviewing current topics in cognitive psychology, designed to introduce new graduate students to the field. Enrollment restricted to psychology graduate students. Enrollment limited to 10. *T. Seymour, R. Gibbs*

225A. Introduction to Developmental Research I (3 credits). F,W

Surveys the rationale and techniques of research in developmental psychology. Students build skills in evaluating published research, in translating theoretical ideas into researchable hypotheses, and in selecting appropriate research designs, measurement, and statistical approaches for research problems. Multiple-term course; students receive 6 credits in the second quarter of attendance; the grade and evaluation submitted for the final quarter applies to both quarters. Enrollment restricted to psychology graduate students or with instructor's permission. May be repeated for credit. *P. Gjerde*

225B. Introduction to Developmental Research II. S

Focuses on drawing reasonable conclusions from research findings by focusing on students' first-year research projects and critiques of existing research. Enrollment restricted to psychology graduate students. *C. Cooper*

227. Contemporary Issues in Psychology of Language. F

Special topics in thought and language are examined from the perspectives of cognitive science. Particular attention given to embodied experience and higher-order cognition. Enrollment restricted to graduate students. May be repeated for credit. *R. Gibbs*

229. Computer Simulation Models. W

Course analyzes various computer simulation techniques and how they can be used to model perception and cognition. Parallel processing in networks is emphasized. Enrollment restricted to graduate students; undergraduates who have completed course 132 may enroll with permission of instructor. Offered in alternate academic years. *A. Kawamoto*

230. Research in Cognitive Psychology Seminar. F,W,S

Seminar to study, critique, and develop research in perception and cognition, including topics in psychobiology, psycholinguistics, and memory. Enrollment restricted to psychology graduate students. May be repeated for credit. (F) *D. Massaro*, (WS) *T. Seymour*

231. Research in Social Psychology

Seminar. F,W,S

Seminar to study, critique, and develop research in social psychology. Enrollment restricted to psychology graduate students. May be repeated for credit. (F) *A. Hurtado*, (WS) *P. Hammack*

232. Evolution of Cognition. *

Explores current research on evolution of human cognition, drawing on findings from other species and from the archaeological record. Topics include language, working memory, episodic memory, numerical abilities, and social cognition. Enrollment restricted to graduate students. *The Staff*

235. Infant Development in Contexts. *

Seminar on how contextual factors influence the development in infancy, especially on cognitive domains. Discusses at least four types of contextual factors: cultural, experiential, event, and interpersonal contexts. Enrollment restricted to psychology graduate students. *S. Wang*

236. Person, Culture, Society. *

Integrative seminar on the relationship between individual psychological experience and its social, cultural, and institutional context. Explores various paradigms of "culture" in social science literature, including psychoanalytic theory, culture and personality, cultural psychology, Marxism, symbolic interactionism, narrative, and sociocultural theory. Enrollment restricted to graduate students. Enrollment limited to 10. *P. Hammack*

242. Research in Developmental Psychology Seminar. F,W,S

Seminar to study, critique, and develop research in developmental psychology. Enrollment restricted to psychology graduate students. May be repeated for credit. (FW) *S. Wang*, (S) *C. Cooper*

244A. Proseminar I: Cognitive and Language Development. F

Explores major theories and research in the fields of cognitive development and language development. Begins with classic theories, such as Piaget's theory of cognitive development, and proceeds to theories and research on topics of current interest, such as the relation between culture and cognitive and language development. Enrollment restricted to graduate students. *N. Akhtiar*

244B. Proseminar II: Social, Emotional, and Personality Development. W

An examination of contemporary theory and research on socioemotional and personality development across the lifespan. (Formerly *Proseminar II: Socioemotional and Personality Development*.) Enrollment restricted to graduate students. *C. Leaper*

246. Cultural Diversity in Human Development. F

Focuses on issues of culture and ethnicity in our theoretical and empirical understanding of human development. Particular attention paid to issues of language, culture, and socialization as they relate to social institutions, such as education, that affect children and families. Enrollment restricted to graduate students. Enrollment limited to 20. *B. Rogoff*

247. Special Topics in Developmental Psychology. S

Focuses on particular issues of theoretical importance in developmental psychology. Topics vary from year to year. Particular issues in language, culture, cognitive, social,

and personality development may be covered. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *M. Azmitia*

248. Survey Methods. F

Practicum to give students hands-on experience with survey methods by conducting their own survey on the topic of their choice. Course requires the survey to be conducted off campus at a local agency or program chosen by student with approval of instructor. Enrollment restricted to graduate students. Enrollment limited to 10. *A. Hurtado*

249. Field Methodologies and Social Ethnography. *

Designed to train graduate students in applied field methods. Emphasis is on gaining knowledge and experience with actual field methods, by conducting social ethnography in the community. Field research in community placements required. Enrollment restricted to graduate students. Enrollment limited to 10. Offered in alternate academic years. *C. Haney*

250. Prejudice and Social Relations. *

Examines the ways in which the various branches of psychology have approached the issue of prejudice. Attention paid to the assumptions underlying each approach and their relation to core psychological ideas such as the self and emotion. Enrollment restricted to graduate students. *The Staff*

251. Feminist Theory and Social Psychology. *

Course bridges feminist theory and social psychological research to explore connections between theory covered and empirical studies on various topics in social psychology. Seminar format allows students opportunity for extensive discussion. (Also offered as Feminist Studies 251. Students cannot receive credit for both courses.) Enrollment restricted to graduate students. *A. Hurtado*

252. Special Topics in Cognitive Psychology. F

Focuses on particular issues in cognitive psychology. Topics vary from year to year. Particular issues in language, memory, perception, attention, judgment and decision making, problem solving, reasoning, emotion, cognitive modeling, cognitive neuroscience, and cognition and aging covered. Enrollment restricted to graduate students. May be repeated for credit. *M. Wilson*

253. Theory and Research in Intergroup Relations. *

Examines, compares, and contrasts a variety of theories in intergroup relations while examining relevant empirical research. The relevance of both theory and research findings to contemporary social issues is explored. Enrollment restricted to psychology graduate students; undergraduates considering graduate work in social psychology are encouraged to enroll with permission of instructor. Enrollment limited to 12. Offered in alternate academic years. *The Staff*

254. Psychology of Gender. *

Course reviews recent theory, research, and applications in the psychology of gender. Developmental, social-psychological, cultural, and feminist approaches are emphasized. Enrollment restricted to graduate students. *C. Leaper*

256. Psychology of Social Class and Economic Justice. *

Course examines the social psychological antecedents, correlates, and consequences of economic inequality in contemporary U.S. society. The impact of social class on attitudes, beliefs, and behaviors is assessed. Strategies for

reducing classist discrimination and improving interclass relations are discussed. Enrollment restricted to graduate students. Enrollment limited to 10. *H. Bullock*

261. Participatory Action Research. S

Participatory Action Research (PAR) is a theoretical standpoint and collaborative methodology that is designed to ensure that those affected by the research project have a voice in that project. Topics include philosophies of science; defining and evaluation PAR; ethics; and reflexivity. Enrollment restricted to graduate students. Enrollment limited to 10. *R. Langhout*

290. Proseminar.

Various topics to be offered throughout the year.

290B. Advanced Developmental Research and Writing (2 credits). F,W,S

Tailored to graduate students' interests among topics involving research and scholarship in sociocultural approaches to development, methods for research design, data collection, coding, and analysis, and preparing and reviewing grant proposals and journal manuscripts. Multiple-term course; students receive 6 credits in the third quarter of attendance; the performance evaluation and grade submitted for the final quarter applies to all three quarters. Enrollment restricted to graduate students. May be repeated for credit. *B. Rogoff*

290C. Professional Development (3 credits). F,W

Designed to aid advanced psychology graduate students with development of competence in professional activities (e.g., preparing a vita, making job and conference presentations, submitting and reviewing manuscripts and grant proposals, professional communication, career decisions). Multiple-term course; students receive 6 credits in the second quarter of attendance; the grade and evaluation submitted for the final quarter applies to the previous quarter. Enrollment restricted to advanced psychology graduate students. May be repeated for credit. *A. Thorne*

290E. Grant Writing for Psychologists. S

Discusses how to write and put together a grant proposal for psychological research, culminating in a completed proposal. For psychology graduate students at all levels of their careers, applying to predoctoral, dissertation, summer, or postdoctoral funding sources. Enrollment restricted to psychology graduate students. *J. Fox Tree*

293. Field Study. F,W,S

Student-designed and student-conducted research carried out in field settings. *The Staff*

297. Independent Study. F,W,S

Independent study and research under faculty supervision. *The Staff*

299. Thesis Research. F,W,S

The Staff

Queer and Sexuality Studies

Feminist Studies
315 Humanities 1
(831)459-4324
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<http://queer.ucsc.edu>

Program Description

Scholarship pertaining to the critical study of gender and sexuality can be found across a broad range of departments at UCSC. This presence is manifested in a diverse faculty, in course offerings, and in research programs. Courses with queer content can be found in American studies, anthropology, community studies, feminist studies, film and digital media, history, history of consciousness, legal studies, literature, sociology and theater arts.

For more specialization, departments such as Community Studies, Feminist Studies and Literature have sufficient flexibility to allow students to design a course of study within those majors to explore these interests. For students who prefer to take a more self-directed approach, there is the option of designing an individual major.

Research activities are sponsored by the Queer Theory research cluster (a part of the Center for Cultural Studies), the Center for Justice, Tolerance and Community, the Queer and Sexuality Studies Working Group, and many campus departments and student organizations.

The Lionel Cantú GLBTI Resource Center serves as a clearinghouse for queer activities on the UCSC campus. Each quarter, the center prepares a list of all course offerings with queer content. Information is available at <http://queer.ucsc.edu> via e-mail at queer@ucsc.edu.

More information may be obtained from members of the faculty working group: Anjali Arondekar (Feminist Studies), Carla Freccero (Literature, Feminist Studies, History of Consciousness), Irene Gustafson (Film and Digital Media), Marcia Ochoa (Community Studies), B. Ruby Rich (Community Studies), Gabriela Sandoval (Sociology). Additional faculty contacts: Julie Bettie (Sociology), Benjamin Carson (Music), Sheila Crane (History of Art and Visual Culture), Jody Greene (Literature, Feminist Studies), Herbert Lee (Applied Mathematics and Statistics), Peter Limbrick (Film and Digital Media), Catherine S. Ramirez (American Studies), Jenny Reardon (Sociology), Lisa Rofel (Anthropology), Danny Scheie (Theater Arts), Daniel Selden (Literature), Elizabeth Stephens (Art).

Please contact Anjali Arondekar in the department of Feminist Studies in the Humanities Division (aarondek@ucsc.edu) for information about course offerings and resources.

Religious Studies

Religious studies is not a separate program at UCSC, but students interested in the study of religion can select a degree plan from several majors and complement the requirements from a broad array of courses that focus on religion. Majors particularly appropriate for the study of religion at UCSC include the following: anthropology, history, history of art and visual culture, literature, and philosophy. Two departments, the Department of History of Art and Visual Culture and the Department of Philosophy, offer specific concentrations within their majors for students interested in the study of religion. The Department of History of Art and Visual Culture offers a concentration in religion and visual culture, while the Department of Philosophy offers a concentration in religious thought.

Students interested in the study of religion may build an independent program of study by fulfilling the requirements of one of the majors listed above and,

under the guidance of a member of the faculty, use elective courses to develop a concentration of study appropriate to their interests and needs. One of the following faculty should be contacted to discuss a course of study in religion at UCSC: Murray Baumgarten (literature), Raoul Birnbaum (history of art and visual culture), Gildas Hamel (classics/French language), Susan Harding (anthropology), John Lynch (classics/literature), Ralph Quinn (psychology), Triloki N. Pandey (anthropology), Cynthia Polecristi (history), and Marilyn Westerkamp (history).

Students seeking information on an individual major in religious studies should contact their college academic preceptor.

Russian

Language Program
239 Cowell College
(831) 459-2054
<http://language.ucsc.edu>

Faculty and Professional Interests

Lecturer

WILLIAM NICKELL
Leo Tolstoy, Russian cultural history, 1920s and 1930s Soviet Russia, Russian Soviet film, Russian language and pedagogy

Program Description

Russian language, beginning and intermediate level language courses are offered. Students may also select an individual major in Russian studies.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program, page 317.

Lower-Division Courses

1. Instruction in the Russian Language. F

Aural comprehension, speaking, reading, and writing. Recitation and laboratory. Elementary sequence (1-2-3) begins in the fall quarter only. *The Staff*

2. Instruction in the Russian Language. W

Aural comprehension, speaking, reading, and writing. Recitation and laboratory. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 1; or placement by examination. *The Staff*

3. Instruction in the Russian Language. S

Aural comprehension, speaking, reading, and writing. Recitation and laboratory. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 2; or placement by examination. *The Staff*

4. Intermediate Russian. F

Second-year courses designed to improve functional competence in speaking, listening, reading, and writing by activating basic grammar covered in introductory courses. Grammatical explanations and exercises supplemented

with short readings and films. Prerequisite(s): course 3; or permission of instructor. (General Education Code(s): IH.) *The Staff*

5. Intermediate Russian. W

Second-year courses designed to improve functional competence in speaking, listening, reading, and writing by activating basic grammar covered in introductory courses. Grammatical explanations and exercises supplemented with short readings and films. Prerequisite(s): course 4; or permission of instructor. (General Education Code(s): IH.) *The Staff*

6. Intermediate Russian. S

Second-year courses designed to improve functional competence in speaking, listening, reading, and writing by activating basic grammar covered in introductory courses. Grammatical explanations and exercises supplemented with short readings and films. Prerequisite(s): course 5; or permission of instructor. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. Enrollment limited to 10. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Science Communication

Kresge Annex A
(831) 459-4475
<http://scicom.ucsc.edu>

Faculty and Professional Interests

PETER ALDHOUS, Lecturer in Science Writing
Science journalism, feature writing, magazine editing, investigative and policy reporting

GLENDA G. CHUI, Lecturer in Science Writing
Science journalism, newswriting, magazine editing

MARC A. DESJARDINS, Lecturer in Science Writing
Newspaper reporting and editing

ROBERT W. IRION, Senior Lecturer in Science Writing, Program Director
Science journalism, newswriting, feature writing, and editing

MARTHA MENDOZA, Lecturer in Science Writing
Newswriting, investigative and policy reporting

MARY K. MILLER, Lecturer in Science Writing
Science journalism, web media, videography, educational and museum outreach

PAUL R. ROGERS, Lecturer in Science Writing
Newswriting, environmental reporting

EVELYN J. STRAUSS, Lecturer in Science Writing
Science and health journalism, science advocacy, essay and profile writing

Program Description

The Science Communication Program is a graduate certificate program composed of one track: science writing. Students combine a background in science with a desire to communicate science to the general public. Special note: the science illustration track, a separate track in the program until July 2004, is now being offered through UC Extension, Santa Cruz (<http://scienceillustration.org>). Some science illustration courses are still offered during UCSC Summer Session (<http://summer.ucsc.edu>) for UCSC credit through the science communication program.

The science writing graduate program focuses on the theory and practice of conceiving, reporting, writing, and editing articles on scientific, medical, environmental, and technological subjects for newspapers, magazines, and special publications directed at general readers. The program in science writing offers intensive training in news, features, multimedia storytelling, essays, and investigative reporting. Graduates receive a certificate in science writing.

Graduate Certificate in Science Writing

The program accepts 10 students per year. Enrollment in science writing classes is strictly limited to students enrolled in the program. The program consists of one academic year of full-time study, beginning in fall quarter, followed by a full-time internship lasting a minimum of 10 weeks. Science Notes, the UCSC online science magazine, is produced annually by the graduate students. Please see the current issue and an archive of past issues on our web site, <http://scicom.ucsc.edu>.

All students are required to complete at least two part-time internships in parallel with the six required graduate courses taken during the academic year. Internships are supervised by mentors on site, as well as by the program director. The interns earn academic credit for these field study courses. The three writing seminar courses, three writing and editing workshops, and two course-equivalent internships constitute the eight courses required for the graduate certificate. In addition to the academic year coursework, a full-time 10-week (minimum) internship, or an equivalent approved by the program director, is required.

Admission to the Science Writing Graduate Program

Students who have an intimate acquaintance with the theory and practice of science, an aptitude for writing, and a strong desire to communicate science to the general public are ideal candidates for the program. At least a bachelor's degree in science is required for admission. Other admission requirements are: full-time research experience of at least six months duration; official GRE

General Test scores; and official GRE Subject Test score in one of the following fields: biochemistry, cell and molecular biology, biology, chemistry, computer science, mathematics, or physics. Applicants with a Ph.D. in one of these subjects are granted a waiver of the GRE Subject Test. Applications and instructions can be found online through the UCSC Graduate Division web site at <http://graddiv.ucsc.edu>.

Further Information

Details about the science writing graduate certificate program may be obtained from the Science Communication Program office, the web site, or by sending e-mail to scicom@ucsc.edu.

Upper-Division Courses

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. *The Staff*

Graduate Courses

201A. Reporting and Writing Science News. F

A survey of the conventions of newspaper journalism and the special application of those conventions to scientific and technological subjects. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program. *The Staff*

201B. The Science Feature. W

A survey of selected feature articles in the current national science magazines, with attention to strategy, level of complexity, explanation technique, and style. Writing assignments include a publishable feature article. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program. *The Staff*

201C. The Science Essay. S

A survey of science and nature essayists. Purpose, content, form, and style are considered. Writing assignments include original essays on current issues in science, technology, and society. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program. *The Staff*

202. Writing and Editing Workshop. F,W,S

Theory and practice of writing and editing articles on scientific, medical, environmental, and technological subjects for newspapers, magazines, and special publications directed at non-technical readers. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

A media internship is completed with faculty tutorial assistance, to satisfy a need for the student when a regular course is not available. Enrollment restricted to graduate students formally accepted into the writing track of the Science Communication Program. May be repeated for credit. *The Staff*

Social Documentation

235 Oakes Academic Building
(831) 459-2371
<http://communitystudies.ucsc.edu>

Faculty and Professional Interests

Professor

DAVID BRUNDAGE

American working-class and immigration history, history of U.S. social movements, Irish history and politics

WILLIAM H. FRIEDLAND, Emeritus

B. RUBY RICH

Documentary film and video, post-9/11 culture, new queer cinema, feminist film history, Latin American and Latin/a cinema, U.S. independent film and video, the essay film, the politics of film festival proliferation and the marketing of foreign films in the U.S.

NANCY STOLLER, Emerita

DAVID T. WELLMAN

Working-class culture, American ethnic and racial diversity, social documentary studies, critical race theory, interrogations of whiteness, and qualitative research methods

DEBORAH A. WOO, Emerita

Associate Professor

JULIE GUTHMAN

Sustainable agriculture and alternative food movements, international political economy of food and agriculture, politics of obesity, political ecology, race and food, critical human geography

PAUL ORTIZ

African American history, U.S. social and political history, social documentary, oral history, subaltern studies and theories of resistance, U.S. South, Latino studies, social movements, working-class history; history of farm labor, African diaspora

MARY BETH PUDUP

Regional studies, economic justice, public policy, historical geography of the U.S.

RENEE TAJIMA-PEÑA

Documentary film and video focusing on Asian American and immigrant communities, media, and social change

Assistant Professor

MARCIA OCHOA

Gender and sexuality, race and ethnicity, Latina/o studies, media and cultural studies, ethnography of media, feminism, queer theory, geography, multimedia production, graphic design, colonialism and modernity, Latin American studies—Colombia and Venezuela

Lecturer

ANDREA STEINER

Health policy, critical public-health studies, gerontology (aging), ageism, women's health, critical analysis of civically engaged education



Professor

JULIANNE BURTON-CARVAJAL (Literature)

Twentieth- and 21st-century Latin(o) American visual media, particularly film; melodrama as a transnational form; gender and authorship; history, cultures, and representations of California, particularly the Central Coast

ELI E. HOLLANDER (Film and Digital Media)

Film and video directing; ethnographic documentary directory, editing, cinematography, and videography; digital image generation; screenwriting

CHARLES L. LORD (Film and Digital Media)

Film and video directing and editing, video theory and history, video installation, screenwriting, documentary production

MARGARET MORSE (Film and Digital Media)

Digital and electronic media theory and criticism, media art, media history, technology and culture, film history and theory, German cinema, documentary, science fiction, and silent comedy

Associate Professor

DAVID HENRY ANTHONY III (History)

African and African American history, art, music, literature, and cinema; eastern and southern Africa; African languages; Indian Ocean world; African and African American linkages; Islamic civilization; African diaspora studies; world history

SHARON DANIEL (Film and Digital Media)

Community-based public art in information and communications environments, social and political aspects of information technology, community networks, participatory culture, digital inclusion, Net art, human-computer interface design

JENNIFER GONZÁLEZ (History of Art and Visual Culture)

Contemporary theories of visual culture, semiotics, critical museum studies, photography, public and activist art in the U.S.

LOURDES MARTÍNEZ-ECHÁZABAL (Literature)

Latin American and Caribbean literatures; Afro-Latin American literatures, cultures, and societies; found[n]ational narratives; Brazilian literature; literatures of Cuba and the Cuban diaspora; critical race theory

ERIC PORTER (American Studies)

Black cultural and intellectual history; U.S. cultural history and cultural studies; comparative ethnic studies; popular music and jazz studies; race, science, and technology

WARREN SACK (Film and Digital Media)

Software design and media theory

LEWIS WATTS (Art)

Photography

Assistant Professor

MIRIAM GREENBERG (Sociology)

Media studies, cultural studies, globalization, political and cultural economies of global cities, video production, and ethnography

IRENE GUSTAFSON (Film and Digital Media)

Producing across the boundaries between "theory" and "practice," non-fiction, gender and queer studies, production design

FELICITY SCHAEFFER-GRABIEL (Feminist Studies)

Transnational feminism, migration, Latin American/Latino studies, chican(a) studies, Internet, technology and the body, sexuality, gender and globalization

GUSTAVO VAZQUEZ (Film and Digital Media)

Film and video production, directing drama, documentary and experimental cross-cultural experiences in film, film curator

Lecturer

DON ADAMS (UC Extension, Santa Cruz)

Director, Arts and Humanities Program

Program Description

The Master of Arts degree program in social documentation focuses on the development of expertise in analyzing and producing social documentaries in the genres of video, film, photography, audio pieces, radio programs, public ethnographies, installations, and museum exhibitions.

The social documentation program was created by the Community Studies Department, and, accordingly, takes as its foundation a social science approach to sociopolitical issues, prioritizing graphic expressions of people's lives and cultures, the conditions under which they work and sustain themselves, challenges to their survival, and strategies for improving their lives. Issues as varied as globalization, immigration, militarization, racial justice, gender redefinition, youth empowerment, gentrification, domestic violence, food and body politics, media conglomeration, environmental inequities, the digital divide, history, and memory as social agents are all anticipated subjects of our students' investigations and documentary productions. International, local, national, and regional views are equally acceptable and encouraged.

The digital revolution of recent years and the growth of alternative models of documentary distribution, radio transmission, and internet dissemination have energized new methods of knowledge transmittal, social organization, and communication. Alternative modes of social documentation can take into account both codes of production and subjects of study, without sacrificing access to audiences or communities not previously within reach. The social documentation program aims to be a laboratory for knowledge acquisition and deployment, pioneering a model of documentary practice suited to real-world applications within a social-change dynamic.

Building upon years of community studies experience in social justice scholarship and community intervention, students are able to hone documentary approaches suited to their project concerns, acquiring professional skills while maintaining social change commitments.

Students in the social documentation program learn to translate academic interpretations of social life into effective, accessible and professional quality products in one or more media, museum settings and/or public-history collections. Working with the faculty in community studies and the social documentation program's affiliated faculty in other departments, students pursue their courses of study by acquiring substantive knowledge in their social science subject areas as well as the ability to navigate media standards with political and ethical processes of representation.

Objectives

The social documentation Program aims to train its graduates in critical thinking and the use of visual, audio, electronic, and print media, as well as historic presentations and ethnographies, dedicated to the documentation of underrepresented areas of community life. The curriculum concentrates on the analysis of social problems, the creation of a critical approach in the collection and presentation of documentary material, and on the role of effective documentary in social change. For the Master's degree, students produce documents of their own: documentaries in film or video; oral histories; audio productions; photographic essays; extensive oral histories or written ethnographies; historic exhibitions for museum or public display; internet, DVD or CD-ROM projects; and/or digital archives.

Special features of the program include its focus on the study of "ordinary life" and its emphasis on training

students to produce original social analysis in broadly representational forms. The course of study includes training in the techniques of appropriate media and systems of representation. The unique emphasis of the social documentation program, however, is the acquisition of a level of academic rigor in the chosen subject of focus, an insistence on social scientific methodologies, a reliance on an ethical process of production that takes its subjects into full account, and a commitment to research in the development of material for extra-academic uses and audiences. Broadcast and theatrical media have increasingly recognized the importance of ancillary distribution through partnerships with pertinent communities of interest, just as the internet is increasingly utilized for added depth and community interaction on issues. The social documentation program aims to prepare documentarians for newly evolving social media landscapes. At the same time, students receive training in the basic theories of social documentation with the aim of applying these theories to the analysis, prioritization, and solution of social problems.

Graduates are expected to generate work that will have an impact on the world outside the academy and to develop an understanding of documentary practices and traditions, as well as social codes that can form a foundation for future work in their targeted subject area and arena of practice. The master's project, which constitutes the culmination of the two years of study, will be given a public exhibition or reading, and be the springboard for continuing work after graduation.

Requirements

The social documentation program has a required core curriculum around which students develop a plan of study. Each student has two advisers, one for technical guidance and the other for topical expertise, who will be involved in designing each student's study and project plans. Full-time enrollment is required.

A total of 72 units are required to complete the master's degree in social documentation, comprising a combination of seminars on social documentary and social science research designed specifically for the social documentation graduate students, other courses on campus selected by students individually on the basis of relevance to the proposed project, and courses focused on conceptualizing, executing, and completing the students' social documentary master's projects. There are seven required core courses.

Required courses for the first year are as follows:

- 200 *Approaches to Social Documentary*
- 202 *Practice of Social Documentary*
- 208 *Social Science Research and Social Representation*
- 270 *Project Planning*

Required courses for the second year:

- 204 *Ways of Seeing and Hearing*
- 294A *Production, Analysis, Editing*
- 294B *Production, Analysis, Editing*

In addition to these mandatory courses an additional 37 units must be secured through electives as identified on an individual basis, offered by Community Studies or other departments, or through independent-study classes as approved by faculty advisers.

To satisfy requirements for the Master of Arts degree, a student must complete the first year of required courses and electives. By the end of the first year, before summer quarter begins, students will have written a proposal for their documentary project, which will be the basis for a required oral qualifying examination conducted by at least two community studies faculty. This proposal will include a description of the subject to be

documented, a treatment or narrative outline, a work plan including budget and timeline, and a preliminary annotated bibliography and filmography/videography of related works. Approval of the written proposal and satisfactory completion of the qualifying exam is a prerequisite for advancement to further coursework or fieldwork on the master's project.

The second year is largely focused on the final documentary project required for completion of the Master's degree. This project must reflect original research and creative activity while demonstrating a command of related previous work by others. With an understanding of budgetary, equipment and time limitations, students' electronic, digital, photographic or written projects should reflect a level of quality appropriate for publication, exhibition, or broadcast (including digital/web-cast).

Typically, the expectation in each medium is as follows:

Documentary Film/Video. One 20-30 minute documentary suitable for television broadcast and public exhibition.

Documentary Photography. One on-campus showing and one major off-campus showing; 10-15 page text accompanying pictorial exhibition.

Audio Documentary/Sound Recording. One 20-30 minute documentary suitable for radio broadcast or museum/public installation.

Historic Presentation/Public History. One on-campus presentation or exhibit and one major off-campus presentation/exhibit of "museum quality."

Oral History/Ethnography. One 75-100 page document.

Internet/Digital Presentation or Archive. To be worked out with program chair, given the evolving nature of this field.

The final examination consists of the public presentation of the project.

In addition, every project must be accompanied by a written essay describing its relationship to its field and documents its research via field notes, bibliographies, archival searches, filmographies, and videographies. These materials will be filed in digital form and archived for future reference and access.

Goals for Social Documentation Graduates

The social documentation Program prepares graduates with critical skills and professional tools well suited to careers in the evolving fields of documentary media in the private and public sectors, for collaboration on community-based projects, for a range of activities geared to the analysis and documentation of sociopolitical issues, and for work with private and public organizations in need of media expertise and analysis. It is expected that students will make careers in the nonprofit fields evolving to link social justice organizations with media outlets, as well as in a range of public campaigns and initiatives. They will also be well equipped to function as independent documentarians working on behalf of social change within the expanding sectors of media production and representational intervention.

Also, given the emphasis on the histories of the social documentary and on developing methods suitable for contemporary challenges, many graduates are likely to enter the field of education on a part- or full-time basis. The social documentation program's teaching assistant training program and TA opportunities provide graduates with the preparation necessary to exercise such options.

Graduate Courses

200. Approaches to Social Documentation. F

Comprehensive review and analysis of documentary strategies aimed at societal critique and social change, evaluating changes in argument, evidence, and process over development of the discipline. A concurrent media lab is required. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *B. Rich*

202. Practice of Social Documentary. F

Introduction to social documentary genres including video, audio, and photography, which addresses social-scientific research and methodology in the context of these processes. A concurrent media lab is required. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *R. Tajima*

204. Ways of Seeing and Hearing. W

Graduate-level advanced seminar in social documentation explores ways that seeing, hearing, and knowing are influenced by culture, power, race, and other factors. Readings emphasize how documentary subjects are constituted and known, addressing questions of epistemology, social constructivism, objectivity, and method. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *The Staff*

208. Social Science Research and Social Representation. W

Designed to acquaint students with how social science research represents social reality and how social documentarians represent social reality. Designed to encourage comparison among different modes of social science research and between social science and different modes of social documentation representations of social life. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *D. Wellman*

220. Oral History. *

Introduction to the theory and practice of oral history. Seminar participants read foundational texts in oral history, historical memory, public history, and social documentary. Students conduct two oral-history interviews; write synthesis essays; and complete a seminar paper. Concurrent enrollment in course 291 required. Enrollment restricted to graduate students. Enrollment limited to 15. *P. Ortiz*

270. Project Planning for the Social Documentary. S

Workshop seminar in project planning focusing on the form and content of the documentary project; research and preproduction; technical, financial, and logistical plans; and coordination with subjects and resources. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *R. Tajima*

280. Video Production of the Social Documentary. S

Intensive directing and producing course that covers the conceptualization, research, treatment and proposal writing, interview technique, camera, editing, production, and distribution. Students cannot receive credit for this course and Community Studies 180. Enrollment restricted to social documentation graduate students. Open to qualified undergraduates with permission of instructor. Enrollment limited to 15. *R. Tajima*

290. Special Topics in Social Documentation. F,W,S

Designed to provide supplemental instruction on specific topical and/or technical matters related to social documentation. Topics include technical standards and

innovations within the field of social documentation, documentary subjects, and/or the work of individual professional documentarians. Enrollment restricted to graduate students majoring in social documentation. Enrollment limited to 15. May be repeated for credit. *The Staff*

291. Media Laboratory for Social Documentation (2 credits). F,W,S

Individual training in a social documentation medium under the guidance of a faculty supervisor. Course is intended to be taken concurrently with social documentation courses requiring a laboratory course. Enrollment restricted to social documentation graduate students. Enrollment limited to 10. May be repeated for credit. *The Staff*

292. Special Topics (2 credits). F,W,S

Provides supplemental instruction on specific topical and/or technical matters related to social documentation. Topics include technical standards, artistic strategies, and innovations within the field of social documentation, documentary subjects, and/or work of individual professional documentarians. Enrollment restricted to graduate students. Enrollment limited to 15. May be repeated for credit. *R. Tajima*

294A. Production/Analysis/Editing. F

Workshop seminar oriented toward actual fieldwork and production of the thesis project in the student's chosen genre. Techniques of collection and recording, analysis, preparation, and editing taught. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *R. Tajima*

294B. Production/Analysis/Editing. W

Workshop seminar oriented toward the editing and creative assemblage of the thesis project in the student's chosen genre. Techniques of preparation, exhibition, and editing taught. Enrollment restricted to social documentation graduate students. Enrollment limited to 15. *B. Rich*

295. Project Completion. F,W,S

Individualized study for second-year graduate students working on and completing their final projects. Limited to students enrolled in the social documentation program during their final quarter of study. May be repeated for credit. *The Staff*

297. Independent Study. F,W,S

Study either related to a course being taken or a totally independent study. Enrollment restricted to graduate students. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Social Sciences

460 Humanities and Social Sciences Building
(831) 459-3212
<http://socialsciences.usc.edu>

Program Description

The Division of Social Sciences focuses on the study of human relationships and society. As global economic and political changes transform the world around us, social scientists help us meet the challenges and opportunities of the 21st century.

Our nine departments offer more than 35 undergraduate and graduate degree programs, including many

that are interdisciplinary collaborations. Our faculty members conduct leading-edge research in their fields, frequently working with students in research clusters linking departments to our research centers. We also offer extensive opportunities for experiential learning through field studies.

Our research, teaching, and state-of-the-art facilities provide students with a comprehensive and rigorous education that prepares them for productive careers and further academic pursuits. For more information on the division, see our website at: <http://socialsciences.usc.edu>.

Upper-Division Courses

194A. UCDC Internship Research Seminar. F,W,S

Weekly seminar that focuses on the production of a major research paper or equivalent scholarly undertaking connected to an internship in Washington, D.C., government, non-profit, or private institution. Seminar stresses institutional analysis, the development of bibliographic expertise in the use of Washington-based resources, and participant-observer skills. Required for participants in the UCDC program. Required for and enrollment restricted to students participating in the UCDC Program. (Formerly *UCDC Internship and Internship Seminar*.) Enrollment limited to 22. *The Staff*

194B. UCDC Internship Seminar (7 credits). F,W,S

A 30- to 36-hour-per-week internship in a Washington, D.C., government, non-profit, or private institution. Required for and enrollment restricted to UCDC program participants. (Formerly *UCDC Internship and Internship Seminar*.) Enrollment limited to 22. *The Staff*

199. Tutorial. F,W,S

A program of directed study arranged with a Social Sciences Division faculty member. Enrollment restricted to participants in the UCDC program. *The Staff*

199F. Tutorial (2 credits). F,W,S

A program of directed study arranged with participating faculty. Class time is proportionally less than a 5-credit course. Enrollment restricted to participants in the UCDC program. *The Staff*

Sociology

226 College Eight
(831) 459-4306
<http://sociology.usc.edu>

Faculty and Professional Interests

Professor

DANE ARCHER, Emeritus

JOHN BROWN CHILDS

Ethnic conflict and transcommunal cooperation; sociology of knowledge; African American, Native American, Latino interactions

E. MELANIE DUPUIS

Economic sociology, sociology of consumption, sociology of development, political sociology, sociology of the environment, technological change, historical sociology, social theory, food and social change

WILLIAM H. FRIEDLAND, Emeritus

HIROSHI FUKURAI

Lay participation in law, intersection between race and jury, world's jury systems, wrongful acquittals (reframing lynching phenomena), Japanese judicial reforms and the establishment of "quasi-jury" (saiban-in) and new "grand jury" (kensatsu shinsa-kai), advanced quantitative methods (covariance and moment structural modelings), survey and research methods

WALTER L. GOLDFRANK

Social change, historical sociology, world systems, modern Mexico, Chile, social movements and revolution, development theories, policies and outcomes, jury studies

HERMAN S. GRAY

Cultural studies, media and television studies, black cultural politics, social theory

PAUL M. LUBECK

Political sociology; political economy of development, globalization, labor and work; logics of methodology; religion and social movements; Islamic society and identities; information and networks

DENNIS C. McELRATH, Emeritus

MARCIA MILLMAN

Social psychology, the family, sociology of emotions, field research methods, sociology of medicine

JAMES R. O'CONNOR, Emeritus

CRAIG REINARMAN

Political sociology; law, crime, and social justice; drugs and society

PAMELA ANN ROBY, Emerita

DANA Y. TAKAGI

Social inequality and identity, research methods, race relations, nationalism and social movements

ANDREW SZASZ

Environmental sociology (environmental movements, policy, environmental justice); theory

CANDACE WEST

Language and social interaction, sex and gender, conversation analysis, microanalysis and medicine, animals and society

Associate Professor

JULIE BETTIE

Cultural studies, feminisms and cultural politics, race/ethnic studies, identity, popular culture, critical ethnography

BEN CROW

International development, sociology of water and markets, global inequality, South Asia and East Africa, political economy, and green enterprise

HELEN SHAPIRO

Political economy, Latin American economic history and development (with an emphasis on Brazil), industrial policy, the auto industry, the state and transnational corporations

Assistant Professor

MIRIAM GREENBERG

Urban sociology, media studies, cultural studies, political economy, and globalization

STEVEN MCKAY

Work; technology and labor markets; globalization and social change; race, ethnicity and migration; political sociology; ethnography/qualitative methods

JENNIFER E. REARDON

Issues of social identity as influenced by the new sciences of genetics and genomics; intersection of the sociology of science and knowledge and the sociology of race, gender, and class

GABRIELA SANDOVAL

Race and ethnic studies, Latino and Chicano studies, stratification, urban and political sociology, and voting behavior

Lecturer

FRANCESCA GUERRA

Comparative-historical sociology, race and ethnicity, social justice, poverty, law, crime, deviance, asylum and prison architecture, religious non-profits, history of eugenics, disability studies, mass media, oral history, and qualitative and quantitative research methods

WENDY MARTYNA

Social psychology, death and dying, gender, social change, family and youth



Professor

BARBARA L. EPSTEIN (History of Consciousness)

Social movements and theories of social movements, 20th-century U.S. politics and culture, Marxism and related theories of social change

NANCY STOLLER, Emerita (Community Studies)

MARK TRAUOGOTT (History)

Social and economic history, 19th-century France, French revolutions, European working class, historical methods, workers' autobiographies

DAVID WELLMAN (Community Studies)

Working-class culture, American ethnic and racial diversity, social documentary studies, critical race theory, interrogations of whiteness, and qualitative research methods

Assistant Professor

JULIE GUTHMAN (Community Studies)

Sustainable agriculture and alternative food movements, international political economy of food and agriculture, politics of obesity, political ecology, race and food, critical human geography

Program Description

Sociology is the study of social interaction, social groups, institutions, and social structures. Sociologists examine the contexts of human action, including systems of beliefs and values, patterns of social relations, and the processes whereby social institutions are created, maintained, and transformed. Sociology was born as an intellectual response to the democratic and industrial revolutions that ushered in the modern era. It encompasses an exploration of social order together with a vision of a just, free, and egalitarian society—a vision that may require fundamental change in the existing social order. Developing an understanding of both these aspects of the sociological tradition is one of the teaching goals of sociologists at UCSC. In the process, we expect to develop in students an appreciation for the craft of social science: disciplined inquiry, observation, and research.

Sociology faculty members are engaged in research on a wide range of topics, such as the study of violence; microanalysis of conversations; medicine and technology; social inequality; the intersection of class, race, and gender; revolutions; drugs in society; crime and deviance; environmental sociology; legal institutions; popular culture; media studies; globalization and international development; political economy; and language and communication. Because of the interdisciplinary emphasis among sociology faculty, undergraduates find the department agreeable to double majors and minors; and nonmajors find many sociology courses of interest.

In recent years, students have conducted independent studies and written senior theses on a variety of subjects including the social construction of gender, emerging professions in health care, utopian communities, mass communication, surveys of health care needs, the social effects of war, gender differences in attitudes and behavior, causes of and beliefs about family violence, and the history of political struggles.

The sociology major at UCSC is a rigorous program of study that retains enough flexibility to accommodate students with diverse career goals and plans. It ensures that all students are trained in the main theoretical and methodological traditions of sociology, yet permits considerable variation in students' own areas of specialization. The major provides the necessary intellectual foundation for students who are considering graduate studies in sociology and related social sciences. It also can be used as preparation for careers in fields as diverse as law, social work, management, environmental planning, public service, teaching, health services, journalism, and counseling. Finally, the sociology major can provide a general liberal education for undergraduates interested in the study of contemporary society and social problems.

Global Information and Social Enterprise Studies (GISES) is an innovative program sponsored by the Department of Sociology in collaboration with the Global Information Internship Program (GIIP) and the Center for Global, International, and Regional Studies (CGIRS). Grounded in UCSC's distinguished tradition of undergraduate social activism and "hands on" service learning, GISES aspires to create a new generation of "info-savvy" social advocates committed to advancing the public good. GISES encourages students to work in solidarity with local and global communities to overcome the "digital divide" which excludes the world's majority from enjoying the benefits of the information revolution. GISES synthesizes project-based analysis with information technologies in order to democratize globalization, deepen social justice, reduce poverty, advance the transition to a sustainable world, and support movements for social justice. By combining the restless spirit of social entrepreneurship with the innovation of information technologies, GISES aspires to strengthen the informational, communication and organizational capacity of global civil society: schools, community organizations, non-governmental organizations (NGOs), and non-profits in general. Because of the premium GISES places on supporting social entrepreneurship and nurturing sustainable social enterprises, the GISES program provides an excellent foundation for students pursuing careers in non-profit management and professional careers in social advocacy. Depending on a student's major, there are two ways to enter the GISES program. If a student is a Sociology major and wishes to participate in GISES, she or he should declare the intensive Sociology major. A student who majors in any field other than Sociology should declare GISES as a minor.

Admission into the General Sociology Major, Intensive Sociology Major, Combined LALS Major, Sociology Minor, or GISES Minor

The Sociology Department offers three undergraduate majors, a general sociology major, an intensive sociology major, and a combined major with Latin American and Latino studies, and two minors, one in sociology and one in GISES.

Students must take three courses prior to petitioning for entry to the general sociology major: Sociology 1, *Introduction to Sociology*, Sociology 10, *Issues and Problems in American Society*, and Sociology 15, *World Society*. Students with a grade point average (GPA) of 3.0 or above for these three courses will be allowed to declare the sociology major.

Students must take six courses prior to petitioning for entry to the intensive sociology major: Sociology 1, *Introduction to Sociology*, Sociology 10 *Issues and Problems in American Society*; Sociology 15 *World Society*; Sociology 30A, *Introduction to Global Information and Social Enterprise Studies*; Sociology 30B, *Designing ICT Projects for Social Enterprises*; and Sociology 30C, *Project Implementation and Grant Writing for Social Entrepreneurs*. To be considered for admission to the intensive major, students are required to obtain a GPA of 3.0 or above in these courses and submit a self-evaluation including a one- to two-page project plan with their declaration of the intensive major. The project plan will summarize their performance in Sociology 30A, 30B and 30C, including a description of their technology skills (e.g., web design or database applications), an assessment of their completed projects and a rough draft proposal describing their capstone project for Sociology 196G.

Students must take two of the following three courses, Sociology 1, 10 or 15, prior to petitioning for entry to the sociology/Latin American and Latino studies major. Students with a GPA of 3.0 or above for these two courses will be allowed to declare the combined major. (If a student takes all three courses, calculation of the GPA will be based on the two highest grades.)

Students must take one of the following three courses, Sociology 1, 10, or 15 prior to petitioning for entry to the sociology minor. Students who receive a grade of B or higher in this course will be allowed to declare the sociology minor. (If a student takes more than one of these three courses, admission to the minor will be based on the highest grade in the courses taken.)

Students must take four courses prior to petitioning for entry to the GISES minor: Sociology 15, *World Society*; Sociology 30A, *Introduction to Global Information and Social Enterprise Studies*; Sociology 30B, *Designing ICT Projects for Social Enterprises*; and Sociology 30C, *Project Implementation and Grant Writing for Social Entrepreneurs*. To be considered for admission to the GISES minor, students are required to obtain a GPA of 3.0 or above in these courses and submit a self-evaluation including a one- to two-page project plan with their declaration of the minor. The project plan will summarize their performance in Sociology 30A, 30B and 30C, including a description of their technology skills (e.g. web design or database applications), an assessment of their completed projects and a rough draft proposal describing their capstone project for Sociology 196G.

Equivalent courses may be taken at other universities or at community colleges.

Students should take Sociology 1, 10, 15, 30A, 30B, and 30C for letter grades. For courses taken on a pass-no pass basis, the department will use the narrative evaluation in its assessment of eligibility for the major.

Courses for which the grade of W is given are not counted in the computation of the GPA. The department will evaluate grades for repeated courses following the university's grading policy for repeated courses.

Students may petition for admission to the major by filling out the campus's Declaration of Major form, and by supplying evidence of their performance in the required lower-division courses.

Transfer students who cannot complete Sociology 1, 10, and 15 before university policy requires them to declare a major will be allowed to declare if they have taken at least two of the three courses (or their equivalent) listed above (at UCSC, at another university, or at a community college) with an overall GPA of 3.0. Transfer students allowed to declare under this rule are expected to complete all three courses with an overall minimum GPA of 3.0. Transfer students will be subject to disqualification from the major if they subsequently do not achieve an overall 3.0 GPA in courses 1, 10, and 15 or their equivalent.

Appeal of Negative Decisions

Students must submit appeals of negative decisions to the Sociology Department in writing within 30 days of notification of denial of entrance into the major. Letters of appeal should describe any extenuating circumstances that might have affected the student's record.

Requirements for the General Sociology Major

For more details, students may consult the sociology handbook, available online at <http://sociology.ucsc.edu>, or at the department office, 226 College Eight.

Sociology majors are required to take a total of 13 courses (three prescribed lower-division courses in preparation for the major, four prescribed upper-division core courses, and six upper-division electives). In addition, they must successfully complete the comprehensive requirement prior to graduation.

Lower-division preparation. All sociology majors are required to take the following three courses or their equivalents.

- 1, *Introduction to Sociology*
- 10, *Issues and Problems in American Society*
- 15, *World Society*

Upper-division core courses. The following four sociology courses are required as the foundation of theoretical and methodological training in the discipline. Students are encouraged to take these courses early in their academic career.

- 103A, *Statistical Methods*
- 103B, *The Logic and Methods of Social Inquiry*
- 105A, *Classical Sociological Theory*
- 105B, *Contemporary Sociological Theory*

Upper-division advanced course work. Six additional upper-division sociology courses are required, including at least one in each of three areas of specialization (clusters): institutional analysis, social psychology, and inequality and social change. Consult the sociology web site for a list of courses that can be applied to each cluster:

- *Cluster I: Institutional Analysis.* Courses in this cluster address the issues of how major social institutions are organized, the relationship between their technologies and social relations, the subcultures that develop around them, the problems they both solve and create, and the ways they change over time.
- *Cluster II: Social Psychology.* Courses in this cluster deal with the intersection of sociological and psychological concepts. Social psychologists have traditionally been concerned with the experience of the individual in a social context. Topics of classic interest in social psychology include conformity, deviance, influence, social interaction, interpretive processes, attribution, sex and gender roles, and prejudice.

- *Cluster III: Inequality and Social Change.* Courses in this cluster address the issues raised by unequal distribution of wealth, power, privilege, and cultural control. Principal axes of inequality are class, race and ethnicity, and gender. Consequences of inequality for social organization and personal life are examined. Also covered in this cluster are courses that examine the momentous transformation that preoccupied the founders of sociology and ongoing changes in the contemporary world: the rise and spread of capitalism, the scientific and technological revolutions, the emergence of mass politics, large-scale urbanization, shifts in family life, the growing predominance of bureaucracy, and social movements and revolutions. Specialization in one geographical area—East, South, or Southwest Asia; the Middle East; Africa; Europe; Latin America—may be pursued. Courses in this cluster develop the student's ability to conduct social research and analyze policy issues. Also considered are the social definition of social problems and the process of policy formation. Emphasis is on applied research on topics that are currently attracting public attention.

Comprehensive requirement. Prior to graduation, all sociology majors are required to complete one of the following comprehensive requirements.

- *Senior thesis.* The prerequisite for the senior thesis is course 103B. Students who would like to write a senior thesis must submit to their preferred faculty thesis sponsor a proposal that includes a one- to three-page abstract and draft research plan or design, a brief bibliography, and evaluations from relevant courses. The proposal must be submitted by the second week of the quarter, four quarters before graduation. Students unsuccessful in obtaining a thesis sponsor through these means may submit their proposals to the department's undergraduate education committee (UEC) by the first week of spring quarter. UEC members will review the merits of these proposals and assign the ones they approve to faculty members who have not yet agreed to serve as thesis advisers for the following year. Students will be notified of the outcome of the UEC's deliberations by the end of spring quarter.
- *Capstone course.* Sociology 196A, *Capstone: The Sociologist as Public Intellectual*. Upper-division lecture course that explores public sociology and integrates current research with theoretical strands in sociology.

In exceptional cases, students unable to take the senior capstone course may be allowed to substitute a portfolio of work. This substitution must be approved in advance, by the department chair. The portfolio option consists of: (1) portfolio of materials from (at least) three upper-division Sociology courses; (2) a synthetic essay; (3) a paper consisting of new research by the student on some contemporary social or political issue, analyzed using the theoretical and empirical materials from those three courses. See the department for additional information.

Sociology Major Planner One

The following is a recommended academic plan for students to begin the sociology major.

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Soc 1	Soc 15	Soc 10
2nd (soph)	Soc 105A	Soc 103A Soc 105B	Soc 103B

Sociology Major Planner Two

The following is a recommended academic plan for transfer students entering the sociology major as juniors. It is assumed that course 1 and course 10 equivalencies were completed at the previous college.

Students Beginning in Fall Quarter

Plan Two			
Year	Fall	Winter	Spring
3rd (jr)	Soc 15 Soc 105A	Soc 103A Soc 105B	Soc 103B

Students Beginning in Winter Quarter

Plan Two			
Year	Fall	Winter	Spring
3rd (jr)		Soc 15 Soc 103A	Soc 103B
4th (sr)	Soc 105A	Soc 105B	

All majors must complete the remaining six upper-division courses in their junior and senior years.

Requirements for the Intensive Sociology Major

The intensive major is an option for students wishing to major in sociology and focus in the area of Global Information and Social Enterprise Studies (GISES). Students are required to take a total of 18 courses (six prescribed lower-division courses in preparation for the major, four prescribed upper-division core courses, seven upper-division electives, and a project practicum course). In addition, they must successfully complete the comprehensive requirement prior to graduation.

Lower-division preparation. Students must take the following six courses or their equivalents.

- 1, *Introduction to Sociology*
- 10, *Issues and Problems in American Society*
- 15, *World Society*
- 30A, *Introduction to Global Information and Social Enterprise Studies*
- 30B, *Designing ICT Projects for Social Enterprises*
- 30C, *Project Implementation and Grant Writing for Social Entrepreneurs*

Upper-division core courses. The following four sociology courses are required as the foundation of theoretical and methodological training in the discipline. Students are encouraged to take these courses early in their academic career.

- 103A, *Statistical Methods*
- 103B, *The Logic and Methods of Social Inquiry*
- 105A, *Classical Sociological Theory*
- 105B, *Contemporary Sociological Theory*

Upper-division advanced course work. Seven additional upper-division courses are required, including at least one in each of the three sociology clusters and four upper-division electives from the approved GISES list. Consult the sociology web site for a list of courses that can be applied to each cluster and for the approved GISES elective list. The student's choice of electives must be approved either by the student's project adviser or by the Director of GISES before the student enrolls in the GISES Project Practicum course.

Project practicum. Students must enroll in Sociology 196G Project Practicum and complete their GISES capstone project.

Comprehensive requirement. Prior to graduation, students are required to complete one of the following comprehensive requirements.

- *Senior thesis.* The prerequisite for the senior thesis is course 103B. Students who would like to write a senior thesis must submit to their preferred faculty thesis sponsor a proposal that includes a one- to three-page abstract and draft research plan or design, a brief bibliography, and evaluations from relevant courses. The proposal must be submitted by the second week of the quarter, four quarters before graduation. Students unsuccessful in obtaining a thesis sponsor through these means may submit their proposals to the department's undergraduate education committee (UEC) by the fourth week of spring quarter. UEC members will review the merits of these proposals and assign the ones they approve to faculty members who have not yet agreed to serve as thesis advisers for the following year. Students will be notified of the outcome of the UEC's deliberations by the end of spring quarter.
- *Capstone course.* Sociology 196A, *Capstone: The Sociologist as Public Intellectual*. Upper-division lecture course that explores public sociology and integrates current research with theoretical strands in sociology.

In exceptional cases, students unable to take the senior capstone course may be allowed to substitute a portfolio of work. This substitution must be approved in advance by the department chair. The portfolio option consists of: (1) portfolio of materials from (at least) three upper-division sociology courses; (2) a synthetic essay; (3) a paper consisting of new research by the student on some contemporary social or political issue, analyzed using the theoretical and empirical materials from those three courses. See the department for additional information.

Requirements for the Combined Major in Sociology and Latin American and Latino Studies

Students may choose to declare a combined major in sociology and Latin American and Latino studies. The requirements (listed below) should be examined carefully before choosing the combined major option. Both departments must approve a study plan before the major can be declared. Once the lower-division sociology courses have been completed, students may petition to declare the combined major. Each department determines major and thesis honors separately.

Language Study

Students must demonstrate proficiency in Spanish or Portuguese equivalent to the completion of Spanish 6 or 56 or Spanish for Spanish Speakers 63 or Portuguese 65A-B.

Sociology/Latin American and Latino Studies

Students are required to take a total of 14 courses and satisfy a comprehensive requirement. There are four lower-division course requirements, two each from the sociology and Latin American and Latino studies (LALS) majors. One of the lower-division LALS classes must be Latin American and Latino Studies 10 (no substitutions); transfer students may petition to replace the other lower-division class with an appropriate course from another institution. Students are assigned a faculty adviser from each discipline. Upper-division requirements include six core courses: Latin American and Latino Studies 100A, 100B; Sociology 103A, 103B, 105A, and 105B; and four additional elective courses, two from sociology and two from Latin American and

Latino studies. At least one of the Latin American and Latino studies upper-division courses must be taught in Spanish or Portuguese, and at least one course in the sociology/Latin American and Latino studies combined major must be on Chicano/Latino issues. Up to three relevant courses taken through study abroad programs from which credits are transferable to UCSC may be credited toward the major when the content is deemed appropriate by the faculty advisers of both sociology and Latin American and Latino studies. Students can satisfy the comprehensive requirement in one of three ways: (1) writing a senior thesis, (2) passing an appropriate Latin American and Latino Studies Senior Seminar (194 series), or (3) completing a sociology course option of two additional sociology upper-division cluster III courses. If the thesis option is selected, it should be planned in consultation with an adviser from each department, completed under the supervision of a faculty member from either department, and read and approved by both advisers; one adviser is sufficient if this faculty member belongs to both departments.

Requirements for the Sociology Minor

Students minoring in sociology are required to take seven courses: one of courses 1, 10, or 15; at least two of courses 103B, 105A, and 105B; and at least four other upper-division sociology courses. Students must provide evidence of completion of the lower-division requirement, courses 1, 10, or 15 with a grade of B or better, prior to declaring the sociology minor.

Requirements for the GISES Minor

Students minoring in GISES are required to take nine courses (four prescribed lower-division courses in preparation for the minor, four upper-division electives, and a project practicum course). The four lower-division requirements are courses 15, 30A, 30B and 30C. The four upper-division electives may be selected from the approved GISES electives list, available on the sociology web site. Students must take Sociology 196G Project Practicum and complete their GISES capstone project. The student's choice of electives must be approved either by the student's project adviser or by the Director of GISES before the student enrolls in the GISES Project Practicum course. Students must provide evidence of completion of the lower-division requirements with a GPA of 3.0 or better. In addition students will be required to submit a self-evaluation and a one or two page project plan with their declaration of the minor. The project plan will summarize their performance in Sociology 30A, 30B and 30C, including a description of their technology skills (e.g. web design or database applications), an assessment of their completed projects and a rough draft proposal describing their capstone project for Sociology 196G, to be considered for admission to the GISES minor.

Disqualification Policy

Students who receive a D, F, NP, or W twice in any of the upper-division core courses (courses 103A, 103B, 105A, and 105B) will be disqualified from the major or minor. Students, their college, and the Office of the Registrar will be notified by the department no later than the first day of instruction of the quarter following the disqualifying failure. Students who feel there were extenuating circumstances surrounding their failure of a course for the second time may appeal their disqualification by submitting a letter to the chair of the Sociology Undergraduate Education Committee. The appeal must be filed no later than 15 days after the disqualification notification was mailed, or the 10th day of

classes in the quarter of the disqualification, whichever is later. For further information regarding the disqualification process, contact the Sociology Department.

UC Education Abroad Program Students

Academic year programs. Students must declare the major and pass the three lower-division preparatory course requirements (1, 10, and 15) and three of the upper-division core courses (103B, 105A, 105B) prior to study abroad. It is recommended that the students have the courses intended to be taken abroad reviewed and approved by the Sociology Department prior to departure. Up to three approved courses may be used toward the sociology major.

Semester programs. Fall semester: students must declare the major and pass the three lower-division preparatory course requirements (courses 1, 10, and 15) and one upper-division core course (105A) prior to fall semester study abroad. Spring semester: students must declare the major and pass the three lower-division course requirements (courses 1, 10, and 15) and two upper-division core courses (103B and 105B) prior to spring semester study abroad.

Up to three relevant courses taken through study abroad programs from which credits are transferable to UCSC may be used toward satisfaction of the major requirements when the content is deemed appropriate and approved by the Sociology Department.

Transfer Students

Junior transfer students expressing an interest in sociology on their UCSC application for admission are admitted as proposed sociology majors. This status is considered undeclared. Transfer students must meet with the sociology undergraduate adviser when they arrive on campus to determine their status and begin the actual declaration of major process, which must be completed by the end of the second quarter of the junior year for transfer students.

Declaring sociology early in the academic career will give a student priority for sociology course enrollment in subsequent quarters.

Graduate Program

The graduate program in sociology at UCSC is an interdisciplinary program that leads to the Ph.D. in sociology. An M.A. degree may be taken en route to the doctorate, but a master's program per se is not available. The program is designed to educate students in most major areas of sociology. It provides a general background in sociological theory and methods and also stresses independent work. After completing a group of required courses, students work closely with individual faculty members in designing their own course of study.

The sociology graduate program is intended to lead to both academic and nonacademic careers, and the interests of the faculty reflect this twofold objective. Faculty specialties include comparative and historical sociology; criminal justice; cultural sociology; development, drug policy, deviant behavior; economy and society; education; emotions; environmental sociology; globalization; health; language and social linguistics; law and society; Marxist sociology; mass communication and public opinion; medical sociology; policy analysis and political economy; qualitative methodology; race, class, gender; science and technology; sexuality and homosexuality; social inequality; sociology of knowledge; and visual sociology.

When asked what they most appreciate about the sociology graduate program, most students cite the students' and faculty's activism and commitment to

social change in combination with their dedication to teaching, scholarly research, and understanding of the social forces of our society. Research concerns cluster around environmental, racial, cultural, feminist, Latin American, peace, sexuality, and class issues. The Sociology Department's colloquium series—as well as occasional national and international conferences on one or another of these concerns held on campus—enhances scholarship, practice, and collegial networks. The diversity in age, ethnicity, and work experience of the student body enriches this work.

The core curriculum is divided into two parts, (1) basic grounding in theory and methods, and (2) exposure to research in three areas of concentration: (a) economy, development, and environment; (b) inequality and identity; and (c) culture, knowledge, and power. Beyond the required series of core courses, students are expected to specialize in a particular area and to take additional course work offered in that area. Students use comparative and historical analysis, quantitative techniques, and interpretive and/or field research methods to study questions of human agency and social structure and the ways in which these questions are limited by and dependent upon one another.

Numerous sociology students present papers at professional conferences and publish articles during the course of their graduate studies. The sociology master's paper is designed in part to prepare students to write for professional journals. Ongoing faculty seminars focusing on concrete research topics and problems are available for advanced graduate students working on papers and dissertations in related areas.

The program encourages interdisciplinary work. Many of the faculty in the Sociology Department have additional interests and are affiliated with other departments on campus. Seminars in the anthropology, environmental studies, history, history of consciousness, politics, psychology, and feminist studies programs are open to sociology students. Graduate students in sociology may obtain a parenthetical notation on the sociology Ph.D. diploma indicating that they have specialized in feminist studies, Latin American and Latino studies, environmental studies, philosophy, or education. Students must meet requirements spelled out by the relevant department and their committee members. Some fellowship and grant opportunities are available. Students also participate in research projects under the auspices of six interdisciplinary social science research centers: the Center for Agroecology and Sustainable Food Systems; the Center for Global, International, and Regional Studies; the Center for Justice, Tolerance, and Community; the Chicano/Latino Research Center; the Center for Research on Educational Diversity and Excellence; and the Santa Cruz Center for International Economics.

The sociology program also emphasizes teaching experience because the skills required for good teaching—the ability to articulate ideas, to organize and present materials in logical sequence, and to listen attentively and discern someone else's comprehension—are fundamental to many human activities and occupations. Therefore, the sociology program requires that graduate students serve as teaching assistants for at least three quarters in the department's core classes of the undergraduate curriculum, whether or not they plan to pursue an academic career.

Required Courses

Students are required to take at least 12 courses as follows.

A three-course core group:

201 *The Making of Classical Theory*
202 *Contemporary Sociological Theory*
203 *Sociological Methods*

Two methods courses:

204 *Methods of Quantitative Analysis*

and one of the following seven courses:

205 *Field Research Methods*

206 *Comparative Historical Methods*

209 *Analysis of Cultural Form*

241 *Cross-National and Cross-Cultural Research*

242 *Feminist Research Seminar*

Psychology 248 *Survey Methods*; or Sociology 282

Social Policy Research

Three area foundation courses:

220 *Global Transformation: Macrosociological Perspectives*

240 *Inequality and Identity*

260 *Culture, Knowledge, Power*

At least one writing course (208 or 250)

A minimum of three elective courses approved by the graduate director (excluding Sociology 250 and Sociology 293).

Students with no background in statistics are required to take the undergraduate course, *Statistical Methods*, before enrolling in *Methods of Quantitative Analysis*.

Progress Toward the Ph.D.

- Beginning at least by the end of the first year, students initiate work on their master's paper.
- Completion of the master's paper is expected by the end of the second year.
- Students are expected to take an oral qualifying exam by the end of the third year, but no later than the end of the fourth year.
- Graduate students prepare field statements in two distinct areas of sociology and, in addition, prepare a detailed course outline and a grant proposal in one or the other of these areas.
- The qualifying examination is an oral examination and based on the student's field statements.
- After passing the qualifying examination, a student is advanced to candidacy and begins work on the dissertation with the aid of a three-person dissertation committee.

Details of the policies for admission to the graduate program, the requirements for the Ph.D. degree, and information on financial support opportunities are available from the Department of Sociology. For more information, refer to the Graduate Studies section of the catalog.

Lower-Division Courses

1. Introduction to Sociology. F,S

A systematic study of social groups ranging in size from small to social institutions to entire societies. Organized around the themes of social interaction, social inequality, and social change. Fulfills lower-division major requirement. (General Education Code(s): IS.) *F. Guerra, C. Reinerman*

10. Issues and Problems in American Society. W,S

Exploration of nature, structure, and functioning of American society. Explores the following: social institutions and economic structure; the successes, failures, and intractabilities of institutions; general and distinctive features of American society; specific problems such as

race, sex, and other inequalities; urban-rural differences. Fulfills lower-division major requirement. (General Education Code(s): IS.) *M. Greenberg, J. Reardon*

15. World Society. F,W

Introduction to comparative and historical sociology. Focuses on the global integration of human society. Examines social changes such as industrialization, globalization, colonial rule, and the rise of Islamic fundamentalism. Uses social theory (including ideas from Marx, Weber, and Adam Smith) to explore the making of institutions like the nation-state, the World Trade Organization, the World Bank, and the International Monetary Fund. Fulfills lower-division major requirement. (General Education Code(s): IS, E.) *P. Lubeck, S. Mc Kay*

20. Key Issues in Race and Ethnic Analysis. *

Provides a solid conceptual foundation for undergraduates interested in pursuing the study of race and ethnic issues in advanced upper-level classes. (General Education Code(s): IS, E.) *The Staff*

30A. Information Methods for Global Information Internships (3 credits). F

Introduction to information technology and communication networks using the Internet to reduce global inequality and bridge the "digital divide." Prepares students enrolled in the Global Information Internship Program to construct web pages and write grant proposals for community and non-governmental organizations. Course 186 recommended but not required. Enrollment limited to 60. *P. Lubeck*

30B. Information Methods for Global Information Internships (3 credits). W

Introduction to information technology and communication networks using the Internet to reduce global inequality and bridge the "digital divide." Prepares students enrolled in the Global Information Internship Program to construct web pages and write grant proposals for community and non-governmental organizations. Course 186 recommended but not required. Enrollment limited to 60. *P. Lubeck*

30C. Information Methods for Global Information Internships (3 credits). S

Introduction to information technology and communication networks using the Internet to reduce global inequality and bridge the "digital divide." Prepares students enrolled in the Global Information Internship Program to construct web pages and write grant proposals for community and non-governmental organizations. Course 186 recommended but not required. Enrollment limited to 60. *P. Lubeck*

35. Information Methods: IT Design and Application for Social Change. *

Information technology (IT) is an essential tool for community organizations. When, how, and with what success IT is used, however, is not a simple problem. This seminar works through core design processes and helps develop "information plans" for successful technology application in community organizations. Priority given to Global Information Internship Program participants. Enrollment limited to 30. *The Staff*

42. Student-Directed Seminar. F,W,S

Seminars on selected topics taught at various times by upper-division students under faculty supervision. (See course 192.) Consult the *Schedule of Classes* for specific offerings. *The Staff*

80E. The Sociology of Love. *

Investigation of love from a sociological perspective, including the following: (1) how the experience of love is constructed/shaped by the individual, social structure, conventions, ideology; (2) functions of love for the individual/society; (3) how love varies by gender/social class; (4) mythologies of love. Emphasis on romantic heterosexual love and its historical development in Western culture. (General Education Code(s): T3-Social Sciences.) *The Staff*

80V. Understanding Agile Web Development for Social Justice. S

Focuses on development of web applications using agile methodologies and fundamentals of web programming and/or web UI design. Topics include: free/open-source software movement, social computing, and practices of digital justice. Focus is on ruby language, design principles, storyboarding, source control, testing, and documentation. May be repeated for credit. (General Education Code(s): T7-Natural Sciences or Social Sciences.) *P. Lubeck*

80Z. Youth and Crime. *

Addresses foundations of development of our juvenile justice system and its adaptation (or failure to adapt) to changing youth crime and socioeconomic patterns at beginning of the millennium, with special emphasis on California. (General Education Code(s): T3-Social Sciences.) *The Staff*

93. Field Study. F,W,S

Ordinarily call numbers for this course will not be issued after the first week of instruction. Students submit petition to sponsoring agency. *The Staff*

99. Tutorial. F,W,S

Ordinarily call numbers for this course will not be issued after the first week of instruction. Students submit petition to sponsoring agency. *The Staff*

Upper-Division Courses

103A. Statistical Methods (7 credits). W

Fundamental concepts in statistics. Introduction to measuring causation. Learn to use computer to analyze data efficiently. Emphasis on practical applications. Enrollment restricted to sociology, proposed sociology, and combined sociology majors. (General Education Code(s): Q.) *H. Fukurai, D. Takagi*

103B. The Logic and Methods of Social Inquiry (7 credits). S

The first part of the course focuses on basic ethical, political, and logical issues in social scientific inquiry. The second part develops a wide range of skills and methods appropriate to actual research. Course 103A, Statistical Methods, is strongly recommended. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; enrollment restricted to sociology and sociology combined majors, minors and proposed majors. (General Education Code(s): W, Q.) *G. Sandoval*

105A. Classical Sociological Theory. F

This intensive survey course examines the intellectual origins of the sociological tradition, focusing on changing conceptions of social order, social change, and the trends observed in the development of Western civilization in the modern era. Readings are all taken from original texts and include many of the classical works in social theory with special emphasis on the ideas of Marx, Weber, and Durkheim which constitute the core of the discipline. Required for sociology majors planning on studying abroad (EAP). Enrollment restricted to sociology, proposed

sociology, the combined Latin American and Latino studies/sociology, and the proposed combined Latin American and Latino studies/sociology majors and sociology minors. *E. DuPuis, M. Traugott*

105B. Contemporary Sociological Theory. W

Surveys major theoretical perspectives currently available in the discipline including functionalism, symbolic interactionism, ethnomethodology, conflict theory, critical theory, neo-Marxism, feminist theory. Enrollment restricted to sociology, proposed sociology, the combined Latin American and Latino studies/sociology, and the proposed combined Latin American and Latino studies/sociology majors and sociology minors. *A. Szasz*

110. Violence in the Family. *

Examines child abuse and neglect, wife abuse, and sexual abuse in the family, using gender as a lens through which to understand domestic violence. Using a variety of sources, the course undertakes to understand the social, political, and cultural forces that contribute to abuse and to consider solutions. *The Staff*

111. Family and Society. F

Focuses on the interaction between family and society by considering the historical and social influences on family life and by examining how the family unit affects the social world. Readings draw on theory, history, and ethnographic materials. *W. Martyna*

112. Economic Sociology. *

Introduction to economic sociology using field visits to key sites of production and consumption to investigate sociological ideas about the modern economy. *B. Crow*

113. Political Sociology. *

An intensive examination of major substantive monographs representing pluralist, elite, and class theories of the state in industrialized capitalist democracies. *The Staff*

114. Sports and Society. *

Explores the interconnections between sports and society using sociological theories and methods. Topics include class, race, and gender; mass media and popular culture; political economy; education and socialization; leisure patterns (participants and spectators); globalization and cross-national comparisons. *W. Goldfrank*

115. Collaborative Design for Sustainable Technology Lab. S

A hands-on, integrated-learning workshop where students are trained to pursue collaborative design projects, and carry out a design project in which they use these skills. Students read sociological analyses of particular case studies of collaboration in innovation and design, illustrating particular social-science approaches to collaboration and sustainable design. Prerequisite(s): Electrical Engineering 80S or 80J. Enrollment limited to 30. *E. DuPuis*

116. Communication and Mass Media. S

Examines media institutions, communication technologies, and their related cultural expressions. Focuses on specific ways the media—including media studies and criticism—operates as social and cultural factor. Contemporary theory or equivalent in related fields recommended. Enrollment restricted to upper-division students. *F. Guerra*

117. California Youth in Transition. *

Explores modern California youth as a transitional generation whose trends signal a "new sociology" in the interplay of race, immigration, class, gender, and age. Examines the myths/realities of youth crime, violence,

suicide, drug abuse, school failure, and other social issues. Course 1 or course 10 recommended but not required. *The Staff*

118. Popular Music, Social Practices, and Cultural Politics. *

Considers the role of popular music as a site of contemporary social practices and cultural politics. Examines the institutional organization and production of popular music, its cultural meanings, and its social uses by different communities and social formations. Also examines popular music as a vehicle through which major cultural and political debates about identity, sexuality, community, and politics are staged and performed. Prerequisite(s): course 105A or 105B. Enrollment restricted to juniors and seniors. *The Staff*

119. Sociology of Knowledge. F

Focus includes the following three areas: historical examination of sociological theories of knowledge with reference to Durkheim, Weber, Mannheim, and others; examination of black and feminist perspectives within sociology; examination of whether and how "outside" observers can analytically grasp the inner workings of other cultures. Prerequisite(s): course 103B or 105A or 105B. *J. Childs*

120. Feminisms and Cultural Politics. W

Focuses on the role feminist discourses play in cultural politics emphasizing sex, sexuality, and sex work as related to gender, race, and class. Examines the relationship between academic and popular feminisms. Interrogates post-feminism, third-wave feminism, and generational differences in feminisms. Prerequisite(s): course 129 recommended. Enrollment restricted to juniors and seniors. *J. Bettie*

121. Sociology of Health and Medicine. S

Analysis of the current health care "crises" and exploration of the social relationships and formal organizations which constitute the medical institution. Study of the political, economic, and cultural factors which affect the recognition, distribution, and response to illness. *J. Reardon*

121B. Comparative Health-Care Systems and Policies. *

Critical examination of the American health-care system, its history, and the interests it serves; and an analysis of the health-care systems of comparable nations. *C. Chaufan*

122. The Sociology of Law. *

Explores the social forces that shape legal outcomes and the ways law, in turn, influences social life. Traces the history and political economy of American law; the relation between law and social change; how this relation is shaped by capitalism and democracy; and how class, race, and gender are expressed in welfare and regulatory law. (Also offered as Legal Studies 122. Students cannot receive credit for both courses.) *C. Reinerman*

123. Law, Crime, and Social Justice. *

Blends the latest research in criminology with that from social stratification, inequality, and social welfare policy with the objective of exploring the relationship between levels of general social justice and specific patterns of crime and punishment. The focus is primarily on the U.S. although many other industrialized democracies are compared. An introductory course in sociology is recommended as preparation. (Also offered as Legal Studies 123. Students cannot receive credit for both courses.) *The Staff*

124. Visual Sociology. S

Learn to critically consume documentary, ethnographic film, photojournalism, and the genre of realism as these methods are increasingly used to describe the social world. Addresses theoretical, methodological, practical, and ethical issues of creating visual media. Optional media lab teaches students how to create visual products as well. (Formerly *Visual Ethnography*) Prerequisite(s): Enrollment restricted to juniors and seniors. *J. Bettie*

124L. Visual Ethnography Media Lab (2 credits). S

Teaches the basics of digital narrative/storytelling, basic use of digital video cameras, digital video editing in iMovie and/or Final Cut Pro, and use of microphones and sound. Students use these skills to aid in creation of their final course project. Concurrent enrollment in course 124 is required. Enrollment restricted to juniors and seniors. *J. Bettie*

125. Society and Nature. *

A healthy society requires a stable and sustainable relationship between society and nature. Covering past, present, and future, the course covers environmental history of the U.S., the variety and extent of environmental problems today, and explores their likely development in our lifetimes. *E. DuPuis*

126. Sociology of Sex. *

Explores social and cultural aspects of human sexuality and reproduction, including how and why meanings and behaviors are contested. Analyzes sexuality and reproduction as forms of social and political control as well as cultural expression and self-determination. Enrollment restricted to upper-division students. Enrollment limited to 90. *The Staff*

127. Drugs in Society. S

Explores the history of the use and abuse of consciousness-altering substances like alcohol and other drugs. Social-psychological theories of addiction are reviewed in tandem with political-economic analyses to identify the social conditions under which the cultural practices involved in drug use come to be defined as public problems. An introductory sociology course is recommended prior to taking this course. *C. Reinerman*

128. Law and Politics in Contemporary Japan and East Asian Societies. *

Introduction to contemporary analysis of Japan's race relations, ethnic conflicts, and a government's failure to restore remedial justice for war victims in Japan, Asia, and the U.S. Specific issues include comfort women, national or state narratives on Hiroshima, forced labor during World War II, and Haydon legislation that allows war victims to sue Japanese government and corporations in California. (Also offered as Legal Studies 126. Students cannot receive credit for both courses.) Enrollment limited to 30. *H. Fukurai*

128I. Race and Criminal Justice. F

An introduction to comparative and historical analyses of the relations between race and criminal justice in the U.S. Emphasis on examinations of structural mechanisms that help maintain and perpetuate racial inequality in law, criminal justice, and jury trials. (Also offered as Legal Studies 128I. Students cannot receive credit for both courses.) Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 120. *H. Fukurai*

128J. The World Jury on Trial. S

Adoption of the jury and its varied forms in different nations provides ideal opportunities to examine differences between systems of popular legal participation. Course

considers reasons why the right to jury trial is currently established in Japan or Asian societies, but abandoned or severely curtailed in others. American jury contrasted with other forms of lay participation in the legal process. (Also offered as Legal Studies 128J. Students cannot receive credit for both courses.) Prerequisite(s): course 1 or equivalent. Enrollment restricted to sophomores, juniors, and seniors. Enrollment limited to 30. *H. Fukurai*

128M. International Law and Global Justice. W

Examines war crimes, crimes against humanity, and the evolution and role of the International Criminal Court (ICC). Examines the evolution of the concept of international law, the rationale for its birth and existence, roots of international conflicts and genocides, possible remedies available to victims, mechanisms for the creation and enforcement of international legal order, as well as the role of colonialism, migration, poverty, race/ethnic conflicts, gender, and international corporations in creating and maintaining conflicts and wars. (Also offered as Legal Studies 128M. Students cannot receive credit for both courses.) Enrollment restricted to juniors and seniors. Enrollment limited to 30. *H. Fukurai*

129. Popular Culture and Cultural Studies. F

Examines the hidden politics of popular pleasure, studying the workings of domination and transgression in popular culture and everyday life. Explores not only media representations but cultural practices as well. Examines both cultural production and consumption. Considers how hegemonic discourses render the politics of resistance invisible. (Formerly Popular Culture.) Enrollment restricted to juniors and seniors. *J. Bettie*

130. Sociology of Food. W

Following food from mouth to dirt, explores the politics, economy, and culture of eating, feeding, buying, selling, and growing food. Topics cover both the political economy of the food system as well as how body and nature are contested categories at either "end" of this system. *E. DuPuis*

131. Culture, Economy, and Power. *

Explores relationship between modern forms of cultural production and the economy and society in which they emerge. Course reads, screens, and discusses variety of the cultural texts: from the historical and theoretical to the commercial, popular, and countercultural. Enrollment restricted to juniors and seniors. *M. Greenberg*

132. Sociology of Science and Technology. *

Reviews social and cultural perspectives on science and technology, including functionalist, Marxist, Kuhnian, social constructionist, ethnographic, interactionist, anthropological, historical, feminist, and cultural studies perspectives. Topics include sociology of knowledge, science as a social problem, lab studies, representations, practice, controversies, and biomedical knowledge and work. Prerequisite(s): course 103B, 105A, or 105B. Enrollment limited to 20. *The Staff*

133. Currents in African American Cultural Politics. *

Takes as its subject, the dialogues, debates, conceptions, and strategies of self representation produced by blacks in the U.S. and Atlantic world in the twentieth and twenty-first centuries. These issues are examined through the insights of feminist theory, cultural studies, media studies, sociology, and African American studies. Enrollment restricted to juniors and seniors. (General Education Code(s): E.) *H. Gray*

134. Television and the Nation. *

The role of American network television in the production of the post-war American national imagination is our focus. Our approach will explore issues of media power, especially television's industrial apparatus, its network structure, its strategies of representation in relationship to the construction of the image of the nation, and the meaning of citizens, consumers, and audiences. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to juniors and seniors. (General Education Code(s): W.) *F. Guerra*

135. Nonverbal Communication. *

Explores varieties of nonverbal communication: facial expressions, tones of voice, personal space and proxemics, gestures, and paralanguage. Readings are drawn from sociology, psychology, and anthropology. Includes films, videotapes, photographs, and audiotapes. *The Staff*

136. Social Psychology. W

Major theories and concepts in sociological study of social psychology. Topics include identity and social interaction, deviance, sociology of emotions, social narratives, and the social construction of reality. *M. Millman*

137. Deviance and Conformity. W

Why certain social acts are considered threatening and how individuals or groups become stigmatized. Sociological analysis of the institutions and processes of social control and the experience of becoming deviant and living with a stigmatized identity. Introductory course in sociology recommended. *F. Guerra*

140. Social Psychology of Power. *

This course uses historical, sociological, and social psychological materials to introduce students to issues concerning class and power, religion and power, minorities and power, women and power, the rise of the New Right, and the successes and failures of the Left. Prerequisite(s): course 1, 10, or 15 or Psychology 40. Enrollment restricted to juniors and seniors. *G. Dombhoff*

141. Group Process. *

The study of group development and interpersonal behavior based primarily on observation of the class discussion group. Readings are drawn from psychology and fiction as well as from sociology. Offered in alternate academic years. Enrollment restricted to senior sociology majors. Enrollment limited to 18. *M. Millman*

142. Language and Social Interaction. W

Concerns the routine and taken-for-granted activities that make up our interactions with one another, consisting in large part—but not exclusively—of verbal exchanges. Emphasis on the socially situated character of communication, whether intimacy between two people or dominance of a group. An introductory sociology course is recommended prior to taking this course. Enrollment restricted to sophomores, juniors, and seniors. *W. Martyna*

143. Conversation Analysis. *

A working seminar, involving the analysis of actual conversations. Covers fundamental ethical, conceptual, and methodological issues that arise in the collection of conversational data, as well as the skills and techniques of conversation analysis. Given our operating assumption, that talk is a primary means of constructing social identities, there is a heavy thematic emphasis on gender, status, and power in conversation. Prerequisite(s): course 142 or Psychology 80E. Enrollment restricted to juniors and seniors. Enrollment limited to 20. *C. West*

144. Sociology of Women. W

Analysis of the social significance and social production of gender. Some consideration of how sex differences have developed. Major emphasis on the impact of gender as a categorical imperative in the present social context. In this context, the course is also about sexual segregation, sexual inequality, and the dynamics of interpersonal power. Enrollment restricted to juniors and seniors. An introductory sociology course is recommended. *C. West*

145. Sociology of Men. S

Examines conflicting views on the development and state of modern masculinity as adaptation, transitional phase, or pathology. Did men lose the "gender war"? Do boys need rescuing? What are common and divergent social experiences of men within race, class, gender, culture, era? An introductory sociology course recommended. *The Staff*

146. Sociology of Violence, War, and Peace. *

Explores key issues, theories, and topics in the study of violence, war, and peace. Addresses aspects of aggression, personal violence, political violence, and war. In addition, various strategies for the prevention of violence and war are examined. *The Staff*

148. Sociology of Learning. *

Examines learning and achievement from class, race, and gender perspectives; provides tools for improving learning and achieving goals; explores interplay between past and present social forces affecting learning and achievement. Class has dyads rather than sections. Enrollment restricted to juniors and seniors. *The Staff*

149. Sex and Gender. F

Modern analyses of sexuality and gender show personal life closely linked to large-scale social structures: power relations, economic processes, structures of emotion. Explores these links, examining questions of bodily difference, femininity and masculinity, structures of inequality, the state in sexual politics, and the global re-making of gender in modern history. Recommended as background: any lower-division sociology course. *The Staff*

150. Sociology of Death and Dying. S

Explores contemporary, historical, cross-cultural and interdisciplinary perspectives on the social psychology of death and dying. Cultural norms and institutional contexts are studied, along with the individual experience, and the ways in which our perspectives on death and dying influence our experiences of life and living. Enrollment restricted to juniors and seniors. *W. Martyna*

151. Research Seminar on Human Communication. *

Focuses on advanced topics in verbal and nonverbal communication. Members of this research seminar select a specific area of human communication (e.g., "gestures," "facial expressions," "the voice," etc.). Students assemble an annotated bibliography, drawing on literatures in many social science disciplines, and write scripts that demonstrate complex communication issues. Finally, students use audio and video equipment to illustrate these scripts. Prerequisite(s): course 135. Enrollment limited to 25. *The Staff*

152. Body and Society. F

Critically examines the place of the human body in contemporary society. Focuses on the social and cultural construction of bodies, including how they are gendered, racialized, sexualized, politicized, represented, colonized, contained, controlled, and inscribed. Discusses relationship between embodiment, lived experiences, and social action. Focuses on body politics in Western society and

culture, especially the United States. An introductory sociology course is recommended prior to taking this course. Enrollment restricted to juniors and seniors. Enrollment limited to 50. *The Staff*

153. Sociology of Emotions. S

Examines sociological approaches to the understanding of emotions and the application of these approaches to work, learning, interpersonal relationships, health and illness, sports, and other aspects of everyday life. Enrollment restricted to juniors and seniors. *M. Millman*

154. Cross-National and Cross-Cultural Research. *

Examines a variety of theoretical, methodological, and substantive approaches to cross-national and cross-cultural research. Focuses on the importance and variety of cross-national and cross-cultural studies. Prerequisite(s): one of the following: course 103, 139, or 183. Enrollment limited to 20. *The Staff*

155. Political Consciousness. F

Explores the relationship between consciousness, ideology, and political behaviors from voting to rebellion. Special attention is given to the lived experience and the identity interests that complicate the nexus of class position and political ideology. An introductory sociology course is recommended as preparation. *G. Dombhoff*

156. U.S. Latina/o Identities: Centers and Margins. *

Explores historical and contemporary constructions of Latina/o identities and experiences in U.S. Particular emphasis placed on transcultural social contexts, racial formations, and intersections with other identities including sexuality and gender. Enrollment restricted to juniors and seniors. Enrollment limited to 40. (General Education Code(s): E.) *G. Sandoval*

163. Global Corporations and National States. *

Examines the nature and development of the capitalist world system since 1945. Emphasis is on the power of multinational corporations as managers of the world system and the response of states: role of multilateral agencies such as the World Bank, International Monetary Fund, United Nations. *H. Shapiro*

165. World Systems Perspective. S

Seminar on the intellectual origins and contemporary exponents of the world-systems perspective in the social sciences: Marx, Braudel, Polanyi, Arrighi, Wallerstein. Prerequisite(s): courses 105A and 105B or permission of instructor. *W. Goldfrank*

166. Economics for Non-Economists. *

Fosters economic literacy among students who are not economics majors but are interested in the political and social ramifications of economic change. Emphasizes economic institutions and policy and is taught by case-study method, which requires active student participation. Enrollment restricted to juniors and seniors. Enrollment limited to 40. *H. Shapiro*

167. Development and Underdevelopment. F

Examines contemporary debates about development in the Third World: alternative meanings of development, recent work on the impact of colonial rule, how some economies have industrialized, ideas about agrarian change, and recent research on paths out of poverty. Students work in pairs to examine a development in one country since World War II. *B. Crow*

168. Social Justice. *

What is social justice? People answer this question differently, depending upon their sociological perspective.

Using a combination of political philosophy and sociological studies, explore five perspectives on social justice within the Western sociological tradition: utilitarianism, Marxism, liberal egalitarianism, communitarianism, and pluralism. Students pick a topic and learn to articulate different visions of socially just change based on these perspectives. Prerequisite(s): course 105A. Enrollment limited to 60. *E. DuPuis*

169. Social Inequality. F

A survey of theories and systems of social stratification focusing on such phenomena as race, class, power, and prestige. Enrollment restricted to juniors and seniors. (General Education Code(s): E.) *D. Takagi*

170. Ethnic and Status Groups. S

Examines the enduring and changing status of ethnic and other visible minority groups in the United States, e.g., Latinos, Asian Americans, African Americans, and immigrants, with comparative materials drawn from other societies. An introductory course in ethnicity and race is recommended as preparation. Satisfies American History and Institutions Requirement. (General Education Code(s): E.) *J. Childs*

171. Exploring Global Inequality. *

Seminar focusing on readings of key texts and recent research papers on several dimensions of global inequality (material, health, gender, cultural, migration) to find innovative ways of understanding the connections among different dimensions of inequality and of visualizing inequality in digital media. Collaborative interaction with Film Studies 177, *Advanced Digital Media Workshop* and Environmental Studies 155, *Geographic Information Systems*. Enrollment restricted to seniors. Enrollment limited to 25. *B. Crow*

172. Sociology of Social Movements. *

Through readings on social movements that span the 20th century, examines the causes of popular mobilizations, their potential for rapid social change, and the theories developed to understand and explain their role in modern social life. Enrollment restricted to upper-division students. Enrollment limited to 40. *M. Traugott*

173. Water. F

Analyzes access to clean water, both in the American West and global South. Reviews water quality, pivotal role of water in settlement and society, history and contemporary inequalities, water supplies, international conflict over water, climate change, and human use of water. Enrollment restricted to juniors and seniors. Enrollment limited to 60. *B. Crow, A. Szasz*

174. Twenty-First-Century African American Social Structure. W

A sociological overview of African American society in the 21st century. The changing patterns of social/cultural organization, class structure, and modes of political action are analyzed. This analysis is located within the framework of migration, urbanization, and social struggle among black Americans. Prerequisite(s): course 10 or 20. (General Education Code(s): E.) *J. Childs*

175. Social History of Asian Americans. *

Provides a general introduction to the history of Chinese, Japanese, Filipinos, Koreans, and Southeast Asians, within the context of American history. Examines the diverse processes of immigration, the formation of communities, work, and family relations of Asians and Asian Americans. Looks at how social, political, and economic changes in the larger U.S. society have affected the lives of Asians in America. Offered in alternate academic years.

Enrollment restricted to juniors and seniors. Satisfies American History and Institutions Requirement. (General Education Code(s): E.) *The Staff*

176. Women and Work. *

Examines the history of women and work; women's current conditions of work and political, economic, and social factors affecting these conditions; means by which women may shape working conditions including contributing leadership, developing policies, building unity, and creating alliances. Enrollment restricted to juniors and seniors. *The Staff*

176A. Work and Society. *

Addresses how work is organized and shapes life changes. Covers: the history of paid work; the impact of technology; race/class/gender at work; professional and service work; work and family; collective responses to work; and challenges of work in a globalizing economy. Enrollment restricted to juniors and seniors. *S. Mc Kay*

177. Urban Sociology. W

Historical and contemporary examination of urban life including community, race, geography, urban and suburban cultures and lifestyles, stratification, housing, crime, economic and environmental issues, demographic changes, and global urbanization. Enrollment restricted to junior and senior sociology majors. Enrollment limited to 60. *G. Sandoval*

177A. Latinos/as and the American Global City. F

Examines roles of emerging Latino/a majorities in urban centers across the U.S. Explores the "Latinization" of U.S. cities and various factors affecting the life chances of Latinos/as including, but not limited to, immigration, segregation, social movements, and other forms of political participation. Enrollment restricted to juniors and seniors. Enrollment limited to 35. *G. Sandoval*

177G. Global Cities. *

Explores how "global cities" have facilitated increasing integration of the diverse cultures and economies of the world. Using historical, sociological, and comparative methods, analyzes how these spaces both enable and constrain transnational flows of capital, labor, information, and culture. Enrollment restricted to juniors and seniors. *M. Greenberg*

178. Sociology of Social Problems. S

Views "problems" in society not as given but as social constructs. Examines the ways in which conditions in society become identified and defined as problems and consequences that follow from such a process. *The Staff*

179. Nature, Poverty, and Progress: Dilemmas of Development and Environment. W

Concerns about environmental change, including global warming, threats to the ozone layer, and industrial pollution, raise questions about Third World development. Simple views of the relation between society and nature, such as blaming population growth, industrialization, or poor people, seem to preclude higher living standards. Uses debates and case studies to explore more subtle and optimistic views of social-natural relations. *B. Crow*

179L. Nature, Poverty, and Progress Laboratory. *

For enrollees in course 179, this optional lab provides opportunity to research ideas and produce a rough business plan for green enterprise of choice. Examples include compostable packaging, gray water systems, sustainable

manufacturing, solar-powered submarines, green consulting, and other enterprises. Concurrent enrollment in course 179 required. Enrollment limited to 20. *B. Crow*

180. Social Movements of the 1960s. *

Examines the roots, development, and political outcomes of black civil rights organizations during the Sixties. Explores social and structural forces, mobilization of black communities, strategies and tactics used, nature of the relationships between various civil rights organizations, unity and disunity among organizations, leadership gains, and impact on race relations in the U.S. Enrollment restricted to junior and senior sociology and combined sociology/Latin American and Latino studies majors. Enrollment limited to 45. *The Staff*

181. A Sociology of Place: The California Coast. *

Examines the California coast, including important social, political, cultural, and environmental aspects of this most important place. Lectures, readings, discussion, and class assignments examine the history, development, and future of the California coast. Enrollment restricted to juniors and seniors. Enrollment limited to 45. *The Staff*

184. Hunger and Famine. *

Why do famines happen? Why are some hungry and some over-fed? Recent advances in the understanding of food crises and chronic undernutrition are the focus of this course. *B. Crow*

185. Environmental Inequality. *

Modern society not only assaults nature, it does so in ways that reproduce existing social inequalities. Reviews research on disproportionate exposure to risks and hazards, especially along dimensions of class and race, and examines the environmental justice movement. Enrollment restricted to junior and senior sociology and environmental studies students. Course 125 recommended as preparation. Enrollment limited to 42. *A. Szasz*

186. Globalization, Information, and Social Change. *

Reviews theories of globalization, the information revolution, world inequality, and the value of information networks for upgrading capacity of NGOs and community groups to promote progressive social change. Requires research project/grant proposal using Internet resources. *P. Lubeck*

187. Feminist Theory. *

Examination of shifts in 20th- and 21st-century feminist theory and epistemology. Considers various deconstructive challenges to second wave feminism based on the politics of race, ethnicity, nation, sexuality, and class. Focus changes regularly. Prerequisite(s): course 105B, and either course 144 or 149 or Feminist Studies 1 or 100. Enrollment limited to 35. *The Staff*

188. Religion and Social Change. *

Uses historical-comparative method to explore role of religion in global and local social movements. Case studies include historical analysis of the civil rights movement, Islamic movements, liberation theology, and millenarian movements. Topics vary annually. Recommended for social science and history majors. (General Education Code(s): E.) *P. Lubeck*

188A. Social Change in the Global Economy. S

Explores local dimensions of globalization, focusing on experiencing more global divisions of labor in both industrialized and developing countries. Themes include: economic integration and dislocation; new forms of

governance; globalizing consumption and culture; gender; and popular resistance. Enrollment restricted to juniors and seniors. *S. McKay*

190. Proseminar. F,W,S

Under the supervision of the instructor, the student works

191. Sociology Teaching Practicum. F,W,S

Under the supervision of the instructor, the student works with a group of students in a lower-division course, leading discussions, explaining material, reading and marking submissions, consulting individually and/or in other ways assisting in the teaching of a course. Interview and selection by professor required. Prerequisite(s): Senior standing and excellent performance in core courses in the major. Enrollment restricted to senior sociology majors. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Students submit petition to sponsoring agency. *The Staff*

193. Field Study. F,W,S

Provides for (department-sponsored) individual field study in the vicinity of the campus under the direct supervision of a faculty sponsor (as opposed to course 198 where faculty supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. Ordinarily call numbers for this course will not be issued after the first week of instruction. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193F. Field Study (2 credits). F,W,S

Provides for department-sponsored individual field study in the vicinity of campus under the direct supervision of a faculty sponsor. May not be counted toward major requirements. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

Small group study of a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

195A. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. The senior thesis satisfies the comprehensive requirement. Course is for independent thesis research and writing. Courses may be taken consecutively or concurrently. Prerequisite(s): course 103B. Students submit petition to sponsoring agency. *The Staff*

195B. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. The senior thesis satisfies the comprehensive requirement. Course is for independent thesis research and writing. Courses may be taken consecutively or concurrently. Prerequisite(s): course 103B. Students submit petition to sponsoring agency. *The Staff*

195C. Senior Thesis. F,W,S

Preparation of a senior thesis over one, two, or three quarters, beginning in any quarter. The senior thesis satisfies the comprehensive requirement. Course is for

independent thesis research and writing. Courses may be taken consecutively or concurrently. Completion of course 195C (completion of the thesis) satisfies the W general education requirement. Prerequisite(s): course 103B and satisfaction of the Entry Level Writing and Composition requirements. Students submit petition to sponsoring agency. May be repeated for credit. (General Education Code(s): W.) *The Staff*

196A. Capstone: The Sociologist as Public Intellectual (3 credits). F,S

Students hear a selected group of faculty discuss their current research and how that research furthers public understanding and discussion of some vital contemporary social issue. Enrollment restricted to junior and senior sociology majors. *W. Goldfrank, A. Szasz*

196G. Project Practicum: Global Information and Social Enterprise. F,W,S

Project summary and evaluation are required for completion of minor in global information and social enterprise studies (GISES). Projects require approval in advance by director of GISES. Completed projects must be uploaded electronically on the web site or archive of the global information internship program. Prerequisite(s): courses 30A, 30B, and 30C. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Provides for (department-sponsored) individual study program off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. Ordinarily call numbers for this course will not be issued after the first week of instruction. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Advanced directed reading and research. Petitions may be obtained from the Sociology Department Office. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

201. The Making of Classical Theory. F

Examines the establishment of "theory" in the discipline of sociology. Introduces students to close readings and analysis of a core selection of social theory. Problematises the construction, maintenance, and reproduction of a theoretical canon in sociology. Enrollment restricted to graduate students in sociology and by permission number. Enrollment limited to 20. *E. DuPuis*

202. Contemporary Sociological Theory. W

Intensive survey of major tendencies in modern social thought, including functionalism, symbolic interactionism, ethnomethodology, critical theory, structuralism, phenomenology, neo-Marxism, and feminist theory. Enrollment restricted to graduate students in sociology and by permission number. *A. Szasz*

203. Sociological Methods. F

Approaches methods as a series of conscious and strategic choices for doing various kinds of research. Introduces students to the epistemological questions of method in social sciences; to key issues in "technique," particularly control, reliability, and validity; and to good examples of social research. Enrollment restricted to graduate students in sociology and by permission number. *C. West*

204. Methods of Quantitative Analysis. W

Students are provided with intuitive explanation of fundamental concepts in statistics and learn how to use statistics to answer sociological questions. Experience and guidance in using computers to efficiently analyze data are provided. Enrollment restricted to graduate students in sociology and by permission number. Enrollment limited to 20. *D. Takagi*

205. Field Research Methods. F

Gives students first-hand experience doing fieldwork with an emphasis on participant observation and some interviewing. Students submit weekly field notes and a final project analysis. At seminar meetings, field experiences and relevant literature are examined. Enrollment restricted to graduate students in sociology and by permission number. Enrollment limited to 10. Offered in alternate academic years. *M. Millman*

206. Comparative Historical Methods. *

Overview of research strategies and methods used in historical and social sciences. Students read works exemplifying a variety of analytical approaches. Written assignments cultivate critical skills, weighing of tradeoffs inherent in all methodological choices, and elaboration of hypothetical research designs. Enrollment restricted to graduate students. Enrollment limited to 20. *E. DuPuis*

208. Writing Practicum. S

Writing intensive course designed to facilitate the completion of the master's thesis, orals field statement, or the dissertation in sociology. The seminar is convened by a faculty member in conjunction with students and their adviser or appropriate committee chair. Students are expected to produce and present drafts of work completed in the seminar. Enrollment restricted to sociology graduate students and by permission number. Enrollment limited to 12. *M. Millman*

209. The Analysis of Cultural Forms. *

Examines material and symbolic forms such as media products, cultural artifacts, language, nonverbal communication and social practices using discourse, textual, content, interpretive, and conversation analyses as well as ethnography and different channels of communication. Theoretically, relies on cultural studies, communication studies, cultural sociology, film studies, and ethnomethodology. Enrollment restricted to sociology graduate students. *C. West*

220. Global Transformation: Macrosociological Perspectives. W

Classical concepts and contemporary approaches in macrosociology, the study of large-scale, long term social change. Readings drawn primarily from the Marxian and Weberian traditions (new institutionalism, varieties of neo-Marxism, environmental history, state centrism) as they focus on agrarian and industrial structures and commodity chains; household, village, and neighborhood organization; social movements and revolutions; culture, ideology, and consciousness; policy analysis; comparative urban, national, and civilizational development. Enrollment restricted to graduate students in sociology. Enrollment limited to 15. *S. McKay*

222. Political Sociology. *

A survey of major works and themes in the relationship of politics and society, with primary emphasis on the compatibilities and contradictions of pluralist, elite, and class perspectives on the state. Enrollment restricted to graduate students. *E. DuPuis*

223. Sociology of the Environment. *

Advanced treatment of the dominant ideas of nature and the environment in the West and their relationship to the development of Western capitalism. Leading Western theories of environmental crisis and their relation with ideologies of environmentalism and environmental movements. Enrollment restricted to graduate students. Enrollment limited to 20. May be repeated for credit. *E. DuPuis*

224. Globalization: Theories and Social Movements. *

Examines the structures, processes, and movements associated with globalization processes. Reviews political economy theories, cultural theories systems, state industrial policies, and popular responses to globalization. Also assesses contribution of resistance movements informed by class, ethno-nationalism, religion, or gender. Enrollment restricted to graduate students. Enrollment limited to 25. Offered in alternate academic years. May be repeated for credit. *P. Lubeck*

225. Political Economy for Sociologists. *

Examines rudiments of historical materialism in light of advances in cultural and ecological Marxism. Basic categories of Marxist political economy. Thematic focus on the "first" and "second" contradictions of capitalism in world economy today. Enrollment restricted to graduate students. Enrollment limited to 15. *H. Shapiro*

227. Learning from Environmental Historians. *

Looks at several major themes in the sociology of the environment and asks how the works of environmental history address those themes. Includes reflections on how history as a method interrogates social questions. Possible themes include: sustainability; social justice; universalism vs. particularity; city and country; and social movements. Enrollment restricted to graduate students. Enrollment limited to 8. *E. DuPuis*

229. Work and Labor Markets in the New Economy. F

Focuses on the interaction of work restructuring and existing race/class/gender inequalities. Themes include: the labor process and theories of consent; labor market segmentation; job and occupational segregation; information technologies, flexible work, and post-industrialism; flexible employment relations; and low-wage service and labor markets. Enrollment restricted to graduate students. *S. McKay*

230. Theory and Method in the Sociology of Marx. *

Examines theoretical and methodological implications of Marxist theory for empirical social research. Analyzes how historians and social scientists apply Marxist method in explaining society, social change, globalization, culture, and late capitalism. Goal is to assist students to employ Marxist theory and method creatively in their research projects. Enrollment restricted to graduate students. Enrollment limited to 12. *P. Lubeck*

240. Inequality and Identity. S

Explores recent theoretical and empirical studies of race, class, gender, and sexuality with an emphasis on the production of identities and their relationship to processes and structures of power in a postcolonial context. Enrollment restricted to graduate students in sociology. *D. Takagi*

241. Cross-National and Cross-Cultural Research. *

Seminar examining theoretical and methodological issues in doing cross-national and cross-cultural research. In ad-

dition to a consideration of different research paradigms and approaches, representative works from each comparative tradition are examined. Enrollment restricted to graduate students. Enrollment limited to 15. *The Staff*

242. Feminist Research Seminar. *

Provides scholarly support to students doing feminist research. Examines issues concerning conceptualization of feminism and feminist research. Explores relation of feminist research to intersections of gender, class, and race; to the self; to power; and to transformative social praxis. Students present and are given assistance with their work, as well as listen to, read, and assist with the work of others. Enrollment restricted to graduate students. Enrollment limited to 10. *The Staff*

244. Race and Ethnicity. S

A critical survey of the theoretical issues of persistence and change, public policy, and recent empirical studies in the field of race and ethnic relations. Readings introduce comparative race relations and a historical background of major theoretical paradigms in the field which purport to explain race and ethnic relations in general and race relations in America specifically. Enrollment restricted to graduate students. Enrollment limited to 15. Offered in alternate academic years. *J. Childs*

245. Feminist Theory. *

Examination of shifts in 20th- and 21st-century feminist theory and epistemology. Explores the decentering of universalist feminist theories and asks what constitutes feminist theory after gender has been decentered. Considers various deconstructive challenges to second-wave feminist theory based on the politics of race, ethnicity, nation, sexuality, and class. Focus changes regularly. Enrollment restricted to sociology graduate students. Enrollment limited to 12. *J. Bettie*

246. Class, Culture, and Movement. S

Analyzes impact of ethnicity, gender, and religion on the class situation of laboring people in a globalized economy by intensive reading and critique of classic studies, explaining how social movements reflect combinations of social relations and cultural practices. Enrollment restricted to graduate students. Enrollment limited to 15. *C. Reinerman*

247. Race and Class. *

Introduces the student to the recent literature on race and class. Covers several different theoretical perspectives including internal colonialism, labor market segmentation theories, racial formation, and neo-gramscian cultural analyses. In addition to study of theory, also compares theoretical perspectives to the historical experience of minority groups, in particular, blacks, Hispanics, and Asians. Enrollment restricted to sociology graduate students. *J. Childs*

249. Feminisms and Cultural Politics. W

Focuses on the role feminist discourses play in contemporary cultural politics with the main focus on the politics of sex, sexuality, and sex work. Begins with considerations of (mis)representations of feminisms in popular cultures; considers the relationship between academic and popular feminisms; and interrogates the meaning of terms post-feminism and third-wave feminism. Enrollment restricted to graduate students. *J. Bettie*

250. Course Design and Grant-Writing Seminar. *

A professional training seminar devoted to the philosophical, conceptual, and practical issues of course design, pedagogy, and grant writing. Topics covered: institutional contexts; curriculum (including syllabi, course

content, assignments, evaluation); pedagogy; teaching as work/labor process; grant writing; budgets. Enrollment restricted to sociology graduate students. Enrollment limited to 15. *D. Takagi*

252. Symbolic Interactionism and Sociology of Emotions. *

Examines classic and contemporary theories and concepts that play a major role in sociological studies of identity, symbolic and social interaction, and the sociology of emotions. Examines how cultural forms, rules, and rituals define, structure, and mediate emotions and how identities are situated within social institutions. Enrollment restricted to graduate students. Enrollment limited to 10. *M. Millman*

253. Race, Crime, and Justice. *

An introduction to comparative and historical analyses of relations between race and the criminal justice system. Specific topics include defining race/ethnicity, sentencing disparities, jury nullification, jury selection and decisions, prosecutorial misconduct, government's charging and investigative discretions, and other racially biased law enforcement practices and criminal court processes. Also covers a number of highly publicized trials that involved unmistakable elements of race and racism such as Chin, King, Simpson, and Unabomber cases. Students are also exposed to World Wide Web (Internet) to learn how to do research in the field of criminal justice. Enrollment restricted to graduate students. Enrollment limited to 15. *H. Fukurai*

255. Engaging Cultural Studies. *

Examines feminist and ethnic studies production, appropriation, and transformation of cultural studies theories and methodologies. Considers the utility of various theoretical apparatuses and methodological strategies employed in the interdisciplinary site that combines feminist, ethnic, and cultural studies. Enrollment restricted to graduate students. Enrollment limited to 15. *J. Bettie*

256. Urban Sociology. W

Introduction to core writings and key theoretical paradigms in urban sociology. Examines the history and contemporary conditions of cities in the U.S. and the urban experience. Urbanization, suburbanization, community, social inequality, urban politics, relationship between the built environment and human behavior. Enrollment restricted to graduate students. *G. Sandoval*

260. Culture, Knowledge, Power. S

An introduction to theoretical approaches and exemplary studies of culture, knowledge, and power which critically interrogate the relationship between cultural formations and the production, circulation, and meaning of knowledges, materials, artifacts, and symbolic forms. Explores the concrete ways that power is organized and operates through different forms and sites, how it interpolates with other forms of power, and examines knowledges and culture as specific forms of power and sites of political struggle. Enrollment restricted to sociology graduate students. Enrollment limited to 15. *M. Greenberg*

261. Sociology of Knowledge. *

Explores three main issues: the social determination of knowledge, including natural science; the character of intellectual labor and intellectuals as a social group; the role of organized knowledge and "knowledge industries" in contemporary social change. Texts examined include class-based theories (Lukacs, Mannheim, Gramsci), feminist standpoint analysis (Smith, Harding, etc.), and theories of postmodern culture (Lyotard, Harvey, etc.). Enrollment restricted to graduate students. Enrollment limited to 20. *J. Childs*

262. Cultural Practice and Everyday Life. *

Examines contemporary debates about the role of mass produced expressive symbols in modern industrial societies, and the circumstances of cultural production for its impact on the creation, organization, and use of cultural artifacts. Concern with the use and experience of popular symbols for the ways that their use involves the creation of meanings and the role of such meanings in the social organization of society. Enrollment restricted to graduate students. Enrollment limited to 10. *H. Gray*

264. Science, Technology, and Medicine. W

Explores social and cultural perspectives on science, technology, and medicine. Analyzes theoretical approaches that open up "black boxes" of scientific and biomedical knowledge, including the politics of bodies, objects, and health/illness. Links are made to medical sociology. Enrollment restricted to graduate students. *J. Reardon*

282. Social Policy Research. *

Policy research. Covers a variety of theoretical perspectives found in policy studies. Surveys various methodological approaches used in policy research. Theories and methods linked to research agendas on the various phases of the policy life cycle. Students are required to design a research proposal. Enrollment restricted to graduate students. Enrollment limited to 10. Offered in alternate academic years. *E. DuPuis*

290. Advanced Topics in Sociological Analysis. *

The topics to be analyzed each year vary with the instructor but focus upon a specific research area. *D. Takagi*

293. Going on the Job Market. F

A seminar devoted to the practical problems of securing a job as a professional sociologist. Topics covered: researching colleges, universities, and public and private organizations that employ sociologists; designing a curriculum vitae; writing an application letter; preparing a "job talk"; handling questions during the interview process; the etiquette of visiting (and its aftermath); finding out about them; and the terms of employment: what is negotiable and what is not. Enrollment restricted to graduate students. *C. West*

294. Writing for Social Scientists. *

Seminar on the genres of social science writing, and the problems of starting and finishing a publishable thesis, book, or article. For advanced graduate students working on the composition of their dissertations and journal articles. Enrollment restricted to graduate students. Enrollment limited to 10. *M. Millman*

297. Independent Study. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

299. Thesis Research. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Spanish and Spanish for Spanish Speakers

Language Program
239 Cowell College
(831) 459-2054
<http://language.usc.edu>

Faculty and Professional Interests

Professor

JORGE ALADRO FONT (Literature)

Spanish mysticism, theory and historical developments of imagery in the Middle Ages to the baroque period, Renaissance and baroque Hispanic literature, Italian ideas in the Spanish Renaissance, Cervantes

JULIANNE BURTON-CARVAJAL (Literature)

Twentieth- and 21st-century Latin(o) American visual media, particularly film; melodrama as a transnational form; gender and authorship; history, cultures, and representations of California, particularly the Central Coast

NORMA KLAHN (Literature)

Latin American literary and cultural studies (specialization: Mexico), Chicano/Latino literature and culture from a cross-border perspective, modernity/postmodernity, poetics and politics, genre theory (novel, poetry, autobiography), contemporary critical theories (i.e., border, ethnic, feminist, transnational/global)

Associate Professor

LOURDES MARTÍNEZ-ECHAZÁBAL (Literature)

Latin American and Caribbean literatures; Afro-Latin American literatures, cultures, and societies; found[n]ational narratives; Brazilian literature; literatures of Cuba and the Cuban diaspora; critical race theory

JUAN POBLETE (Literature)

Latin(o) American literatures; transnational/global cultures (literature, radio, film); Latin(o) American cultural studies; 19th-century studies; the history of reading practices

Assistant Professor

EVE ZYZIK

Spanish linguistics, second language acquisition, cognitive linguistics, language pedagogy and curriculum design

Senior Lecturer

MARIA VICTORIA GONZÁLEZ-PAGANI

Language teaching methodology; Spanish syntax; computer-assisted foreign language learning; Latin American cultural studies, especially women's contributions

Lecturer

IGNACIO AZNAR, Emeritus

BRENDA BARCELÓ

Medical Spanish, Latin American culture, Latin dance expressions, Spanish/English and English/Spanish translation and interpretation, Hispanic linguistics, Romance languages

CARLOS CALIERNO

Latin American culture, history, literature, cinema, music, art, economics, and politics

VERÓNICA FELIU

Latin American literature of the 20th century; Chilean feminisms, politics, and culture; Latin American cultural studies; Spanish learning for both non-native and heritage speakers

MARÍA MORRIS

Language learning styles and strategies, culture and technology in language training

MARTA NAVARRO

Latin American literature, Mexican/Chicano culture, Latina/Chicana issues

ARIEL PÉREZ

Language acquisition and teaching methodology, computer-assisted language learning, teaching language for proficiency, oral proficiency assessment; Latin American current affairs

FRANK A. (PACO) RAMÍREZ

Second-language acquisition, bilingual education, Siglo de Oro Theater, Peninsular medieval literature, Spanish-language film and theater for linguistic and cultural acquisition

ALVARO ROMERO-MARCO

Spanish literature of the 19th- and 20th-centuries; film, cultural studies

Program Description

Students interested in acquiring proficiency in Spanish can enroll in a wide range of Spanish language or Spanish for Spanish speakers (SPSS) courses, from beginning to advanced levels. The language and culture sequences of lower-division courses, Spanish 1-6 and 56 and Spanish for Spanish Speakers 61-63, and upper-division series 156 courses, are aimed at enabling students to gain proficiency in aural comprehension, speaking, reading, and writing as well as cultural competence. Students are strongly encouraged to finish year-long sequences without interruption and, if possible, to study in Spanish-speaking countries. Students who want to do a major that would allow them to take several courses in Spanish may select from among several programs: a major or minor in language studies, a major in literature with an emphasis in Spanish/Latin American/Latino literatures, a major in Latin American and Latino studies, or a major in global economics.

Spanish

Students beginning with Spanish level 1 can choose between two teaching tracks, either the first-year 1-2-3 series or the first-year 1T-2T-3T series. However, students placing beyond level 1 cannot enter the linked "T" series, which requires continuous enrollment from fall through spring quarters. For further information on the aims and nature of the 1-2-3 series and the 1T-2T-3T series, please see the course descriptions. Students are encouraged to continue on to second-year (intermediate level) studies and take Spanish 4, 5, and 6, or Spanish 56, an introduction to Spanish language literature. Health science majors have priority enrollment in Spanish 5M (*Medical Spanish*), but others may enroll if there is space in the class. Students are also encouraged to continue with the third-year Spanish 156 series of courses in which a wide variety of topics are covered.

Spanish for Spanish Speakers

Spanish for Spanish speakers (SPSS) has been developed for students who, although raised in Spanish-speaking communities or households, are not yet fully proficient in Spanish. Spanish for Spanish speakers courses take into account the experiences and influences of bilingual and bicultural upbringing.

SPSS students are required to attend lab instruction once a week in addition to the regular class meetings. Some lower-division and all upper-division courses can fulfill requirements for several majors or departments, such as American studies, education, global economics, language studies, and Latin American and Latino studies.

Campus Language Laboratories and Placement Exams

Information about these topics can be found under Language Program, page 317.

Study Abroad

The UC Education Abroad Program (EAP) offers programs ranging from one quarter to one year in Santiago, Chile; San José and Monteverde, Costa Rica; Mexico City and Monterrey, Mexico; and Cordoba, Madrid, Alcalá, Barcelona, and Granada, Spain. Generally, students must have completed Spanish for Spanish Speakers 63 or Spanish 6 or 56 by the end of the sophomore year to qualify for a junior year abroad. Courses taken abroad can, with approval of an adviser, be applied to major requirements. For more information on the program, see UC Education Abroad Program, page 40. For information on credit applied to a major, contact the appropriate department.

Spanish

Lower-Division Courses

1. Instruction in the Spanish Language. F,W,S

Speaking, listening comprehension, reading and writing fundamentals. Taught entirely in Spanish; conversational fluency is encouraged through classroom practice and conversation groups, and is supplemented by language laboratory work. Classes are held three days a week; students complete the conversation group work independently of the classroom sessions. Prerequisite(s): Spanish Placement Examination score of 10. Enrollment limited to 24. *The Staff*

1T. Topic-Oriented Spanish Language Instruction (Special Track). F

Prepares students to understand, speak, and write on topics (geography, nature, society, art, history, etc.) and to provide information about themselves and their surroundings. Emphasis on the development of proficiency in all language skills and the active use of Spanish through task-oriented activities. Multiple-term course; students receive 5 credits per course and receive credit for all three courses upon completion of course 3T. Prerequisite(s): Spanish Placement Examination score of 10. Enrollment limited to 24. *The Staff*

1U. Laboratory to Topic-Oriented Spanish Language Instruction (2 credits). F

Consists of individualized instruction which allows students to work at their own pace developing their oral comprehension, reading comprehension, speaking and writing skills. Provides the supplementary exposure and practice students need in the acquisition of the target language. Multiple-term course; students receive credit for all three courses upon completion of course 3U. Prerequisite(s): interview only; Spanish Placement Examination score of 10. *The Staff*

2. Instruction in the Spanish Language. F,W,S

Speaking, listening comprehension, reading and writing fundamentals. Taught entirely in Spanish; conversational fluency is encouraged through classroom practice and conversation groups, and is supplemented by language laboratory work. Classes are held three days a week; students complete the conversation group work independently of the classroom sessions. Prerequisite(s): course 1 or Spanish Placement Examination score of 20. Enrollment limited to 24. *The Staff*

2T. Topic-Oriented Spanish Language Instruction (Special Track). W

Prepares students to understand, speak, and write on topics (geography, nature, society, art, history, etc.) and to provide information about themselves and their surroundings. Emphasis on the development of proficiency

in all language skills and the active use of Spanish through task-oriented activities. Multiple-term course; students receive 5 credits per course and receive credit for all three courses upon completion of course 3T. Prerequisite(s): course 1T. Enrollment limited to 24. *The Staff*

2U. Laboratory to Topic-Oriented Spanish Language Instruction (2 credits). W

Consists of individualized instruction which allows students to work at their own pace developing their oral comprehension, reading comprehension, speaking and writing skills. Provides the supplementary exposure and practice students need in the acquisition of the target language. Multiple-term course; students receive credit for all three courses upon completion of course 3U. Prerequisite(s): interview only; course 1U. *The Staff*

3. Instruction in the Spanish Language. F,W,S

Speaking, listening comprehension, reading and writing fundamentals. Taught entirely in Spanish; conversational fluency is encouraged through classroom practice and conversation groups, and is supplemented by language laboratory work. Classes are held three days a week; students complete the conversation group work independently of the classroom sessions. Prerequisite(s): course 2, 2X, or Spanish Placement Examination score of 30. Enrollment limited to 24. *The Staff*

3T. Topic-Oriented Spanish Language Instruction (Special Track). S

Prepares students to understand, speak, and write on topics (geography, nature, society, art, history, etc.) and to provide information about themselves and their surroundings. Emphasis on the development of proficiency in all language skills and the active use of Spanish through task-oriented activities. Multiple-term course; students receive 5 credits per course and receive credit for all three courses upon completion of course 3T. Prerequisite(s): course 2T. Enrollment limited to 24. *The Staff*

3U. Laboratory to Topic-Oriented Spanish Language Instruction (2 credits). S

Consists of individualized instruction which allows students to work at their own pace developing their oral comprehension, reading comprehension, speaking and writing skills. Provides the supplementary exposure and practice students need in the acquisition of the target language. Multiple-term course; students receive credit for all three courses upon completion of course 3U. Prerequisite(s): interview only; course 2U. *The Staff*

4. Intermediate Spanish. F,W,S

Includes comprehensive grammar review, composition, readings, and discussion. Reading and audiovisual material deal with various sociopolitical and cultural issues in the Spanish speaking world. Classes are conducted in Spanish. Prerequisite(s): course 3, 3T, 3X, or Spanish Placement Examination score of 40. Enrollment limited to 24. (General Education Code(s): IH.) *The Staff*

5. Intermediate Spanish. F,W,S

Includes comprehensive grammar review, composition, readings, and discussion. Reading and audiovisual material deal with various socio-political and cultural issues in the Spanish speaking world. Classes are conducted in Spanish. Prerequisite(s): course 4, 4X, or Spanish Placement Examination score of 50. Enrollment limited to 24. (General Education Code(s): IH.) *The Staff*

5M. Medical Spanish. F,W,S

Students learn vocabulary, expressions, and cultural background to be able to interact with Spanish-speaking patients and doctors. Medical Spanish fulfills language requirement for the health science major of the Biology

Department. Prerequisite(s): course 4; or Spanish for Spanish Speakers 61, 62, and 63; or Spanish for Spanish Speakers 125; or Spanish Placement Examination score of 50 or higher. Enrollment restricted to health sciences majors. Enrollment limited to 24. (General Education Code(s): IH.) *The Staff*

6. Intermediate Spanish. F,W,S

Increases oral and written proficiency using authentic reading materials which focus on such topics as social class, ethnicity, education, religion, economic, and political developments in the Spanish-speaking world. Prerequisite(s): course 5, 5M, 5X, or Spanish Placement Examination score of 60. Enrollment limited to 24. (General Education Code(s): IH.) *The Staff*

56. Advanced Readings in Different Genres. S

Includes composition, discussion, and vocabulary building based on the reading of selected short stories, poetry, theater, film, and related cultural material. Conducted in Spanish. Recommended as preparation for upper-division courses. Prerequisite(s): course 5, 5M, 5X, Spanish for Spanish Speakers 62, or Spanish Placement Examination score of 60. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

114. Advanced Conversation and Composition. S

Advanced conversation and composition based on extensive readings in the humanities and social sciences. Students interested in this course who have not taken the prerequisite should meet with the instructor prior to the first class meeting. Prerequisite(s): course 6, 56, Spanish for Spanish Speakers 63, or Spanish Placement Examination score of 70. *The Staff*

156. Topics in Hispanic Language and Culture.

An analytic study of 20th-century Hispanic language and culture as revealed in print and audio visual media. *The Staff*

156A. The Language of Latin America Cinema. F

Explores Latin American culture through its cinematic art. Students are exposed to and participate in discussion, analysis, and commentary on important social, historical, and political issues presented in the films. Provides a greater understanding of Latin America, and works toward advanced communicative proficiency and comprehension of linguistic variations in countries such as Cuba, Argentina, México, Bolivia, Chile, and others. (Formerly *Hispanic Culture Through Film*.) Prerequisite(s): course 6, 56, Spanish for Spanish Speakers 63, or Spanish Placement Examination score of 70. (General Education Code(s): E.) *C. Calierno*

156E. Spanish Culture. *

A broad survey of Spanish cultural topics, including history, politics, religions, art forms, music, and films. It is based on extensive conversations, discussion, and composition. Particular emphasis is placed on key changes

that have occurred during the 20th century in Spain. Classes conducted through commentary on texts read (or viewed), oral presentations, and debate. Recommended for students preparing to go to Spain with EAP. Prerequisite(s): course 6, 56, Spanish for Spanish Speakers 63, or Spanish Placement Examination score of 70. Enrollment limited to 24. *The Staff*

156F. El humor en Español. *

Topic-oriented language course on sociopolitical and historical issues as seen through humor in different genres and media. Topics include Mafalda and Condorito (comic strips), Rius (collage of comic strips, photographs and original documents), Continflas and Almodovar (cinema), El Teatro Campesino (theater), Ana L., Vega (literature), Les Luthiers (song and music). Course deals with written and oral discourse pertaining to the following Spanish language varieties: Rio de la Plata, Mexican, Caribbean, U.S., and Peninsular. Intensive writing and speaking in Spanish. Prerequisite(s): courses 6, 56, Spanish for Spanish Speakers 63 or Spanish placement examination score of 70. *M. Gonzalez Pagani*

156G. Spanish for the Professions. W

Taught in Spanish. Students learn vocabulary and expressions as well as pertinent cultural background to understand, speak, read, and write about business and professional situations in connection with the Latino experience. Legal, educational, medical, and business topics are covered. Prerequisite(s): course 6, 56, Spanish for Spanish Speakers 63, or Spanish Placement Examination score of 70. Enrollment limited to 18. *B. Barceló*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Spanish for Spanish Speakers

Lower-Division Courses

61. Spanish for Spanish Speakers. F

This course deals with orthography (syllabification, accentuation, etc.), basic grammatical features, verbal structures, and development of conversation skills and confidence in spoken Spanish. Focus on development of writing skills: description, dialogue, exposition, and commentary on contemporary issues relevant to Spanish speakers of the Americas. Students need to utilize the Self-Placement Guidelines, available in 133 Humanities Building to assure proper placement in this class. (General Education Code(s): IH.) *The Staff*

62. Spanish for Spanish Speakers. W

Comprehensive review of the subjunctive, the passive voice, different uses of "se," and other nuances of the language. Intensive practice in understanding specialized readings, presentation/discussion of major ideas, vocabulary expansion, and writing essays on topics discussed. Prerequisite(s): course 61 or placement exam. Students who have not taken Spanish for Spanish Speakers 61

need to speak with an instructor in the Spanish for Spanish Speakers Program. (General Education Code(s): IH.) *The Staff*

63. Spanish for Spanish Speakers. S

Comprehensive grammar review. Rigorous practice in reading historical, sociopolitical, and literary works pointing out nuances of Spanish. Rigorous experimentation with various writing styles: analytical, argumentative, and creative. Prerequisite(s): course 62 or placement exam. (General Education Code(s): IH.) *The Staff*

94. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Students submit petition to sponsoring agency. Enrollment limited to 10. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

125. Mexico and the Southwest. S

An interdisciplinary survey of the cultural history of the Mexican people in both Mexico and the U.S. Southwest. Topics include literature, art, folklore, oral tradition, music, politics, as well as "everyday" cultural manifestations. Conducted in Spanish. May be counted toward fulfillment of upper-division major requirements for Latin American and Latino studies and language studies. Prerequisite(s): course 6, 56, Spanish for Spanish Speakers 63, or Spanish Placement Examination score of 70. Enrollment limited to 25. *The Staff*

194. Group Tutorial. F,W,S

Provides a means for a small group of students to study a particular topic in consultation with a faculty sponsor. Enrollment limited to 10. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Stevenson College

College Office
(831) 459-4930
<http://stevenson.ucsc.edu>

For college description and list of faculty, see page 81.

Lower-Division Courses

10. Skills for College and Beyond (2 credits). W,S

Applications of practical skills for effective, meaningful study in the context of a full, busy life. Topics include learning styles, time management, test preparation, and life balance. Specific techniques for efficient reading

comprehension, note-taking, memorization, and self-assessment are introduced. Enrollment restricted to college members and by permission of instructor. Enrollment limited to 15. *C. Camblin*

20. The Harder They Come—The Postcolonial Self in Jamaica (2 credits). S

Examines Jamaica's transition to independence: the history of colonialism, its legacy of violence, and how the subaltern incorporate and rework hegemonic tropes of the gunslinger, gangster, preacher, politician, and policeman in literature, music, and film. Enrollment restricted to Stevenson College members. Enrollment limited to 20. *B. Lunine*

21. Citizens and Nations: Self and Society in the 19th Century (2 credits). S

A reading seminar focusing on a set of key texts. Examines how the political and industrial revolutions of the 19th century fundamentally transformed the relationships between individuals and their respective societies. Enrollment restricted to Stevenson College members. Enrollment limited to 20. *K. Silver*

22. Self and Society in Classical Social Theory (2 credits). S

Reading seminar focusing on a set of key texts from classical social theory. Explores the transition from traditional to modern societies. Authors addressed may include Locke, Rousseau, de Tocqueville, Marx, Weber, and Durkheim. Enrollment restricted to Stevenson College members. Enrollment limited to 20. *K. Silver*

28. Residential Life Leadership (2 credits). S

Examines the role and facilitates the development of Stevenson College residential advisers. Class themes include an exploration of leadership, resource management, and the process of community building within the college. Course evaluation based on paper writing, participation, engagement with course materials, and a small group final project that requires students to create a year-long program model designed to address an issue facing the Stevenson community. Prerequisite(s): Must have been hired as a Stevenson residential adviser or alternate for the following academic year. Enrollment limited to 30. May be repeated for credit. *E. Suckiel*

30. Thesis Writing and Editing (2 credits). W

Identifies and examines the assumptions, expectations, and formats of writing in students' fields, with the goal of beginning—or continuing—academic research. Prerequisite(s): satisfaction of the Composition requirement. Enrollment restricted to junior and senior college members and by permission of instructor. Enrollment limited to 25. *A. Weaver*

35. Everyday Ethics for College Life (2 credits). S

Exploration of and reflection on everyday values and virtues such as integrity, open-mindedness, honesty, and community. Objectives include learning how to think about moral dilemmas and how to begin drafting one's own code of ethics. Enrollment restricted to college members. Enrollment limited to 20. *C. Camblin*

42. Student-Directed Seminar. F,W,S

Seminars taught by upper-division students under faculty supervision (see course 192). *The Staff*

80A. Introduction to University Discourse: Self and Society. F

Explores rhetorical principles and conventions of university discourse providing intensive practice in analytical writing, critical reading, and speaking. Stevenson's core course considers the roots of modern society using

foundational religious texts and major classical and modern philosophical works. Students cannot receive credit for this course and course 80B. Enrollment restricted to first-year college members who have not satisfied the C1 requirement. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C1.) *The Staff*

80B. Rhetoric and Inquiry: Self and Society. F

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Stevenson's core course investigates the roots of modern society, using foundational religious texts and classical and modern philosophical works. Students cannot receive credit for this course and course 80A. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2.) *The Staff*

80F. Self and Society Through Film (2 credits). *

Seminar designed to expand upon the discussions begun in the Stevenson Core Course. Course uses documentary and feature films to investigate and discuss all sides of modern conflicts that bring class back to the Core Course theme. Prerequisite(s): completion of two-quarter core course sequence. Enrollment limited to 25. *The Staff*

80H. Rainbow Theater: An Introduction to Multicultural Theater. F

Introduction to Asian American, Chicano/Latino, and African American plays through reading of major authors, discussion of social and historical context of their work, and development of a production of a one-act play from each cultural group. In-depth examination of key historical context of these three cultural groups. Video presentations followed by class discussion. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): T4-Humanities and Arts, E.) *D. Williams*

80T. Self and Society for Transfer Students. *

Condensed version of Stevenson's core course for transfer students. Develops analytical writing, critical reading, and effective speaking by considering influential philosophical works while exploring cultural conflicts in modern society. Themes include imperialism, racism, and class conflict. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to college members. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, W, E.) *The Staff*

81A. Self and Society 2. W

Winter quarter of Stevenson's core course continues development of analytical writing, critical reading, and effective speaking in exploring conflicts inherent in modern society. Investigates themes of colonization, race, gender, class, and cultural conflict. Enrollment restricted to first-year college members. Students cannot receive credit for this course and course 81B. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, E.) *The Staff*

81B. Rhetoric and Inquiry: Self and Society 2. W

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Winter quarter of Stevenson's core course investigates themes of colonization, race, gender, class, and cultural conflict. Permission of instructor required; selection for this course based on application submitted. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment restricted to first-year college members. Students cannot receive credit for

this course and course 81A. Enrollment limited to 25. (General Education Code(s): T5-Humanities and Arts or Social Sciences, C2, E.) *The Staff*

Upper-Division Courses

120. Self and Society: Teaching Practicum. W

Each student facilitates one of the discussion sections of Stevenson 81A or attends lectures, and meets with staff for practicum on the teaching process. Prerequisite(s): qualifications as determined by instructor at first class meeting. Enrollment limited to 5. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision (see course 42). Prerequisite(s): upper-division standing and a proposal supported by a faculty member willing to supervise. *The Staff*

193. Field Study. F,W,S

Provides for individual programs of study, sponsored by the college and performed off-campus. This course may be counted for up to three courses of credit in any quarter. Prerequisite(s): approval of student's adviser and the academic preceptor, and, in the case of full-time study, the board of studies supervising the major. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

A program of independent study arranged between a group of students and a faculty instructor. Enrollment restricted to members of Stevenson College. Enrollment limited to 12. *The Staff*

194F. Group Tutorial (2 credits). F,W,S

A program of independent study arranged between a group of students and a faculty instructor. Course designed for members of Stevenson College. Students submit petition to sponsoring agency. Enrollment limited to 10. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Provides for college-sponsored individual study programs off campus, for which faculty supervision is not in person (e.g., supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. Prerequisite(s): approval of the student's adviser, certification of adequate preparation, approval by the academic preceptor. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for college-sponsored individual study programs off campus, for which faculty supervision is not in person (e.g., supervision is by correspondence). Up to three such courses may be taken for credit in any one quarter. Students submit petition to sponsoring agency. Requires approval of the student's adviser and academic preceptor. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual projects carried out under the supervision of a Stevenson faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual projects carried out under the supervision of a Stevenson faculty member. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Theater Arts

J106 Theater Arts Center
(831) 459-2974
theater@ucsc.edu
http://theater.ucsc.edu/

Faculty and Professional Interests

Professor

JAMES H. BIERMAN
Playwriting, theater history and literature, classical and Renaissance drama, Chicano theater, digital media

ANDREW E. DOE, Emeritus

MICHAEL D. EDWARDS, Adjunct
Acting and directing, dramatic literature, opera, Shakespeare

M. KATHLEEN FOLEY
Asian theater, Southeast Asian studies, performance studies, maskwork, puppetry, multicultural theater

MARK FRANKO
Dance history and theory, choreography, technique, performance studies, theatrical theory in historical and critical perspective

NORVID J. ROOS, Emeritus

DANNY SCHEIE
Acting, directing, dramatic literature, theater history, Shakespeare, Wagner, gay studies

RUTH L. SOLOMON, Emerita

AUDREY E. STANLEY, Emerita

PAUL WHITWORTH
Acting, directing, dramatic literature (English and Spanish Renaissance), translating dramatic literature

Associate Professor

DAVID CUTHBERT
Lighting design, CADD, projection design, scenic design

PATTY GALLAGHER
Movement training for actors, circus and clown traditions, and Indonesian dance/performance

KIMBERLY JANNARONE
Directing, dramaturgy, dramatic theory and criticism, theater history, acting

ALMA R. MARTINEZ
Acting, Chicano/Latino theater, contemporary Mexican and Latin American popular/political theater, theater of American culture, critical theory, directing

EDWARD C. WARBURTON
Development of dance thought in action, creative processes, and technology in theater arts; dance technique, movement research and composition, and applied dance practices

ELAINE YOKOYAMA ROOS, Emerita

Assistant Professor

BRANDIN BARON
Costume design, history of design

KATE EDMUNDS
Set design for theater and film

PETER H. MOSTKOFF
Dramatic and performance theory, theater history, acting

Lecturer

TANDY BEAL

Choreography, improvisation, technique, performance skills, collaborations with classical and jazz composers, circus, theater and video, children's productions

GREGORY FRITSCH

Acting, directing

MIKE RYAN

Acting, direction, voice



MARY-KAY GAMEL, Professor, Classics and Comparative Literature

Performance studies, ancient Mediterranean performance, Greek and Latin literatures, myth, reception of Greek and Roman texts and artifacts, film, feminist approaches to literature and performance

Program Description

The Theater Arts Department is a diverse group of scholar/artists united by a passionate belief in the value of the performing arts. Based on respect for the classical theater of all cultures, combined with a determination to challenge tradition and fashion with equal courage, we educate our students in the history, theory, and practice of theater to address fundamental issues by using the tools of body, voice, mind, and imagination. Seeking to attain the highest levels of intellectual and artistic integrity with a commitment to cultural diversity, we serve the research mission of UCSC, our audiences, and the students who will shape the theater of the future.

The Theater Arts Department combines drama, dance, critical studies, and theater design/technology to offer students an intensive program of theater as a unified field. The program stresses the inter-relation of all concentrations as essential to the successful practice of the theater arts in the 21st century. Graduates of the UCSC program typically pursue careers in professional theater and dance companies, in film and television, and in teaching at all levels—from university to high school to grade school. Many students go on to higher degrees at prestigious national programs. Others engage in careers in arts, administration, dramatic writing, and related fields.

The lower-division curriculum requires a range of practical work in the various concentrations and an interdisciplinary exposure to critical and historical studies. At the upper-division level, students are given the opportunity to focus on one or more areas of interest in limited-enrollment studios. At the same time, they are asked to expand their theoretical perspectives through confrontation with performance theory and focused course work in critical studies. The impact of digital and new media on theater is integrated into the curriculum, especially with respect to dance and design.

A wealth of production opportunities is available to students. This includes major productions directed by faculty or distinguished visiting artists each quarter, productions directed or choreographed by students, and faculty-directed workshops. Undergraduate students are also given the opportunity to see their own writing, choreography, or developing concepts put into production in annual festivals of student work. Although majors are given preference in studio courses, most courses and productions welcome nonmajors as well. Opportunities to study and perform non-Western as well as Euro-American traditions are also a significant part of the program.

The stage and studio spaces available to students of theater arts allow for this breadth of training and performance opportunities. The Theater Arts Center contains a 500-seat thrust stage; a state-of-the-art experimental theater; a 200-seat proscenium theater; acting, directing, and dance studios; costume, scene, and properties shops; a sound recording room; a computer lab; and a metal shop.

Elsewhere on campus are the open-air Quarry Theater seating 3,000, the Shakespeare Santa Cruz Festival Glen, and the 150-seat Barn Theater. Library holdings in theater literature and history are extensive, including a large slide collection and dance video holdings; journals in current theater, design/technology, and dance; and recordings, films, videotapes, and CD-ROMs.

A unique resource for UCSC students is Shakespeare Santa Cruz (SSC). Acknowledged to be one of the leading Shakespeare festivals in the country, SSC was founded in 1982 to foster links between modern scholarship and contemporary professional theater practice. SSC's annual summer festival presents the works of Shakespeare in thematic context with other great plays of the world stage, performed, designed, and directed by professionals from all over the country. SSC offers undergraduates various opportunities to work in conjunction with theater professionals through its summer intern program, its winter holiday production (in fall quarter), and Shakespeare-to-Go, a 45-minute Shakespeare outreach production in which students perform and tour (rehearsed during winter quarter and performed during spring quarter) for audiences throughout Santa Cruz County and beyond.

Majors who wish to concentrate their study of one particular theater arts area before seeking admission to graduate school or work with professional companies are encouraged to apply to the department's Fifth-Year Certificate Program.

Requirements to Declare the Major

Prior to petitioning for the major, students must have successfully completed courses 10, *Introduction to Theater Design and Technology*, 20, *Introductory Studies in Acting*, 30, *Introduction to Dance Theory and Technique*, 61, *Issues and Methods in Theater Arts*, and two credits of course 50, *Fundamentals of Theater Production*. Students are encouraged to complete these courses as early in their studies as possible so that the petition to major status can be accomplished no later than the end of sophomore year.

Transfer Students

Transfer students who have not satisfied the requirements to declare the major are advised to take as many of the six lower-division requirements listed above as possible in their first two quarters. Transfer students may petition to have equivalent lower-division courses taken at other schools count toward the lower-division major requirements. Petition forms and information on courses and major requirements can be obtained at the department office, J106 Theater Arts Center.

Major Requirements

The theater arts major requires six lower-division courses, six credits of course 50, and 10 upper-division courses (inclusive of a senior seminar project). Majors may organize their studies around a concentration in an area of interest in accordance with the requirements outlined below. The following six lower-division courses must be taken by all majors:

10, *Introduction to Theater Design and Technology*
20, *Introductory Studies in Acting*
30, *Introduction to Dance Theory and Technique*
61, *Issues and Methods in Theater Arts*

One lower-division studio elective (chosen from: courses 12, 14, 17, 18, 19, 21, 22, 23, 32, 33, 36, 40)
Plus: 50, *Fundamentals of Theater Production* (two-credit course; must take a total of six credits)

The following upper-division courses must be taken to complete the major:

Eleven upper-division theater arts courses:

- three survey courses in the history/theory of performance (intermediate-level 100 courses) chosen from these three areas: 1) Pre-modern, 2) Non-Western, 3) Western
- 160, *Dramatic Theories*
- two studio courses
- one elective
- one faculty-directed theater arts production course
- two 161 series (drama) and/or 130 series (dance) critical studies courses, or 113, 116A (design) courses
- one senior seminar requirement, (course 185)

One of the 16 courses required for the major must be a lower- or upper-division diversity course. Exceptions to the major requirements, through the UC Education Abroad Program or transfer credits, are considered on a case-by-case basis by the department chair.

Theater Arts Major Planners

The following are two recommended academic plans for students to complete during their first two years as preparation for the theater arts major. Plan One is a guideline for students who are committed to the major early in their academic career; Plan Two is for students who are considering the major.

Plan One			
Year	Fall	Winter	Spring
1st (frsh)	Thea 61 gen ed college core	Thea 20 low-div studio gen ed	Thea 10 Thea 50 gen ed
2nd (soph)	Thea 30 gen ed gen ed	Thea 50 gen ed	elective gen ed gen ed (declare major)

Plan Two			
Year	Fall	Winter	Spring
1st (frsh)	gen ed gen ed college core	Thea 20 low-div studio gen ed	Thea 10 Thea 61 gen ed
2nd (soph)	Thea 30 Thea elective gen ed	Thea 50 Thea elective gen ed	Thea 50 gen ed gen ed (declare major)

Comprehensive Requirement

Theater arts majors are responsible for successfully completing course 185, *Senior Seminar*.

Minor Requirements

Students earn a minor in theater arts by completing nine courses (eight 5-credit courses and one 2-credit course) comprising a background in the theory and practice of the theater arts as well as a focus on either drama, theater design/technology, or dance. The course

requirements are listed below. There is no comprehensive requirement for the minor.

- two courses in the literature/history/theory of theater arts: 61 and one upper-division critical studies course
- one quarter of the 2-credit course 50
- one of the following courses in the student's area of focus: 10, 20, 30, or 40
- three upper-division courses chosen from the following: 113, 116A, 161, 163, 133, 134
- two studio courses, one of which may be a faculty-directed production (151)

Independent Studies (199) and *Field Studies* (198) will not satisfy minor requirements unless approved in advance by an adviser and the chairperson.

Transfer students are advised to check with the department office to determine which courses can be articulated from a community college.

Fifth-Year Certificate Program

The Theater Arts Department offers a graduate certificate program that allows a limited number of students to refocus or intensify their skills, concentrating on performance reinforced by scholarship and research. The program provides the opportunity to experience the benefits of apprenticeship in an academic setting. Students follow an individual program suited to their background, needs, and interests while concentrating in drama, design/technology, dance, playwriting, Western or non-Western theater, or dramatic literature.

Students in the graduate certificate program are expected to complete one academic year (fall-spring) as a full-time resident student, passing eight 5-credit theater arts courses. Of those eight courses, one is a required graduate seminar (course 290); and one must be chosen from the upper-division critical studies electives on offer. An incomplete in course 290 must be completed by the end of the following quarter of the residency year. The remainder of the program is designed by the student according to individual interests and needs in consultation with the faculty adviser. Many students elect to take faculty-supervised individual studies courses in their area of emphasis.

For additional information, contact the Theater Arts Department.

Lower-Division Courses

10. Introduction to Theater Design and Technology. F,S

Addresses imagination and creativity. Using the framework of theater production, students explore the process of translating a script into a performance. Topics include visual literacy, creative problem solving, establishing effective working teams, tear sheets, storyboarding, drawing, sound and color theory. This course is a prerequisite for all upper-division design courses. (General Education Code(s): IH, A.) *The Staff*

12. Stage Management. F

Designed to acquaint students with the complexities of staging productions from the audition process to final performance. Directing, lighting, scenic production, sound, cueing, and personnel management are aspects that will be touched upon in class. Students are billed a materials fee. (Formerly Production Management.) (General Education Code(s): A.) *The Staff*

14. Drawing. W

A fundamental course in drawing from still life, the figure, and in the landscape. The approach is from the tonal and volumetric aspects of the object. Color is introduced as the course progresses. Instruction fashioned to the individual needs of the student. The inexperienced are welcomed as well as the experienced. Students are billed a materials fee. Enrollment restricted to theater arts majors. (General Education Code(s): A.) *K. Edmunds*

17. Costume Construction. W

The process of interpreting a costume designer's sketch into a finished theatrical costume. Some techniques included are dyeing, fabric selection, draping, flat pattern drafting, pattern manipulation, adaptation, fitting, and alteration. Using various techniques, students make basic pattern pieces and learn to modify them to create costumes. Students are billed a materials fee. Enrollment limited to 20. (General Education Code(s): A.) *The Staff*

18. Drafting for Theatrical Production. S

An examination of the fundamentals of drafting scale drawings for production, including floor plans, elevations, sections, working drawings, dimensions, layout, and lettering. Students learn isometric drawing, perspective, and rendering techniques. Students are billed a materials fee. Enrollment limited to 20. (General Education Code(s): A.) *The Staff*

18C. Drafting-Computer Aided. *

In-depth exploration of computer-aided drafting, specifically the programs Vectorworks, Spotlight, and Renderworks. Topics include: the user interface, ground plan, section and detail views, paper space vs. working space, tool palettes, USITT drafting standards, layers, line weights, objects, classes, library annotations, importing rasters, and 3D modeling. Students required to do weekly projects such as ground plans, lighting plots, perspectives, and detail drawings, as well as turn in a major final project, and complete a mid-term, final, and quizzes. Students are billed for a materials fee. Enrollment restricted to theater arts majors. Enrollment limited to 10. (General Education Code(s): A.) *The Staff, D. Cuthbert*

19. Design Studio: Lighting Studio A. W

An introduction to the theory and practice of lighting design with attention to the practical skills and creative approaches to lighting performance pieces; the technical side of lighting design via demonstrations, lectures, and labs. Students complete projects evolving and executing concepts for lighting chosen pieces. Students are billed a materials fee. Prerequisite(s): course 10. (General Education Code(s): IH, A.) *D. Cuthbert*

20. Introductory Studies in Acting. F,W,S

Introduction to basic acting skills and the problems of performance. Concentrates on expanding the students' range of expression and ability to respond to and analyze dramatic text. Students with little or no experience are encouraged to attend. (General Education Code(s): IH, A.) *The Staff*

21. Acting Studio I. F,S

Studio course involves acting exercises based on the Stanislavski principles of acting as well as work on movement, voice, and interpretation of text. Enrollment by audition. Prerequisite(s): course 20 or permission of instructor. Enrollment limited to 30. (General Education Code(s): A.) *The Staff*

22. Indonesian Dance and Drama. S

Students learn the basic movement repertoire of the specific characters of the Indonesian dance-drama/puppetry tradition over the quarter with explication of how these

types operate in their own cultural context. The course culminates in an open showing of scenework. May be repeated for credit. (General Education Code(s): A, E.) *P. Gallagher*

23. Voice for the Actor. F

Students work on developing resonance, range and expressivity for stage performance via physical exercises and text explorations undertaken in small groups. Prerequisite(s): course 20. Audition required for acceptance into class. Enrollment limited to 20. (General Education Code(s): A.) *The Staff*

30. Introduction to Modern Dance Theory and Technique. F,W,S

Intensive instruction in developing the dancer's physical instrument, combined with basic movement theory. May be repeated for credit with consent of instructor. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): IH, A.) *The Staff*

31C. Dance Studio I. F,W

Introduction to contemporary dance theory and practice. Focus on basic dance technique, range of styles, and aesthetic points of view of historically significant contemporary dance choreographers in America and worldwide. Students are billed a materials fee. Enrollment limited to 30. (General Education Code(s): A.) *The Staff*

31P. Postmodern Dance I. *

Introduction to postmodern dance theory and technique. Focus on performance practices of historically significant postmodern dance choreographers in the U.S. and worldwide. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *E. Warburton*

32. Introduction to Ballet. *

Introduction to ballet basics such as healthy alignment, anatomically sound articulation of hips and feet, balance control, moving through space harmoniously, and development of technical strength and combinative capacity in a classical, but fluid, aesthetic. Students are billed a materials fee. Enrollment limited to 35. May be repeated for credit. (General Education Code(s): IH, A.) *The Staff, E. Warburton*

33. Advanced Introduction to Modern Dance. *

Intensive instruction in developing the dancer's physical instrument. Intended for students who have a previous fundamental knowledge of the basics of classic dance, combined with movement theory. Students are billed a materials fee. Prerequisite(s): course 30. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): IH, A.) *The Staff*

35. Introduction to Tap Dance. *

Intensive instruction in developing the dancer's physical instrument combined with basic movement theory. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *The Staff*

36. Introduction to Dance Composition. *

Composing solo dances using a variety of approaches for developing movement combinations. Observation and recognition of personal movement patterns and discovering new sources for creative material. Students are billed a materials fee. May be repeated for credit. (General Education Code(s): IH, A.) *The Staff*

37. African Dance. S

A griot (musician-entertainer from western Africa) from Burkina Faso teaches "The African Journey," which emphasizes dance as combined in Africa, including

singing, history, oral tradition, and storytelling. Students are billed a materials fee. Enrollment limited to 30. (General Education Code(s): A.) *The Staff*

40. Introduction to Directing, F

An overview of the analytical and creative processes that inform the director's work. Close examination of texts, concepts, and directorial choices in staged performances, opera, films, and video. (General Education Code(s): IH, A.) *The Staff*

45. Student-Directed Production, F

Participation in a student-directed play or student-choreographed dance concert under faculty supervision. (See course 192). Rehearsals culminate in public performances. Prerequisite(s): admission by audition; see department office for more information. *The Staff*

50. Fundamentals of Theater Production

(2 credits), F,W,S

Work is on various aspects of theatrical production, including scenery, lighting, costumes, sound, stage management, and video documentation. Satisfies the department's technical experience requirement. May be repeated for credit. (General Education Code(s): A.) *D. Cuthbert*

52. Basic Stagecraft, *

Provides introduction to technical theater and basic stagecraft. Course examines two-dimensional and three-dimensional scenery, scenic engineering, the physical theater, stage and scene shop equipment, project organization and process, technical theater graphics, materials, and theatrical construction techniques. Prerequisite(s): course 10. Enrollment limited to 30. (General Education Code(s): A.) *The Staff*

55A. Workshop in Performance: Barnstorm, F,W

Process-oriented investigation of practical theater production by working in and on productions in the Barnstorm season. Requires a total of 150 hours working backstage or onstage. Admission by audition at first class meeting; see department office for more information. May be repeated for credit. *D. Cuthbert*

55B. Workshop in Performance: Barnstorm Lab (2 credits), F,W

Process-oriented investigation of practical theater production by working in and on productions in the Barnstorm season. Requires a total of 50 hours working backstage or onstage. Admission by audition at first class meeting; see department office for more information. May be repeated for credit. *D. Cuthbert*

61. Issues and Methods in Theater Arts, F,S

Introduces issues and methods for analyzing historical and contemporary performance practices from a variety of disciplinary perspectives. Readings contextualize theatrical objects as well as offer theoretical tools for analyzing, interpreting, and making performances out of them. (General Education Code(s): IH, A.) *P. Mostkoff, K. Edmunds*

70. Working in Theater and the Performing Arts (2 credits), *

Creative artists, technicians, and designers discuss the theory and practice of their art. Presentations include discussion of the nature of their artistic work and reflection on the path that brought them to their present work with attention to the creativity and constraint that they experience in their profession. *P. Whitworth*

80A. Introduction to African American Theater, S

Surveys African American theater from late 19th century to contemporary 21st-century playwrights and examines dramatic narratives to trace creation, evolution, and development of African American cultural identity formation in American theater. Enrollment limited to 50. (General Education Code(s): T4-Humanities and Arts, A, E.) *The Staff*

80B. Rock 'n' Roll Design, *

Examination of the genesis, history, and development of technical theater practices used in large arena rock shows. Topics will include the development of rigging practices used in arenas, touring logistics, lighting instrumentation and aesthetics of rock shows, and the nature, practice, and approach of sound in these venues. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80D. Commercial Design 1900 to Present, S

History of 20th-century commercial design for the theater through the eyes of the Western consumer. (Formerly course 161W, *Critical Survey of Commercial Design, 1900 to Present*.) (General Education Code(s): T4-Humanities and Arts, A.) *B. Baron*

80E. Stand-Up Comedy, S

American comedy from Mark Twain to present, including popular humor, history, and politics, using comedy from the '20s through the women's gay and civil rights movements. Discussions are based on readings and videos of a wide variety of artists. Students present performances weekly. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80G. Creative Process/Dance, *

Introductory dance, with participation in a wide range of movement classes taught by the instructor and guest artists. Students develop their movement experiences through further viewing of world dance, discussion, reading, and writing. Enrollment limited to 100. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80H. Hamlet Conundrums, *

Offered online, the course explores major issues of interpretation of Shakespeare's classic play, which has occupied the minds of audiences, directors, designers, performers, and critics during its 400-year history. In doing this, it offers a sense of history of people's preoccupations with and thoughts about the play. Students taking this class are expected to complete the course during the quarter for which they are enrolled. All students enrolled in this course should visit elsinore.ucsc.edu and write to elsinore@ucsc.edu. (General Education Code(s): T4-Humanities and Arts, A.) *J. Bierman*

80L. Muppet Magic: Jim Henson's Art, F

The artistic and social impact of the Muppets on American puppetry, children's television, and Hollywood film is explored through viewings, guest lectures, and analysis. Henson's legacy in artistic innovation, mainstreaming of puppet theater for adult audiences, and establishment of puppetry in media and marketing are also explored. (General Education Code(s): T4-Humanities and Arts, A.) *M. Foley*

80M. Chicano/a Teatro, W

Introduction to Teatro Chicano/a with examination of how cultural diversity plays a role in theater. Through lectures, films, and workshop exercises, reflect upon the process of Teatro Chicano. Students write their own acts, improvise, and perform in class. (General Education Code(s): T4-Humanities and Arts, A, E.) *A. Martinez*

80N. Walt Disney, *

An examination of Walt Disney's creation of the American vision of "family entertainment." Particular attention will be paid to the classic animated feature films of Walt Disney and to the way this Disney invention has been preserved and developed since his death. We will also look at the live action films, theme parks, and other Disney creations. (General Education Code(s): T4-Humanities and Arts, A.) *J. Bierman*

80O. Comedy in American Theater and Media since 1950, *

The interrelationship of comedy in contemporary American media and innovations at Second City, the Chicago-based comedy club, will be explored, as well as the theory and practice of improvisation as a technique for generating comic material and the varied relationships of performers, writers, and audiences in live theater, television, and film. (General Education Code(s): T4-Humanities and Arts, A.) *M. Foley*

80P. The Pixar Feature, *

Combines examination of the canon of Western dramatic literature and theater history through viewings of Pixar Animation Studios' full-length animated features, representing the most popular form of digital art and new media in the world today, and lectures focusing on digital art and new media viewed through established rules and traditions of dramatic art in literature, plays, and the theater. (General Education Code(s): T4-Humanities and Arts, A.) *D. Scheie*

80Q. Introduction to Queer Theater, W

Examines the history of the queer perspective in dramatic literature, from the Greeks to Marlowe and Shakespeare through the calcification of homosexuality in the era of Freud, then traces theater stewardship by gay and lesbian artists from within the closet and without. (General Education Code(s): T4-Humanities and Arts, A.) *D. Holsclaw*

80S. Theater Arts Education and the Community, *

This course is designed to develop ways in which we can direct our interest in the arts into concrete and successful community projects. Although the emphasis will be on developing skills to work within K-12 classrooms, other community projects will be discussed and designed. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80U. Socks, Drugs, and Rock and Roll: American Costume Since 1950, *

This course is an introduction to American fashion and fashion designers from the 1950's to the present with special attention given to the influence of popular media on American costume since 1950, the beginning of rock and roll. Students cannot receive credit for this course and course 116B. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80V. The Circus in American Culture, *

Circus arts from their shamanic roots to contemporary practice will be analyzed in a historical, aesthetic, and creative dimension. Lecture, discussion, and demonstrations will explore the theory and practice of American circus arts. In section, students will explore basic circus skills from clowning to tumbling to exhibition of freaks. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80W. The Way Things Work and the Theater, *

Explores basics of mechanics and movement as applied to theatrical and non-theatrical realms. Utilizes textual

materials as well as interaction with technology. Topics include structural elements, motion, energy, sound/light, their physical properties and how they interface with pre- and post-modern theater. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

80X. The Performance of Story in Theater and Film. *

An examination of the theory and practice of theater and film, comparing and contrasting works that have been adapted from one genre to another. Lecture, film and video viewing and discussion of materialist, psychoanalytic, and feminist approaches will be shared. (General Education Code(s): T4-Humanities and Arts, A.) *P. Mostkoff*

80Z. Indian Dance. F

Classical Indian dance will be studied as a performance practice. Understanding of drum syllables and associated steps, religious and sociological context, and mimesis (abhinaya) as well as introduction to epic stories (Ramayana, Mahabharata, Bhagavata Purana) and classical song. (General Education Code(s): T4-Humanities and Arts, A.) *The Staff*

99. Tutorial. F,W,S

Students must file their petitions for this course with the department office by the end of the fifth day of instruction in the quarter in which they would like to take the tutorial. Prerequisite(s): petition required, approved by instructor and department. May be repeated for credit. *The Staff*

Upper-Division Courses

100A. Asian Theater/Dance and Global Impacts. F

Overview of selected theater/dance performance genres of India, Indonesia, China, Korea, and Japan with attention to how cultural, political, and social flows have impacted contemporary performance in Asia and beyond. Lectures supplemented by workshops. (General Education Code(s): A, E.) *M. Foley*

100B. Black Theater USA. *

Spanning slavery, emancipation, reconstruction, the great depression, civil rights, and the black power/black arts movements, course explores African American drama from literary, historical, and biographical perspectives in lecture/discussions, film excerpts, dramatizations, and visits from award-winning guests. (General Education Code(s): A, E.) *The Staff*

100C. Courts, Courtesans, Shamans, and Clowns: Asian Drama. *

Asian court and popular performance are traced. Sanskrit drama is contrasted with Indian epic recitation, medium, and courtesan dance. Gender specialization is noted in Indonesian courts using Indian and local legends in dance, mask/puppetry, and clowning. Buddhist and Confucian impulses in Chinese theater and early Korean and Japanese mask and puppetry are introduced. Students are evaluated on participation, tests, writing, and a performance project. (General Education Code(s): A.) *M. Foley, P. Gallagher*

100G. Ancient and Classical Drama. W

Examines Western dramatic literature, theater history, and design from ancient Greece to the Renaissance, the Spanish golden age, and Elizabethan England. Looks at dramatic texts in their historical moments, bringing theater design and the function of performance into critical contexts. Major theoretical treatises, scripts, scenarios,

background readings, and other texts are discussed in relation to the actual performance and staging practices of the period. (General Education Code(s): A.) *The Staff*

100H. Ballet: A History. *

Chronological critical and historical overview of ballet from its origins in the 15th century to the present, fleshing out the sociological, aesthetic, and design (costume and set) aspects of ballet production from the courts to the bourgeois opera house and the independent impresario. Enrollment limited to 40. (General Education Code(s): A.) *M. Franko*

100I. Hemispheric and Trans-Atlantic Theater: Indigenous America. *

Considers theater of the Americas with attention to indigenous pre-Colombian roots as well as trans-Atlantic connections forged in Spanish use of performance in conquest and development of African-influenced arts in black communities. Includes use of art in national independence movements, civil-rights struggles, and continuing movement across borders of the Americas with links to Africa. (General Education Code(s): A, E.) *A. Martinez*

100L. Performance and Conquest. *

Looks at use of theater/performance in the U.S. and Latin America by the state, oppositional groups, and theater and performance practitioners to solidify or challenge structures of power beginning with pre-Colombian indigenous civilizations, 16th-century Spanish/European conquest, national independence movements, to the U.S. Latino diaspora. (General Education Code(s): A, E.) *A. Martinez*

100M. Modern Drama. W

Examines modern theatrical experimentation from English Restoration through contemporary era. Major theoretical texts, scripts, and background readings establish critical contexts for analyzing modern performance and dramatic literature. Prerequisite(s): course 60A or 60B or 60C or 61. (General Education Code(s): A.) *K. Jannarone*

100W. Black/African Diasporic World Theater. S

Examines major black African diasporic playwrights and theater. Focuses on the historical, cultural, and literary contexts that gave rise to the works of dramatists such as Ama Ata Aidoo, Derek Walcott, Wole Soyinke, Aime Cesaire, Debbie Green Tucker, and Paul Boakye. Prerequisite(s): course 61 or 60A or 60B or 60C. (General Education Code(s): A, E.) *M. Hendricks*

104. Multimedia Authoring. *

Introduces students to basic tools for the creation of multimedia digital projects. Special attention is given to the integration of video, sound, graphics, text and virtual reality and to the creation and execution of strategies for interaction between users and the projects themselves. With this in mind, students design and create computer puzzles and games. Enrollment limited to 25. (General Education Code(s): A.) *J. Bierman*

105. Introduction to Digital Media Design. *

Introduction to digital media design for live theater. Primary focus on developing working understanding of Adobe Photoshop, Final Cut Pro, and DVD Studio Pro as applied to digital media design. Gives additional attention to theoretical questions raised by introduction of moving images in a theatrical space, visual composition, and editing practices. Enrollment limited to 15. (General Education Code(s): A.) *The Staff*

107. Design Studio: Masks and Makeup. *

Advanced work in the design and techniques of stage make-up and masks. Students are billed a materials fee. Prerequisite(s): course 10. Enrollment restricted to theater arts majors; open at the end of priority enrollment if space permits. Enrollment limited to 20. Offered in alternate academic years. *The Staff*

110. Advanced Stage Technology. *

An investigation into the intricacies of production, focusing on structural, spatial, and visual concepts, creation and execution of scenic units, drafting, and related areas of technology. Designed to facilitate in-depth studies of specific production problems. Students are billed a materials fee. Prerequisite(s): course 10. (General Education Code(s): A.) *The Staff*

113. The History of Design for Theater. F

The development of scenic design from the Greek period to the present. Concentration is on the changing styles of set design in relation to the changing attitudes toward dramatic literature, art, and theater architecture. (General Education Code(s): A.) *The Staff*

114. Design Studio: Sound. *

The intangible and transitory nature of the acoustic reality. Electronically regenerated sounds for use in the performing arts. Broad scope of the course consideration begins with found sound and includes sound propagation. Emphasis on tape-recording, editing, sound control functions, and equipment utility. Students are billed a materials fee. Prerequisite(s): course 10. (General Education Code(s): A.) *The Staff*

115A. Design Studio: Scenic Design. W

Advanced work in principles and theory of scenic design. Students are billed a materials fee. Prerequisite(s): course 10. (General Education Code(s): A.) *K. Edmunds*

115B. Design Studio: Scenic Design B. S

Advanced theory and practice of theatrical set design. Prerequisite(s): course 115. (General Education Code(s): A.) *K. Edmunds*

116A. History of Clothing and Costume. W

Survey of clothing and theatrical costumes; emphasis on dress of the audience and actor in historical periods of theatrical activity. Students are billed a materials fee. (General Education Code(s): A.) *B. Baron*

116B. American Costume Since 1950: Socks, Drugs, and Rock 'n' Roll. *

Introduction to American fashion and fashion designers from the 1950s to the present, with special attention given to the influence of popular media on American costume since 1950, the beginning of rock and roll. Students cannot receive credit for this course and course 80U. (General Education Code(s): A.) *The Staff*

117. Design Studio: Costume. W

Advanced principles and theory of costume design for theatrical productions. Enrollment by permission of instructor: see enrollment conditions in the quarterly *Schedule of Classes*. Students are billed a materials fee. Enrollment by permission of instructor. May be repeated for credit. (General Education Code(s): A.) *B. Baron*

117A. Advanced Costume Construction. *

Advanced principles in costume construction, including tailoring, advanced pattern drafting, and draping techniques. Focuses on translating modern techniques into historical garment construction. Teaches how to study artifacts and do primary research to unlock the past. Prerequisite(s): course 17. Enrollment limited to 25. (General Education Code(s): A.) *The Staff*

118. Design Studio: Scene Painting. *

Emphasis on techniques used in painting scenery for the theater. Students are billed a materials fee. Prerequisite(s): course 10. (General Education Code(s): A.) *The Staff*

119. Design Studio: Lighting Studio B. W

The theory and practice of lighting design with emphasis on practical application. Light plots, electricity, optics, design, and manipulation of lighting for the theater and related performance events are investigated. The student explores mechanics and aesthetics with hands-on experience. Students are billed a materials fee. Prerequisite(s): course 19. (General Education Code(s): A.) *The Staff*

121. Acting Studio II. F,W,S

Continuing concentrated work on basic acting skills and textual analysis through scene study. May be repeated for credit with consent of instructor. Prerequisite(s): admission by audition at first class meeting. See department office for more information. Course 21 recommended as preparation. May be repeated for credit. (General Education Code(s): A.) *D. Scheie, M. Foley, P. Whitworth*

122. Indian Performance: Rama, Siva, Krishna. *

Study of the classical theater and dance of India, with attention to performance practice, aesthetic theory, relationship to religious practice devoted to Rama, Siva, and Krishna, political implications and intercultural experimentation. (General Education Code(s): IH, A.) *The Staff*

124. Movement for Performers. F

Awareness and extension of personal movement repertoire, through observation, movement experience, and exploration. (General Education Code(s): A.) *The Staff, P. Gallagher*

126. Acting Studio III. F,S

Individual work on acting skills and problems, with emphasis on individual interpretation and scene work with other students. Prerequisite(s): course 121; permission of instructor; audition at first class meeting—contact department office for more information. Enrollment limited to 18. May be repeated for credit. (General Education Code(s): A.) *P. Whitworth, P. Gallagher*

128. Choreographic Workshop. F

Intensive upper-division choreographic workshop that begins from the key motifs of historical dance to develop original work. Dancers made available to the student choreographers. Course is a prerequisite for the student-choreographed production Random With a Purpose. Enrollment limited to 15. (General Education Code(s): A.) *The Staff*

129. Advanced Ballet (2 credits). *

Continued study of classical ballet technique as a serious, expressive art form. Work includes longer combinations, air work, and style study in a regular class routine. Audition at first class meeting. Students are billed a materials fee. Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *The Staff*

130. Intermediate Modern Dance Theory and Technique. *

A progression from the simple phrasing and articulation of beginning technique class to more complex material requiring more acute perceptive skills and richer dynamic range. Emphasis is on both alignment and maintaining the kinetic integrity of the body while moving through space. Students are billed a materials fee. Prerequisite(s): course 30 or 31 or permission of instructor. May be repeated for credit. (General Education Code(s): A.) *The Staff*

131. Advanced Modern Dance Theory and Technique. *

Advanced instruction in developing the dancer's physical instrument, combined with movement theory. Students are billed a materials fee. Prerequisite(s): course 30 or 31 or permission of instructor. May be repeated for credit. (General Education Code(s): A.) *The Staff*

131C. Dance Studio II. W

Continued study of contemporary dance theory and practice. Focus on intermediate dance technique, individual and group movement invention, choreographic voice, and theatrical applications. Students are billed a materials fee. Enrollment limited to 30. (General Education Code(s): A.) *The Staff*

131P. Postmodern Dance II. *

Continued study of postmodern dance theory and technique. Focus on advanced compositional practice, theatrical applications, and critical analysis of contemporary postmodern dance choreographers in the U.S. and worldwide. Audition at first class meeting. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *E. Warburton*

132. Modern Dance Studio (2 credits). *

Instruction in developing the dancer's physical instrument, combined with movement theory. Students are billed a materials fee. Prerequisite(s): course 30 or 31 or permission of instructor. May be repeated for credit. (General Education Code(s): A.) *E. Warburton*

135. Dance Improvisation and Theory. *

Exploring sources for movement; gaining facility in a wide range of movement elements; working in ensemble and solos. Students are billed a materials fee. (General Education Code(s): A.) *E. Warburton*

136. Intermediate Ballet. *

Continued study of classical ballet technique as a serious expressive art form. Work includes longer combinations, air work, and style study (Baroque and Romantic) in a regular class routine. Class also involves viewing, reading, and review writing. Students are billed a materials fee. Prerequisite(s): course 32 or permission of instructor. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): IH, A.) *The Staff*

136C. Dance Studio III. F,W

Advanced study of contemporary dance theory and practice. Focus on dance performance, creative process, and choreographic form in a contemporary style. Students are billed a materials fee. Enrollment limited to 30. May be repeated for credit. (General Education Code(s): A.) *The Staff*

137. Studies in Performance (Dance). *

Studies in dance, taken in connection with performance in a major dance concert. Students are required to work on all aspects of the production. Students work with guest and faculty choreographers. May be repeated for credit with consent of instructor. Students are billed a materials fee. Admission by audition held late winter quarter; see department office for more information. May be repeated for credit. (General Education Code(s): A.) *The Staff*

138. Movement Research in New Arts Praxis. *

Work at the intersection of creative and research practices, focusing on experimental forms of movement theater, applications in digital arts and new media, and critical analysis of the arts in society. Collaborative, interdisciplinary performance projects required. Audition/interview at first

class meeting. Students are billed a materials fee. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *E. Warburton*

139. Random: With a Purpose. S

Participation in a student-choreographed and directed dance concert under faculty supervision. Rehearsals culminate in public performances. Students are billed a materials fee. Auditions to be held on the first day of class. May be repeated for credit. (General Education Code(s): A.) *The Staff*

141. Play Direction Studio I. W

Basic studio exploration through scene problems and exercises of the development of directing principles. Intensive work on the director's pre-rehearsal work from text selection, analysis, and casting. Audition at first class. Enrollment limited to 20. *K. Jannarone*

142. Play Direction Studio II. *

Intensive studio exploration of the art and craft of directing. Primary focus on text analysis, collaboration with designers, developing a point of view and visual/auditory language for the play, staging techniques, and communication techniques with actors. Prerequisite(s): course 40, 141, or permission of instructor. Enrollment limited to 15. May be repeated for credit. (General Education Code(s): A.) *The Staff*

151. Studies in Performance (Drama). F,W

Studies in theater, taken in connection with participation in a Theater Arts Department sponsored production. Enrollment is limited to those persons chosen to take part in a particular production. Admission by audition; audition schedule to be announced at first class meeting. May be repeated for credit. (General Education Code(s): A.) *The Staff, D. Scheie, M. Foley*

152. Advanced Stagecraft. S

Exploration of stage technology from the scene shop's perspective. Conversion of scenic designs to construction drawings. Pursuit of scenic-engineering and construction techniques using steel, wood, and other materials. Training on use of stage machinery: rigging, flying, wagons, tracking, and propulsion. Prerequisite(s): course 52. Enrollment limited to 25. (General Education Code(s): A.) *The Staff*

155. Workshop Experiments in Performance. W

A process-oriented investigation of specific playwrights or theatrical styles consisting of work which may culminate in a final production. Admission by audition at first class meeting; see department office for more information. May be repeated for credit. (General Education Code(s): A.) *The Staff*

156. Play Development Workshop. *

"Hands on" study and exploration of the process of developing a new script from the perspective of the playwright, the actor, and the director. Students enrolling in this course as playwrights are selected on the basis of submissions turned in the previous quarter. Students taking the course as directors are required to obtain consent of the instructor. Other students may enroll as usual. May be repeated for credit. *The Staff*

157. Playwriting. F

Students are given the opportunity to write their own scripts and refine them as the result of class discussion and scenework with actors. Work is on specific problems involving such elements as the structuring of a plot or the development of character. Prerequisite(s): satisfaction of

the Entry Level Writing and Composition requirements. May be repeated for credit. (General Education Code(s): W,A.) *J. Bierman*

158. Chautauqua Workshop. S

Advanced course that provides directors, writers, and performers with an opportunity to develop new works in performance. Students enrolling in this course as playwrights are selected on basis of submissions turned in the previous quarter. Students are billed a materials fee. Students taking the course as directors are required to obtain consent of the instructor. Other students may enroll as usual. May be repeated for credit. *The Staff*

159. Advanced Playwriting. W

A study, through practice, of the constituent elements in the construction of a drama. Students concentrate, in particular, on the organization of complex plots, the expression of character through conflict, and maximizing the emotional impact of dramatic situations. Prerequisite(s): course 157 or equivalent, satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): W,A.) *J. Bierman*

160. Dramatic Theories. W,S

An examination of the theories of acting and directing from the 19th century to our own time, starting with the classic theater and concentrating on the 20th-century debate centered in Stanislavski and Brecht, Grotowski, and Robert Wilson. Prerequisite(s): course 60A, 60B, and 60 C. This course must be taken prior to student's senior year; required for course 185. (General Education Code(s): A.) *P. Mostkoff*

161. Theater, Literature, and History.

161C. The Theater and Drama of Renaissance Europe. W,S

An examination of selected plays from Renaissance Europe (1580-1680, Italy, Spain, and France) from an explicitly theatrical viewpoint which will include practical scene study. Covers Renaissance theater buildings and some related critical materials. Offered in alternate academic years. (General Education Code(s): A.) *P. Whitworth*

161D. Asian Theater: An Anthropological Approach. *

Art serves simultaneously to educate its audience to the group's traditional values and to test new ideas. Indian, Indonesian, and Japanese forms are studied in relation to their cultural context. Through videotapes, lecture demonstrations, performances, and scenework, students explore the forms. Offered in alternate academic years. (General Education Code(s): A, E.) *M. Foley*

161M. Sexuality, Gender, Drama, and Performance. *

Exploration and analysis of the interrelationships between gender, sexuality, and performance on stage and on the page. Topics include gender and homosexuality in the history of performance and dramatic literature, drag, queer Shakespeare, closet drama, same-sex performance conditions (e.g., Greece) vs. dual-gendered (e.g., Restoration England). Combines study of theoretical texts and script with analysis and practice. (Formerly Gender and Performance.) (General Education Code(s): A.) *D. Scheie*

161P. Theater in the "Chicano Power" Movement. *

Covers the rise of Teatro Chicano as a cultural-political force within the 1960's "Chicano Power"

Movement starting with founding playwright Luis Valdez and El Teatro Campesino and covering Chicana/o playwrights inspired by the movement, e.g. Cherrie Moraga, Luis Alfaro, and Josefina Lopez. (Also offered as Latin American&Latino Studies 161P. Students cannot receive credit for both courses.) (General Education Code(s): A, E.) *A. Martinez*

161Q. Queer Theatrics: Representations and Sensibilities. *

An examination of the idea, form, and significance of queer/gay sensibility and representation in the English-speaking theater from the Renaissance to the present. (General Education Code(s): A.) *The Staff*

161R. Theater of American Cultures. *

Interrelationship of ethnicity and the rise of significant American theater groups including the black theater movement, Chicano Teatro, and Asian American theater will be shared via lecture, viewing, and discussion. (General Education Code(s): A, E.) *A. Martinez*

161S. American Drama: Politics and Theater. *

The dream of group theater, a long-term partnership of actors, directors, and playwrights, has fueled extraordinary and exciting change in the 20th-century American theater theory and practice. We examine ten exemplary manifestations of this dream. (General Education Code(s): A.) *The Staff*

161T. Women in Theater. *

Explores 20th-century American female playwrights from textual, historical, and multicultural perspectives. The course progresses from *Trifles* (1916) through the Harlem Renaissance, Broadway's Lillian Hellman, and today's post-feminist theatrical explosion in lectures, films, dramatizations, and award-winning playwrights' visits. (General Education Code(s): A.) *The Staff*

161U. Performance of Story in Theater and Film. W

Examination of theory and practice of theater and film comparing and contrasting works having been adapted from one genre to another. Lecture, film, and video viewing. Discussions of materialist, psychoanalytic, and feminist approaches shared. Students cannot receive credit for this course and course 80X. (General Education Code(s): A.) *P. Mostkoff*

161V. The Broadway Musical. *

Studies musical comedy as a distinctly American contribution to theater and film through scripts, scores, and film and video viewing. Analyzes European backgrounds, the relationship of Broadway musicals and Hollywood film in the studio era, works of Rogers and Hammerstein, and Sondheim, and changes in popular music from blues to rock to Disney musicals. (General Education Code(s): A.) *D. Scheie*

161Y. Modern Ancient Drama. *

Studies 20th- and 21st-century productions and adaptations of ancient Greek drama in theater, dance, music, and film, including Stravinsky, O'Neill, Graham, Pasolini, and Breuer, discussing artists' goals, the sociopolitical context, ideas of authenticity, and audience response. Enrollment limited to 30. (General Education Code(s): A.) *M. Gamel*

162. Public Space/Public Sphere: The Performance of Public Art in 20th Century America. *

Examines phenomenon of public art as a performative phenomenon in the 20th century. Begins with the theory of the public sphere in the work of Jurgen Habermas and social space in the work of Henri Lefebvre. Concludes

with the popular phenomenon of public art in the 1980s and the demise of the NEA by the later 80s with the scandals of the NEA Four. (General Education Code(s): A.) *M. Franko*

163. Special Studies in Individual Playwrights.

163A. Shakespeare. W

Focuses on selected plays of Shakespeare. Explores the range and variety of interpretations of the plays, both in critical writings and in performance. Also studies other writings and graphic art created on the subjects and themes of the plays. Offered in alternate academic years. (General Education Code(s): A.) *J. Bierman*

163E. Chekhov and His Impact. *

Delves into the work of Chekhov and the Moscow art theater. Through scene work Stanislavski's acting techniques are related to the scripts. The impact on later Russian innovators, especially Meyerhold, and on the American theater is considered. (General Education Code(s): A.) *The Staff*

163G. Special Studies in Playwrights: Artaud. F

Antonin Artaud through three critical lenses: influence on modern and contemporary theater, subject and site of psychoanalytic and social criticism, and theater practitioner. Exercises cultural, historical, and analytic approaches to his work. Prerequisite(s): course 60C; course 160 recommended. Enrollment limited to 40. (General Education Code(s): A.) *K. Jannarone*

163Y. Yiddish Theater. S

History of Yiddish theater from the beginning of the 19th Century until after the Second World War. Students read in the canon of Yiddish dramatic literature and discuss the work of major Yiddish theater troupes in Poland, Russia, and the United States. The connection between Yiddish and Hebrew theater is discussed and questioned. Enrollment limited to 40. (General Education Code(s): A, E.) *The Staff*

164. Issues in Dance History and Theory. *

A research seminar. Topics range from problems in dance aesthetics, criticism, or theory to particular movements, periods, or the work of a choreographer. (Formerly course 133.) Enrollment limited to 20. May be repeated for credit. (General Education Code(s): A.) *M. Franko, E. Warburton*

165. Introduction to Dance Modernism. F

Rare historical footage and the writings of famous choreographers provide an overview of 20th-century dance within the perspective of modernism. Topics include romanticism, "natural" dance, Orientalism, Ausdruckstanz, "industrial" dance, American modern dance and neoclassicism, chance procedure, postmodernism, and the avant-garde commodity marketplace. (Formerly course 134.) (General Education Code(s): A.) *The Staff*

170. Design Seminar (2 credits). F

Seminar to help advanced designers segue from student to professional. Topics to include portfolio construction, interview styles, guest speakers, and more. Enrollment restricted to senior and graduate students in Theater Arts. May be repeated for credit. *D. Cuthbert, K. Edmunds, B. Baron*

185. Senior Seminar. F

A required seminar for majors involving readings and discussions of important texts in dance, design, and drama. Prerequisite(s): course 160. *D. Scheie*

190. Group Projects. F,W,S

Prerequisite(s): petition required, approved by instructor and department. May be repeated for credit. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching a lower-division seminar under faculty supervision. (See courses 42 and 45). Petition required, approved by instructor and department. *The Staff*

193. Proseminar. *

Exposes students to an aspect of the theory or practice of theater arts. Visiting scholars share their area of expertise in lectures to a small group of students. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *The Staff*

193F. Proseminar (2 credits). *

Exposes students to an aspect of the theory or practice of theatre arts. Visiting lecturers share their area of expertise in lectures to a small group of students. Enrollment limited to 25. May be repeated for credit. (General Education Code(s): A.) *The Staff*

198. Independent Field Study. F,W,S

Provides for department-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Students engaging in field study must complete application procedures for such study by the fifth week of the previous quarter. Petition required, approved by instructor and department. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Provides for department-sponsored individual study programs off campus for which faculty supervision is not in person (e.g., supervision is by correspondence). Students engaging in field study must complete application procedures for such study by the fifth week of the previous quarter. Petition required, approved by instructor and department. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual study in areas approved by sponsoring instructors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual study in areas approved by sponsoring instructors. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Graduate Courses

290. Special Topics and Area Concentration. F

Study group meetings on a regular basis which involve either the study of shared texts or presentations by the group members and invited guests. Enrollment restricted to graduate students in theater arts. May be repeated for credit. *J. Bierman*

291. Field Study. F,W,S

Student-designed and conducted research carried out in field settings. A brief prospectus must be filed with the department office before undertaking the research, and a brief final report of activities must be filed upon return. Course intended for students with graduate standing in theater arts. Petition required, approved by instructor and department. *The Staff*

292. Teaching-Related Independent Study. F,W,S

Directed graduate research and writing coordinated with the teaching of undergraduates. Course intended for graduate students in theater arts. Petition required, approved by instructor and department. *The Staff*

297. Independent Study. F,W,S

Independent study or research for graduate students in theater arts. Petition required, approved by instructor and department. May be repeated for credit. *The Staff*

297F. Independent Study/Graduate (2 credits). F,W,S

Independent study or research for graduate students in theater arts. Petition required, approved by instructor and department. Enrollment restricted to graduate students in theater arts. May be repeated for credit. *The Staff*

Western Civilization

Students wishing to pursue a course of study in Western civilization should consult the concentration in pre- and early modern studies under Literature, page 337.

Writing Program

166 Kresge College
(831) 459-2431
<http://writing.ucsc.edu>

Faculty and Professional Interests

Senior Lecturer

ELIZABETH ABRAMS, Chair
Composition and rhetoric; writing pedagogy, writing across the curriculum; 19th-century and 20th-century American history and literature, especially concerning the Civil War

CAROL M. FREEMAN
History, theory, and practice of rhetoric; composition theory and pedagogy; the essay as genre

DONALD L. ROTHMAN, Emeritus
Literacy education and democracy; UCIK-12 partnerships; writing, persuasion, and nonviolence; writing pedagogy; connections between beauty and justice

Lecturer

SONDRA M. ARCHIMEDES
Cultural studies, gender studies, contemporary social issues, 19th-century and 20th-century British literature, writing

JEFFREY M. ARNETT
Poetry

DEREDE ARTHUR
Popular culture, cultural studies, 18th-20th-century British literature, theory of the novel, theories of education

MARK BAKER
Media and democracy, postmodernism, 20th-century literature and culture of the Americas, community participation, writing and social responsibility

FARNAZ FATEMI
Media analysis, Middle East issues and cross-cultural perspectives, visual culture

B.K. FAUNCE
Late 18th-century and early 19th-century British literary culture, film, literary theory

TIMOTHY FITZMAURICE
Poetry and politics, writing and publications

SUSAN GORSKY
Composition and rhetoric, writing pedagogy, 19th-century and 20th-century British and American literature, social justice and community

ROXANNE POWER HAMILTON
Writing, poetry, magazine editing, inter-arts performance, gender and queer studies

JUNGMI KIM
Second language writing (SLW), critical pedagogy, contrastive rhetoric, writing and identity, writing in ethnographic research

ROBIN KING
Visual arts, media criticism, sociology of learning and emotions

NANCY KRUSOE
Grammar, English as a second language (ESL), politics and writing

BRIJ LUNINE
Reception studies, cultural studies, popular culture and youth subcultures

PATRICK MCKERCHER
Virtual reality educational environments, outreach projects, collaborative research with James Burke

ELLEN NEWBERRY
Educational partnerships with K-12 schools, transfer/re-entry student writing, women's studies, and queer studies

SARAH-HOPE PARMETER, Coordinator, Entry Level Writing Requirement (ELWR)
Writing and democracy; multilingual, multicultural rhetorics; cross-age writing partnerships and public school collaboratives; lesbian/gay/bisexual/transgender young adult literature; rhetoric of the sciences

ANNALISA RAVA
Animals and human society, science fiction studies, literature and postmodernism

DAN SCRIPTURE
Vietnam War, popular culture studies, fiction writing

ROSWELL SPAFFORD, Emerita

JUDITH TODD
Philosophies of nature, ecopsychology, Native American world views, permaculture, visual arts, cross-cultural and interdisciplinary studies

AMY WEAVER
Creative nonfiction, writing pedagogy

JAMES WILSON
Modern European literary, artistic, intellectual, and political movements (especially of France, Italy, and Spain); poetry of Ezra Pound; Chinese poetry and philosophy; translation; argument in popular culture; the rhetoric of sports

Program Description

The campus wide Writing Program offers courses designed to help students become more competent and confident writers of prose. The courses offered through this program teach skills of grammar and organization and strategies of invention, composition, revision, and editing. These courses approach writing as one of the most important ways we have of making discoveries about ourselves and the world around us and of communicating these insights to others.

Together with the colleges, the Writing Program administers the writing components (C1, C2) of the campus general education requirements; administers the Entry Level Writing Requirement (ELWR), formerly known as Subject A; and advises students about ways to fulfill these requirements.

Writing Program instructors in each college participate in the college's core course and counsel its students about their writing. The Writing Program offers Writing 2 (a lower-division course that satisfies the C2

*Not offered in 2008-10

requirement); the Writing 20, 21, 22, 23 series to help meet the needs of students who have not passed ELWR, including students with complex linguistics backgrounds; and instruction in the theory and practice of teaching writing for peer tutors and graduate students.

Each year, the Writing Program also offers several specialized lower- and upper-division courses, as well as several writing-intensive (W) courses during the summer session.

The Writing Program has offered two minors, a minor in journalism and a minor in communication and rhetoric, though both are suspended at this time.

Courses in creative writing are offered through the Literature Department.

Lower-Division Courses

1. Composition and Rhetoric. F,W,S

A basic composition course, which helps students find specific, practical ways of improving every aspect of their writing, through a broadly based consideration of the nature of language from a diversity of perspectives. Prerequisite(s): satisfaction of the Entry Level Writing Requirement. Enrollment limited to 25. (General Education Code(s): C.) *The Staff*

2. Rhetoric and Inquiry. F,W,S

Explores the intersections of investigation, interpretation, and persuasion and hones strategies for writing and research. Students develop specific, practical ways of improving their writing through sustained critical thinking about diverse issues from multiple points of view. Students cannot receive credit for this course and course 1. Prerequisite(s): satisfaction of the Entry Level Writing and C1 requirements. Enrollment limited to 25. (General Education Code(s): C2.) *The Staff*

11A. Adjunct Tutorial in Writing (2 credits per quarter) (2 credits). F

A tutorial designed to provide follow-up assistance in writing for students who have passed the Entry Level Writing Requirement, but wish to continue to work on various aspects of their writing. Counts only for academic standing and financial aid purposes, but does not apply toward degree requirements (i.e., counts as workload credit only). Prerequisite(s): approval of the Writing Program; satisfaction of the Entry Level Writing Requirement. May be repeated for credit. *The Staff*

11B. Adjunct Tutorial in Writing (2 credits per quarter) (2 credits). W

A tutorial designed to provide follow-up assistance in writing for students who have passed the Entry Level Writing Requirement, but wish to continue to work on various aspects of their writing. Counts only for academic standing and financial aid purposes, but does not apply toward degree requirements (i.e., counts as workload credit only). Prerequisite(s): approval of the Writing Program; satisfaction of the Entry Level Writing Requirement. May be repeated for credit. *The Staff*

11C. Adjunct Tutorial in Writing (2 credits per quarter) (2 credits). S

A tutorial designed to provide follow-up assistance in writing for students who have passed the Entry Level Writing Requirement, but wish to continue to work on various aspects of their writing. Counts only for academic standing and financial aid purposes, but does not apply toward degree requirements (i.e., counts as workload credit only). Prerequisite(s): approval of the Writing Program; satisfaction of the Entry Level Writing Requirement. May be repeated for credit. *The Staff*

20. The Nature of Written Discourse. W

Explores the dynamics of written language: its relationships to speech, thought, and culture; its uses in different personal, academic, professional, and public contexts; its abuses in jargon and propaganda. Course work includes extensive practice in different kinds of writing. Enrollment restricted to students who have not passed the Entry Level Writing Requirement. Open to others by permission of instructor. Enrollment limited to 22. *The Staff*

21. Meaning and Style: The Sentence in Context. S

Explores, via cross-cultural readings, the nature, uses, and abuses of language. Course work includes extensive writing, both take-home and in-class. Emphasis on revising for power of expression and for variety and accuracy at the sentence level. Enrollment restricted to students who have not passed the Entry Level Writing Requirement. Open to others by permission of instructor. Enrollment limited to 22. *The Staff*

22A. Grammar and Editing Workshop (3 credits). F

Offers instruction on selected topics in grammar and conventions of written English as needed to strengthen the writing skills of students whose primary language is not standard English. Provides students practice in applying these concepts to editing their own writing. Designed for entering first-year students. Enrollment limited to 22. D. Scripture, *N. Krusoe*

22B. Grammar and Editing Workshop (3 credits). W

Offers instruction on selected topics in grammar and conventions of written English as needed to strengthen the writing skills of students whose primary language is not standard English. Provides students practice in applying these concepts to editing their own writing. Designed for continuing students who have already taken course 20 and/or 21. Enrollment limited to 22. *The Staff*

23. Grammar and Rhetoric: Language for Writing. F

Builds on writing skills gained in previous writing courses; focuses on effective language use in academic writing. Students reinforce their written English proficiency by reading, studying, practicing, and writing structures and patterns of written English. Enrollment restricted to students who have not passed the Entry Level Writing Requirement. Open to others by permission of instructor. Enrollment limited to 22. *The Staff*

42. Student-Directed Seminar.

Seminars taught by upper-division students under faculty supervision. (See course 192.) *The Staff*

64. Newswriting Workshop. S

Introduction to the basic techniques of newswriting, including practice in leads, formats, and different kinds of news reporting. Emphasis on developing skills in research, interviewing, and shaping stories. Includes an examination of the contemporary media. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements, instructor determination at first class meeting. Enrollment limited to 22. (General Education Code(s): W.) *The Staff*

70. Communication and Rhetoric: An Introduction. *

This course introduces the field of contemporary communication studies, locating its roots in rhetoric and showing how key concepts play out in mass media and

other settings as well as in everyday life. Prerequisite(s): satisfaction of the Entry Level Writing requirement. *The Staff*

93. Field Study. F,W,S

For lower-division students: supervised study within commuting distance of campus. May include internships at magazines, newspapers, publishing houses, or newsletters of corporations, and civic or service organizations. Prerequisite(s): satisfaction of the Entry Level Writing requirement; certification of adequate preparation; approval of Writing Program. May be repeated for credit. *The Staff*

93F. Field Study (2 credits). F,W,S

For lower-division students: supervised study within commuting distance of campus. May include internships at magazines, newspapers, publishing houses, or newsletters of corporations, and civic or service organizations. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99. Tutorial. F,W,S

Individual, directed study for lower-division students in expository writing, editing, or journalism. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

99F. Tutorial (2 credits). F,W,S

Individual, directed study for lower-division students in expository writing, editing, or journalism. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

Upper-Division Courses

101. Introduction to the History, Theory, and Practice of Rhetoric. *

A survey of classical and contemporary ideas about rhetoric which explores, practically and theoretically, "the best means of persuasion in any situation whatsoever" and will consider the nature of human discourse in diverse areas of knowledge. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *C. Freeman*

102. The Rhetoric of the Social Sciences. *

Develops rhetorical facility in disciplinary writing for upper-division social science majors. Requires critical and disciplinary reading, writing in modes appropriate to social science disciplines, and a substantial research or critical paper within the student's own discipline. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. (General Education Code(s): W.) *The Staff*

103. Rhetoric of the Natural Sciences. *

This course explores writing genres within the natural sciences. Emphasis is on the relationships between good science and good writing, clear thinking and clear writing. Frequent papers and substantive revisions required. Prerequisite(s): completion of 10 units coursework in the natural sciences, satisfaction of the Entry Level Writing and Composition requirements. Enrollment restricted to juniors and seniors during priority enrollment. Enrollment limited to 30. (General Education Code(s): W.) *The Staff*

104. Writing in the Arts. *

A writing course focusing on the purposes and composition of various genres of writing about and in the performing arts, visual arts, and music such as reviews, program and exhibit notes, journal and magazine articles, grant proposals, and press releases. Prerequisite(s):

satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 30. (General Education Code(s): W.) *E. Abrams*

106. Public Speaking. *

Students learn strategies to write, analyze, and deliver effective speeches of various kinds as well as professional presentations using PowerPoint and other visuals. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 25. *The Staff*

107. Technical and Business Writing: An Overview. *

An exploration of the conventions and formats of business and technical writing. Course work involves writing effective resumes, proposals, letters, end-user manuals, and the fundamentals of Web site design. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 30. *The Staff*

108. Electronic Communication. *

An introduction to the evolving conventions of effective Web site design as well as collaborative writing. Course work includes evaluation of web site content and structure and creation of hypertext. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 24. *The Staff*

109. Argument and Practical Reasoning. *

An investigation of contemporary persuasive discourse with special attention to the elements and forms of argument, the nature of evidence, questions of validity and probability, and the workings of rhetorical reasoning. Emphasizes the analysis of arguments rather than their construction. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 40. *The Staff*

110A. Writing in the Professions. *

Study of writing required in the selected professions, including law, politics, and government. Considers the rhetoric of each discipline and relevant texts. Includes lectures from visiting professionals and a series of writing assignments based on reading and research. Topic may vary from year to year, focusing on the rhetoric of other professional divisions: medicine, engineering, economics, and so forth. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 40. (General Education Code(s): W.) *The Staff*

120. Editing English Prose. *

This course offers extended, detailed instruction in editing one's own and other people's prose for accuracy, clarity, appropriateness, and effectiveness. It provides some history of theories of style and stylistic analysis, and instruction in prose variation according to social context. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 40. *The Staff*

128. Latino Media in the U.S. W

Explores the history and practice of Latino media in the U.S. with an emphasis on work created by, for, with, and about Latino constituencies. Course highlights the role that media plays in struggles for social change, political enfranchisement, creative self-expression, and cultural development. Course content varies with instructor. (Also offered as Latin American&Latino Studies 128. Students cannot receive credit for both courses.) Enrollment limited to 39. (General Education Code(s): E.) *The Staff*

159. Grammar for Tutors and Teachers (3 credits). W

English grammar from a pedagogical perspective, emphasizing structures, patterns, and conventions of written English that commonly challenge basic writers. Students learn strategies for helping multilingual and other writers improve their writing skills by increasing their awareness of grammar. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements. *N. Krusoe*

161. Academic Writing and Research Methods. W

Introduces library and field research methods and also provides instruction and practice in writing from research, addressing issues such as voice, argument, and documentation. Students write four lengthy essays and do considerable informal writing. Course 161 includes sections for re-entry women, transfer students, and students in the EOP faculty mentor program. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements. Students should contact the instructor for enrollment information. Enrollment limited to 20. (General Education Code(s): W.) *The Staff*

163. Advanced Workshop in Expository Writing. *

A composition course for students who, having mastered basic writing skills, wish to concentrate on increasing their effectiveness as rhetoricians, prose stylists, and editors. Assignments include writing and revising essays, responding to other students' work, and reading published essays. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements. Enrollment limited to 22. May be repeated for credit. (General Education Code(s): W.) *The Staff*

165. Practicum in Reporting. *

In-depth, community-based reporting, with an emphasis on skills ranging from interviewing techniques to profiles, integrating research with writing. Students choose a specific area or "desk" of concentration, and all the stories reflect that beat. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; a writing sample, completed in class, is required at first class meeting. Enrollment restricted to journalism minors during priority enrollment. Enrollment limited to 22. (General Education Code(s): W.) *The Staff*

166. Topics in Journalism.

Courses under this heading explore fields of newspaper and magazine journalism: feature writing, investigative reporting, reviewing, commentary, etc. Students study published writing and hone their own skills as writers under the supervision of a practicing journalist. See the *Schedule of Classes* for specific offerings. *The Staff*

166A. Magazine Writing. *

Introduces students to the various forms of magazine writing, as well as to pertinent reporting techniques. Students work intensively on process, style, and editing, producing numerous formal and informal pieces. Enrollment priority will be given to journalism minors. Students produce a writing sample on the first day of class. Prerequisite(s): satisfaction of Entry Level Writing and Composition requirements; course 64 or permission of instructor. Enrollment limited to 22. (General Education Code(s): W.) *The Staff*

166B. Investigative Reporting. *

Students acquire basic investigative and research skills, with particular emphasis on how to develop investigative subjects, obtain data, check accuracy, and convert information into well written, publishable articles. Priority given to students concentrating in journalism.

Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; interview with instructor to review journalism portfolio. Enrollment limited to 22. (General Education Code(s): W.) *The Staff*

166D. Minorities in Journalism. *

Focuses on the minority press and how it has shaped journalism in the U.S. as well as viewing how the media has dealt with this segment of our society. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements and consent of instructor. Enrollment limited to 22. (General Education Code(s): W.) *The Staff*

166J. Online Journalism. *

A course in using electronic sources to report articles for publication and in publishing journalistic pieces online. Prerequisite(s): course 64 or journalism experience; instructor determination at first class meeting. Enrollment limited to 25. *The Staff*

166N. The Rhetoric of Radio. *

Examines the theory and practice of radio. Students explore how the formats of radio create its meaning, and investigate radio's place in the landscape of the media, particularly in the U.S. and Mexico. Prerequisite(s): satisfaction of the Entry level Writing and Composition requirements and consent of instructor. Enrollment limited to 25. *The Staff*

167. Making the News. *

A writing course examining news and feature articles in popular print media. Students write their own articles and analyze how a particular content is mandated by conventional forms, by the structure of the industries, and by ideas of "newsworthiness." Designed for journalism minors and students for whom a course in media criticism is central to their program. Prerequisite(s): satisfaction of the Entry Level Writing and Composition requirements; qualifications determined by instructor at first class meeting. Enrollment limited to 43. (General Education Code(s): W.) *The Staff*

169. Theory and Practice of Tutoring Writing (3 credits). F

An introduction to theory and research on the composing process and practical strategies for teaching writing, especially in tutorial situations. Recommended for writing assistants. Prerequisite(s): instructor determination at first class meeting; course intended for writing tutors only. Enrollment limited to 30. *A. Weaver, E. Newberry*

180. Seminar in Editing and Publishing. F,W,S

Newsriting seminar for *City on a Hill* editors and writers. Weekly sessions evaluate newspaper in depth, including writing, reporting, and issues in journalism ranging from ethics to legal questions. Prerequisite(s): instructor determination at first class meeting; open only to editors, interns, and writers at City on a Hill Press. Enrollment limited to 40. May be repeated for credit. *The Staff*

189. Methods of Teaching Writing. F,W,S

Supervised by a writing instructor, each student attends a weekly seminar on teaching writing and either assists in a class or serves as a facilitator of a small writing group in a course at UCSC or a public school. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

191. Internships.

Individual work in journalism, publishing, or broadcasting. Internships require a contracted amount of writing or other work, and generally involve group tutorials with faculty in the writing program as well as individual conferences. *The Staff*

191A. Internship in Writing. F,W,S

Regular writing for newspaper or magazine. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

191B. Internship in Editing. F,W,S

Work in an editorial position involving critique and guidance of reporters. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

191C. Internship in Publishing. F,W,S

All phases of work for a publishing house, from manuscript reading to editorial. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

191D. Internship in Broadcasting. F,W,S

Writing, editing, scheduling, and/or broadcast work for television or radio. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

192. Directed Student Teaching. F,W,S

Teaching of a lower-division seminar under faculty supervision. (See course 42.) Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

193. Field Study. F,W,S

For upper-division students: supervised study within commuting distance of the campus. May include internships at magazines, newspapers, publishing houses, or newsletters of corporations, and civic or service organizations. Prerequisite(s): satisfaction of Entry Level Writing requirement; students submit petition to sponsoring agency. *The Staff*

193F. Field Study (2 credits). F,W,S

For upper-division students: supervised study within commuting distance of the campus. May include internships at magazines, newspapers, publishing houses, or newsletters of corporations, and civic or service organizations. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

194. Group Tutorial. F,W,S

A writing, editing, or publishing project undertaken by a small group of students under the direct supervision of a writing instructor. Students submit petition to sponsoring agency. Enrollment limited to 15. May be repeated for credit. *The Staff*

195. Senior Thesis. F,W,S

Individual work on a thesis for any campus major or individual major. Faculty in the writing program help students on all phases of work, from selection and focus to development of bibliographies, research techniques, revision, and editing. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198. Independent Field Study. F,W,S

Individual study for which faculty supervision is possible only by correspondence. May include internships at newspapers, magazines, publishing houses, or the newsletters of corporations, and civic or service organizations. Prerequisite(s): satisfaction of Entry Level Writing requirement; students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

198F. Independent Field Study (2 credits). F,W,S

Individual study for which faculty supervision is possible only by correspondence. May include internships at newspapers, magazines, publishing houses, or the newsletters of corporations, and civic or service organizations. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199. Tutorial. F,W,S

Individual, directed study for upper-division students in expository writing, editing, or journalism. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

199F. Tutorial (2 credits). F,W,S

Individual, directed study for upper-division students in expository writing, editing, or journalism. Students submit petition to sponsoring agency. May be repeated for credit. *The Staff*

*Graduate Courses***202. Writing and Learning Seminar (3 credits). ***

Strategies for teaching assistants to help undergraduates become better learners and writers in disciplinary courses. Topics include using writing to improve reading and thinking, analysis of assignments, avoiding plagiarism, responding to and evaluating papers, ESL writers, peer response, and technological aids. Enrollment restricted to graduate students. Enrollment limited to 30. *D. Scripture*

203. Teaching Writing. S

Prepares graduate students to teach Writing 1 at UCSC and elsewhere. Development of a syllabus, teaching strategy, and class plans based on study of composition and rhetorical theories, research on students' writing development, and effective writing pedagogies. Enrollment restricted to graduate students. Enrollment limited to 18. *E. Abrams*

Teaching Staff and University Administration

Teaching Staff	445
Administration	473



Teaching Staff

Faculty titles for 2008–10 were verified as of June 30, 2008, and subsequent changes may not be reflected in the following list. Please note that inclusion in this list is not a guarantee that the faculty member will be teaching throughout the 2008–10 academic years. In addition, some faculty listed here as emeriti may be recalled to teach courses.

The listing for most faculty members includes college membership, year of arrival at UC Santa Cruz, academic title, degrees, and former affiliations.

Martin Abadi, Stevenson College (2001)
Professor, Computer Science

B.S., M.S., Ph.D., Stanford University. Former affiliations: Systems Research Center, Compaq; Bell Labs Research; Lucent Technologies.

Ralph H. Abraham, Kresge College (1968)
Professor Emeritus, Mathematics
B.S.E., M.S., Ph.D., University of Michigan. Former affiliations: Princeton University; Columbia University; University of California, Berkeley.

W. Emmanuel Abraham, Cowell College (1973)
Professor Emeritus, Philosophy
B.A., University of London; M.A., B.Phil., Oxford University. Former affiliations: Macalester College; University of Ghana; University of California, Berkeley; Stanford University.

Elizabeth S. Abrams, Porter College (2000)
Senior Lecturer, Writing
A.B., University of California, Berkeley; M.A., M.Phil., Yale University. Former affiliation: Harvard Expository Writing Program.

Dimitris Achlioptas (2005)
Associate Professor, Computer Science
B. Engr., University of Patras; M. Sc., Ph.D., University of Toronto. Former affiliation: Microsoft Research.

Robert F. Adams, Crown College (1967)
Professor Emeritus, Economics
B.A., Oberlin College; M.A., Ph.D., University of Michigan. Former affiliations: University of Pittsburgh; University of Maryland.

Anthony N. Aguirre (2003)
Associate Professor, Physics
B.A., Brown University; M.A., Ph.D., Harvard University. Former affiliation: Institute for Advanced Study (Princeton).

facing page: *Associate professor of anthropology Nathaniel Dominy's research explores the diet of hominins—the early human ancestors who lived 2 million years ago. His work is at the center of one of the hottest subjects in physical anthropology, because researchers now believe it was a nutritional jackpot that gave our forebears a major advantage over all other primates, fueling the development of bipedalism and big brains.*

PATRICK AHERNE, Porter College (1966)
Professor Emeritus, Art
B.F.A., University of Kansas; M.A., Northwestern University. Former affiliation: Artist-in-Residence, Kings Canyon and Sequoia National Parks.

JUDITH L. AISSEN, Porter College/Stevenson College (1983)
Professor, Linguistics
B.A., Fordham University; M.A., Yale University; Ph.D., Harvard University. Former affiliations: University of California, Los Angeles; Yale University; University of California, Santa Barbara.

Joshua Aizenman, College Nine (2001)
Professor, Economics
B.A., M.A., Hebrew University of Jerusalem; Ph.D., University of Chicago. Former affiliations: University of Pennsylvania; University of Chicago; Hebrew University of Jerusalem; Dartmouth College.

Ramakrishna Akella (2003)
Professor, Information Systems Management
B.S., Indian Institute of Technology; Ph.D., Indian Institute of Science. Former affiliations: State University of New York at Buffalo; Carnegie Mellon University.

Mark A. Akeson (1996)
Adjunct Professor, Biomolecular Engineering
B.A., University of California, San Diego; Ph.D., University of California, Davis. Former affiliations: University of California, Santa Cruz; National Institutes of Health; University of California, Davis.

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Lecturer, Music (Classical Guitar)
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Michael H. Cowan, Oakes College (1969)
Professor, American Studies
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Adjunct Professor, Physics
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Professor, Chemistry

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Associate Professor, Ecology and Evolutionary Biology

B.Sc., University of California, Davis; M.Sc., California State University, Hayward (Moss Landing Marine Laboratories); Ph.D., Scripps Institution of Oceanography, University of California, San Diego.

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Professor, Psychology

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Ben D. Crow, College Eight/College Nine (1996)

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Robert R. Curry, College Eight (1979)

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Michael S. Dalbey (1977)

Lecturer, Biology

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Professor Emeritus Recalled, Biomolecular Engineering

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Lecturer, Spanish Language
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- F. Joel Ferguson**, College Eight/Crown College
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*Professor, Computer Engineering; Provost, Crown
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B.S.E., University of North Carolina at Charlotte;
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Professor Emeritus, Art
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- Jonathan A. Fox**, Merrill College/College Nine
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Professor, Latin American and Latino Studies
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- Laurel R. Fox**, Crown College/College Nine (1977)
Professor, Ecology and Evolutionary Biology
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- Jean E. Fox Tree**, Porter College (1994)
Professor, Psycholinguistics (Psychology)
A.B., Harvard University; M.Sc., University of
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iations: Stanford University; Max Planck Institute for
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- Dana L. Frank**, Merrill College (1991)
Professor, History
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- Mark Franko**, Cowell College (1991)
Professor, Theater Arts (Dance)
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- Marge Frantz**, Kresge College (1976)
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iation: Institute of Industrial Relations, University
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- Carla A. Freccero**, Kresge College (1991)
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- Carol M. Freeman**, Cowell College (1974)
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- Maria Cecilia Freeman**, Crown College (1990)
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- Rosa Linda Fregoso**, Merrill College (2001)
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B.J., University of Texas at Austin; Ph.D.,
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iations: University of California, Davis; University of
California, Los Angeles; University of California,
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- William H. Friedland**, Merrill College/College
Eight (1969)
Professor Emeritus, Community Studies and Sociology
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tion: Cornell University.
- Benjamin Friedlander** (1999)
Professor, Electrical Engineering
B.S., M.S., Technion University (Israel); M.S.,
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- Daniel Friedman**, Crown College (1985)
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- Susan Friedman**, Porter College (1981)
Lecturer, Art
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- Gregory Fritsch**, Porter College (1987)
Lecturer, Theater Arts (Drama)
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Donald C. Fritz (1988)

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Alexander Gamburd (2004)

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Master in Classics, College S. Estanislao (Madrid); Master in Philosophy, College Chamartin (Madrid); Master in Theology, College S. Georgen (Frankfurt); LL.M., University of Würzburg; Ph.D., University of California, San Diego. Former affiliations: Sophia University (Tokyo); University of San Diego; University of California, San Diego.
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Physical Education Instructor
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- Paul Rangell, Porter College (1983)
Lecturer, Art
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- David M. Rank, College Eight (1971)
Professor Emeritus, Astronomy and Astrophysics; Astronomer Emeritus, UC Observatories/Lick Observatory
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Professor Emeritus, Mathematics
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Professor, Ocean Sciences; Director, Institute of Geophysics and Planetary Physics
B.A., B.S., Stanford University; M.A., M.Phil., Ph.D., Columbia University.
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Professor, Anthropology

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Professor Emeritus, Theater Arts (Design)

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Jacob Rosen (2008)

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B.A., M.A., Stanford University; Ph.D., Indiana University; Ph.D., University of Washington; Universidad Nacional Autónoma de Mexico.
- W. Todd Wipke**, Crown College (1975)
Professor Emeritus, Chemistry and Biochemistry
B.S., University of Missouri; Ph.D., University of California, Berkeley. Former affiliations: University of Missouri; University of California, Berkeley; Harvard University; Princeton University.
- Daniel J. Wirls**, Merrill College (1988)
Professor, Politics
B.A., Haverford College; M.A., Ph.D., Cornell University.
- Donald A. Wittman**, Merrill College (1969)
Professor, Economics
B.A., University of Michigan; M.A., Ph.D., University of California, Berkeley. Former affiliations: University of Chicago; University of California, Berkeley.
- Richard A. Wohlfeiler** (1994)
Lecturer, Art
B.A., University of California, Los Angeles; Graduate Certificate, University of California, Santa Cruz.
- Matthew Wolf-Meyer** (2008)
Assistant Professor, Anthropology
B.A., Oakland University; M.A., University of Liverpool; M.A., Bowling Green State University; Ph.D., University of Minnesota. Former affiliation: Wayne State University.
- Greer Ellison Wolfson** (2002)
Lecturer, Music (Flute)
B.M., Oberlin Conservatory of Music; M.M., University of Michigan, Ann Arbor.
- Deborah A. Woo**, College Eight (1984)
Professor Emerita, Community Studies
B.A., Tufts University; M.A., Ph.D., University of California, Berkeley.
- Stanford E. Wosley**, Crown College (1975)
Professor, Astronomy and Astrophysics
B.A., M.S., Ph.D., Rice University. Former affiliations: California Institute of Technology; Rice University; Lawrence Livermore National Laboratory.
- Thomas Y. Wu** (2006)
Assistant Professor, Economics
M.A., B.A., Pontifical Catholic University of Rio de Janeiro; Ph.D., Princeton University. Former affiliations: Princeton University, Pontifical Catholic University of Rio de Janeiro.
- Shirley S. Wynne**, Porter College (1974)
Professor Emerita, Theater Arts (Dance)
B.A., Mills College; M.A., Ph.D., Ohio State University. Former affiliations: University of California, Los Angeles; Ohio State University; Ohio University.
- Karen Tei Yamashita**, Kresge College (1997)
Professor, Literature (Creative Writing)
B.A., Carleton College. Former affiliation: University of California, Los Angeles.
- Huibin Yan** (2001)
Assistant Professor, Economics
B.A., Wuhan University (People's Republic of China); Ph.D., Washington University.
- Alice Yang Murray**, Merrill College (1993)
Associate Professor, History
B.A., Brown University; M.A., Ph.D., Stanford University.
- Assaf M. Yasur-Landau** (2007)
Assistant Professor, History
B.A., M.A., Ph.D., Tel Aviv University.
- Joel Yellin** (1984)
Professor Emeritus, Physical and Biological Sciences (Environmental Science and Law)
B.S., California Institute of Technology; M.S., Ph.D., University of Chicago. Former affiliations: Massachusetts Institute of Technology; Lawrence Radiation Laboratory, University of California, Berkeley; Institute for Advanced Study (Princeton).
- Fitnat Yildiz**, Crown College (2002)
Associate Professor, Microbiology and Environmental Toxicology
B.S., Hacettepe University (Ankara, Turkey); Ph.D., Indiana University. Former affiliation: Carnegie Institution of Washington.
- A. Peter Young**, Crown College (1984)
Professor, Physics
M.A., D.Phil., Oxford University. Former affiliations: Oxford University; Institut Laue-Langevin (Grenoble, France); Cornell University; Imperial College (London).
- Judy Yung**, Oakes College (1990)
Professor Emerita, American Studies
B.A., San Francisco State College; M.L.S., Ph.D., University of California, Berkeley. Former affiliations: University of California, Berkeley; Stanford University; San Francisco State University.
- James C. Zachos**, Crown College (1992)
Professor, Earth and Planetary Sciences
B.S., State University of New York, College at Oneonta; M.S., University of South Carolina; Ph.D., University of Rhode Island. Former affiliation: University of Michigan.
- Alan M. Zahler**, College Eight (1994)
Professor, Molecular, Cell, and Developmental Biology
B.S., Carnegie Mellon University; Ph.D., University of Colorado, Boulder.

Jack Zajac, Porter College (1969)

Professor Emeritus, Art

F.A.A.R., American Academy in Rome. Former affiliations: University of Colorado; Artist-in-Residence, American Academy in Rome.

Erika S. Zavaleta, College Eight (2003)

Assistant Professor, Environmental Studies

B.A., M.A., Ph.D., Stanford University. Former affiliation: University of California, Berkeley.

Patricia J. Zavella, Merrill College/College

Eight (1984)

Professor, Latin American and Latino Studies

B.A., Pitzer College; M.A., Ph.D., University of California, Berkeley.

Jonathan P. Zehr (1999)

Professor, Ocean Sciences

B.S., Western Washington University; Ph.D., University of California, Davis. Former affiliation: Rensselaer Polytechnic Institute.

Jin Z. Zhang, Crown College (1992)

Professor, Chemistry and Biochemistry

B.S., Fudan University (Shanghai); Ph.D., University of Washington. Former affiliation: University of California, Berkeley.

Yi Zhang, College Eight (2005)

Assistant Professor, Information Systems Management

B.S., Tsinghua University; M.S., Ph.D., Carnegie Mellon University.

Adrienne L. Zihlman, Oakes College (1967)

Professor, Anthropology

B.A., University of Colorado; Ph.D., University of California, Berkeley.

Martha C. Zúñiga, Merrill College (1989)

Professor, Molecular, Cell, and Developmental Biology

B.A., University of Texas at Austin; M.Phil., Ph.D., Yale University. Former affiliation: University of Texas at Austin.

Yi Zuo (2007)

Assistant Professor, Molecular, Cell, and

Developmental Biology

B.S., Tsinghua University; Ph.D., Northwestern University. Former affiliation: University of Texas, Austin.

Eileen Zurbriggen, College Ten (2000)

Associate Professor, Psychology

B.S., M.S., Michigan State University; M.A., Ph.D., University of Michigan.

Eve Zyzik (2008)

Assistant Professor, Language Program

B.A., Indiana University, Bloomington; Ph.D., University of California, Davis. Former affiliation: Michigan State University.

IN MEMORIAM

We mourn the deaths of 11 valued faculty members since the publication of the last catalog.

August 2005. Theodore R. Sarbin, Stevenson College (1969)

Professor Emeritus, Psychology and Criminology

B.A., Ohio State University; M.S., Western Reserve University; Ph.D., Ohio State University.

July 2006. Bert Kaplan, Cowell College (1965)

Professor Emeritus, Psychology

B.A., Brooklyn College; Ph.D., Harvard University.

January 2007. Richard A. Musgrave, Crown

College (1980)

Adjunct Professor, Economics

M.A., Ph.D., (Hon.) LL.D., Harvard University; Diplom Volkswirt, (Hon.) Doctorate, Heidelberg University.

January 2007. Donald E. Osterbrock, Crown

College (1972)

Professor Emeritus, Astronomy and Astrophysics;

Astronomer Emeritus, UC Observatories/Lick

Observatory

Ph.B., B.S., M.S., Ph.D., University of Chicago;

(Hon.) D.Sc.: University of Cincinnati;

University of Chicago; Ohio State University;

University of Wisconsin-Madison.

June 2007. Brian Walton, College Eight (1979)

Lecturer, Environmental Studies; Coordinator,

Predatory Bird Research Group

B.S., California Polytechnic State University, San

Luis Obispo; M.A., San Jose State University.

November 2007. Stanley M. Flatté, Crown

College (1971)

Professor Emeritus, Physics

B.S., California Institute of Technology; Ph.D.,

University of California, Berkeley.

January 2008. Frank C. Child (1983)

Professor Emeritus, Economics

B.A., University of Utah; M.A., Ph.D., Stanford University.

January 2008. Gary L. Lease, Cowell College/

Merrill College (1973)

Professor, History of Consciousness

B.A., Loyola University of Los Angeles; Dr.

Theol., University of Munich.

February 2008. Max M. Levin, Crown College

(1967)

Lecturer Emeritus, Psychology

B.A., University of California, Los Angeles;

Ph.D., University of California, Berkeley.

March 2008. Anthony L. Fink, Crown College

(1969)

Professor, Chemistry and Biochemistry

B.Sc., Ph.D., Queen's University (Canada).

July 2008. Gerhard Ringel, Crown College

(1967)

Professor Emeritus, Mathematics

Dr. rer. nat., University of Bonn; (Hon.) Dr. rer.

pol. h. c., University of Karlsruhe.

University Administration

The governance of the university is entrusted, under the state constitution, to the Regents of the University of California. The Board of Regents is presently composed of 18 members who are appointed by the governor of California, subject to California State Senate confirmation; seven members who participate because of the offices they hold; and a student member appointed by the board.

The president of the university is the chief executive of the 10-campus system. He is appointed by the Regents and is directly responsible to them.

Each of the 10 campuses of the university has a chancellor, its chief administrative officer, who is responsible for the organization and operation of the campus, including academic, student, and business affairs.

The Academic Senate, consisting of the faculty and certain administrative officers, determines the conditions for admission and degrees, subject to the approval of the Regents; authorizes and supervises courses and curricula; and advises the university administration on important matters such as appointments and promotions, budgets, student discipline, and administration of the library.

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George R. Blumenthal

University Professors

The title of University Professor is the highest honor UC bestows on a professor in recognition of outstanding scholarship and teaching. The title is reserved for scholars of international distinction who are recognized and respected as teachers of exceptional ability. University Professors—appointed by the Regents—visit other campuses for seminars and meetings with faculty and students and for presentations to more general audiences.

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J. Michael Bishop
Chancellor, UC San Francisco

E. Margaret Burbidge (*Emerita*)
Department of Physics, UC San Diego

Shu Chien
Departments of Bioengineering and Medicine, UC San Diego

Alexandre J. Chorin
Department of Mathematics, UC Berkeley

Marvin L. Cohen
Department of Physics, UC Berkeley

Michael Cole
Department of Communication, UC San Diego

Robert B. Edgerton
Departments of Psychiatry and Biobehavioral Sciences and Anthropology, UCLA

Emory Elliott
Department of English and Center for Ideas and Society, UC Riverside

Sandra M. Faber
Department of Astronomy and Astrophysics, UC Santa Cruz

Arturo Gómez-Pompa (*Emeritus*)
Department of Botany and Plant Sciences, UC Riverside

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Department of Chemistry and Biochemistry, UCLA

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Computer Sciences, Bioengineering, Industrial
Engineering and Operations Research, and
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Vice Provost—Academic Affairs
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*Vice Provost and Dean—Undergraduate Education
and Summer Session*
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Vice Provost and Dean—Graduate Studies
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*Assistant Vice Chancellor—Academic Human
Resources*
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Director—Strategic Planning
Linda Kittle

*Manager—Information Assets/Campus Records/
Information Practices*
Linda Beaston

Vice Chancellor—Research

Bruce H. Margon*

Associate Vice Chancellor—Research
Burney J. Le Boeuf

*Director—Office for Management of Intellectual
Property*
Gerald Barnett

Director—Office of Sponsored Projects
William F. Clark

*Director—Office of Research Compliance
Administration*
Caitlin Deck

Vice Chancellor—University Relations

Donna M. Murphy

*Associate Vice Chancellor—Public Affairs and
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Barry H. Shiller

Associate Vice Chancellor—Development
Jennifer A. Svihus

Assistant Vice Chancellor—University Relations
Catherine E. Faris

Executive Director—UCSC Alumni Association
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Vice Chancellor—Planning and Budget

Meredith G. Michaels*

Assistant Vice Chancellor—Planning and Budget
Karen Eckert

Director—Academic Planning, Resources and Analysis
Kathleen Dettman

Director—Capital Planning and Space Management
Robin Draper

Director—Institutional Research and Policy Studies
Julian Fernald

Special Assistant
Galen Jarvinen

Vice Chancellor—Business and Administrative Services

Thomas M. Vani

Associate Vice Chancellor
Christina L. Valentino

*Associate Vice Chancellor—Physical Planning and
Construction*
Frank Zwart

Assistant Vice Chancellor—Financial Affairs
Kirk L. Lew

Director—Physical Plant
Ilse Kolbus

Director—University Business Services
Lisa A. Rose

Director—Internal Audit and Advisory Services
Geraldine C. Gail

Director—Staff Human Resources
Willeen McQuitta

Director—Real Estate Office
Lisa Akeson

University Police Chief
Michael A. Aluffi

University Fire Chief
Jeff Trapp

Vice Chancellor—Information Technology

Mary M. Doyle

Director—Applications Solutions
Patrick L. LeCuyer

Director—Business Services
Magge McCue

Director—Client Relationship Management
Bill Hyder

Director—Core Technologies
Doug Hartline

Director—Instructional Technology Group
To be appointed

Director—Information Technology Services
Janine A. Roeth

Director—Portfolio Management Group
Mark Cianca

Director—Technology Strategy
Brad Smith

Vice Chancellor—Student Affairs

Felicia McGinty

*Associate Vice Chancellor—The Colleges and
University Housing Services*
Jean Marie Scott

Associate Vice Chancellor—Enrollment Management
Michelle Whittingham

*Assistant Vice Chancellor—Budget and
Administration*
Sue Matthews (interim)

*Associate Vice Chancellor—Campus Life—and Dean
of Students*
Alma Sifuentes

Director—Admissions
To be appointed

University Registrar
Pamela Hunt-Carter

Executive Director—College Student Life Programs
To be appointed

*Executive Director—Physical Education, Recreation,
Sports, and Wellness*
Ryan Andrews

*Executive Director—Residential, Family, and
Program Support Services*
David Keller (acting)

*Executive Director—Student Academic Support
Services*
Larry Trujillo

Executive Director—Student Auxiliary and Service Enterprises

Robert F. McCampbell

Executive Director—Student Health Services

E. Drew Malloy, M.D. (interim)

Executive Director—Campus Life

To be appointed

Executive Director—UC College Prep

Rafael Granados

Executive Director—University Housing Services

Patt Takeuchi (acting)

Director—African American Resource and Cultural Center

Paula Powell

Director—American Indian Resource Center

Dennis Tibbetts

Director—Asian American/Pacific Islander Resource Center

Nancy I. Kim

Director—Athletics

Linda Spradley

Director—Campus Orientation Programs

Rosa Plaza

Director—Career Center

Barbara Silverthorne (acting)

Director—Chicano Latino Resource Center

Rosalee Cabrera

Director—Early Education Services

Emili Willet

Co-Directors—Counseling and Psychological Services

Mary Jan Murphy, Jerry Lee (interim)

Director—Development for Student Affairs

Kathleen Hughes

Director—Dining and Hospitality Services

Scott Berlin

Director—Disability Resource Center

Peggy Church

Director—Educational Opportunity Programs

Michelle Handy

Executive Director—Educational Partnership Center

Carrol Moran

Director—Financial Aid

Ann Draper

Director—Learning Support Services

Holly Cordova

Director—Lionel Cantú Gay, Lesbian, Bisexual, Transgender, and Intersex Resource Center

Deborah Abbott

Director—Services for Transfer and Re-Entry Students

Corinne Miller

Director—Student Judicial Affairs

Doug Zuidema

Director—Student Media

Marlene Olson

Director—Student Organization Advising and Resources

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Manager—Women's Center

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Director—Institute of Geophysics and Planetary Physics

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Director—Institute of Marine Sciences

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Helen Shapiro

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F. Joel Ferguson

Kresge College

Micah Perks and Juan Poblete

Merrill College

Lourdes Martínez-Echazábal

Oakes College

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The UC Santa Cruz Foundation is a nonprofit, public benefit corporation formed in 1974 to promote greater understanding of UC Santa Cruz and to encourage and accept gifts in support of academic programs, scholarships, fellowships, and capital improvements.

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*Anesthesiologist
San Francisco*

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*Registered Principal, North Coast Securities Corp.
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Theodore C. Goldstein (Oakes & Stevenson '83)
*Vice President of Development Technologies, Apple
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*Superior Court Judge
Los Angeles*

Michael P. Graydon (Cowell '70)
*Managing Director
Bear Stearns Asset Management
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Paul J. Hall (Merrill '72)
*Partner, Nixon Peabody, LLP
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Susan W. Hammer
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Frans M. Lanting
*Nature Photographer and Author
Santa Cruz*

Anne Neufeld Levin
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Kiran Malhotra
*Nutritionist and Arts Advocate
Saratoga*

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Victor Hernandez, 58, a community college transfer student, received a coveted Pister scholarship that enabled him to attend UC Santa Cruz. He received his undergraduate degree in psychology in 2008 and hopes to obtain a doctorate in clinical psychology or forensics.

Appendix A: California Residency and Nonresident Tuition Fee

If you do not meet the University of California requirements for residence for tuition purposes on the residence determination date for each term in which you propose to attend the university, you must pay a Nonresident Tuition Fee in addition to all other fees. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter, and for schools on the semester system, the day instruction begins for the semester.

Law Governing Residence

The rules regarding residence for tuition purposes at the University of California are governed by the California Education Code and implemented by Standing Orders of the Regents of the University of California. Under these rules, adult citizens and certain classes of aliens can establish residence for tuition purposes. There are particular rules that apply to the residence classification of minors (see below).

Note: Registered domestic partners are included in rules that apply to spouses.

Who Is a Resident?

If you are an adult student (at least 18 years of age), you may establish residence in California if

- (1) You are a U.S. citizen.
- (2) You are a permanent resident or other immigrant.
- (3) You are a nonimmigrant who is not precluded from establishing a domicile in the U.S. This includes nonimmigrants who hold valid visas of the following types: A, E, G, H-1B, H-4, I, K, L, N, O-1, O-3, R, T, U, or V.

To establish residence you must be physically present in California for more than one year, and you must come here with the intent to make California your home as opposed to coming to this state to go to school. Physical presence within the state solely for educational purposes does not constitute the establishment of California residency, regardless of the length of stay. You must demonstrate your intention to make California your home by severing your residential ties with your former state of residence and establishing those ties with California. If these steps are delayed, the one-year durational period will be extended until you have demonstrated both presence and intent for one full year. Your residence cannot be derived from your spouse. Likewise, a registered domestic partner does not derive residence from the other registered domestic partner.

Requirements for Financial Independence

If you are not financially dependent on a parent who meets the university's requirements for residence for tuition purposes, you are required to be financially independent in order to be a resident for tuition purposes. You are considered "financially independent" if one or more of the following applies:

- (1) You are at least 24 years of age by December 31 of the calendar year of the term for which you are requesting resident classification.
- (2) You are a veteran of the U.S. Armed Forces.
- (3) You are a ward of the court or both parents are deceased.
- (4) You have legal dependents other than a spouse or a registered domestic partner.
- (5) You are married, a registered domestic partner, or a graduate student or a professional student, and you were not/will not be claimed as an income tax deduction by any individual other than your spouse or domestic partner for the tax year immediately preceding the term for which you are requesting resident classification.
- (6) You are a single undergraduate student and you were not claimed as an income tax deduction by your parents or any other individual for the two tax years immediately preceding the term for which you are requesting resident classification, and you can demonstrate self-sufficiency for those years and the current year.

Note: Financial independence is not a factor in determining residence status for graduate student instructors, graduate student teaching assistants, research assistants, junior specialists, postgraduate researchers, graduate student researchers, and teaching associates who are employed 49 percent or more of full time or awarded the equivalent in university-administered funds (e.g., grants, stipends, fellowships) for the term for which resident classification is sought.

Establishing Intent for California Residency

Indications of your intent to make California your permanent residence can include the following: registering to vote and voting in California elections; designating California as your permanent address on all school and employment records, including military records if you are in the military service; obtaining a California driver's license or, if you do not drive, a California identification card; obtaining California vehicle registration; paying California income taxes as a resident, including taxes on income earned outside California from the date you establish residence; establishing a home in California where you keep your personal belongings; and licensing for professional practice in California. The absence of these indicia in other states during any period for which you claim California residence can also serve as an indication of your intent. Documentary evidence is required and all relevant indications will be considered in

determining your classification. Your intent will be questioned if you return to your prior state of residence when the university is not in session.

General Rules Applying to Minors

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered to be your residence. If you live with neither parent, your residence is that of the parent with whom you last lived. Unless you are a minor alien present in the U.S. under the terms of a nonimmigrant visa which precludes you from establishing domicile in the U.S., you may establish your own residence when both parents are deceased and a legal guardian has not been appointed. If you derive California residence from a parent, that parent must satisfy the one-year durational/intent requirement.

Specific Rules Applying to Minors

(1) *Parent of minor moves from California.* You may be entitled to resident status if you are a minor and a U.S. citizen or eligible alien whose parent(s) was a resident of California who left the state within one year of the residence determination date if

- (a) you remained in California after your parent(s) departed;
- (b) you enrolled in a California public post-secondary institution within one year of your parent(s)' departure; and
- (c) once enrolled, you maintain continuous attendance in that institution. Financial independence is not required in this case.

(2) *Self-support.* You may be entitled to resident status if you are a minor and a U.S. citizen or eligible alien and can prove the following:

- (a) you lived in California for the entire year immediately preceding the residence determination date;
- (b) you have been self-supporting for that year; and
- (c) you intend to make California your permanent home.

(3) *Two-year care and control.* You may be entitled to resident status if you are a minor and a U.S. citizen or eligible alien and you have lived continuously with an adult who is not your parent for at least two years prior to the residence determination date. The adult with whom you are living must have been responsible for your care and control for the entire two-year period and must have been residing in California during the one year immediately preceding the residence determination date.

Exceptions that either Confer Residence Status or Exemption from Nonresident Tuition

You may be entitled to an exception conferring residence status or exemption from nonresident tuition if one of the following applies to you.

Some of the exceptions conferring residence status and exemptions are for a limited period of time. Check with the Campus Residence Deputy for more information:

(1) *Member of the military; spouse, registered domestic partner, or any other dependents of military personnel.* A student who is a member of the U.S. military stationed in California on active duty, unless assigned for educational purposes to a state-supported institution of higher education; the spouse, registered domestic partner, or natural or adopted child or stepchild who is a dependent of a member of the U.S. military stationed in California on active duty. A resident classification may be conferred until the student has lived in California long enough to become a resident.

(2) *Child, spouse, or registered domestic partner of a faculty member.* To the extent that university funds are available, a student who is the unmarried, dependent child under the age of 21 or the spouse or registered domestic partner of a University of California faculty member who is a member of the Academic Senate may be eligible for an exemption.

(3) *Child, spouse, or registered domestic partner of a university employee.* A student who is the unmarried, dependent child under the age of 21 or the spouse or registered domestic partner of a full-time employee of the University of California who is permanently assigned to work outside the state of California (e.g., Los Alamos National Laboratory) may be eligible for a resident classification.

(4) *Child, spouse, or registered domestic partner of a deceased public law enforcement or fire suppression employee.* A student who is a child, spouse or registered domestic partner of a deceased public law enforcement or fire suppression employee, who was a California resident and was killed in the course of law enforcement or fire suppression duties may be eligible for an exemption.

(5) *Dependent child of a California resident.* A student who has not been an adult resident for more than one year and is the natural or adopted dependent child of a California resident who has been a resident for more than one year immediately prior to residence determination date. The student must also maintain full-time attendance in a California public postsecondary institution. A resident classification may be conferred until the student has lived in California long enough to become a resident.

(6) *Graduate of a California school operated by the Federal Bureau of Indian Affairs (B.I.A.).* A student who is a graduate of a California school operated by the B.I.A. (e.g., Sherman Indian High School) and who enrolls at the University of California may be eligible for a resident classification.

(7) *Employee of California public school district.* A student holding a valid credential authorizing service in California public schools and employed by a school district in a full-time certificate position may be exempt from nonresident tuition and may be eligible for a resident classification.

(8) *Student athlete in training at U.S. Olympic Training Center, Chula Vista.* An amateur student athlete in training at the U.S. Olympic Training Center in Chula Vista may be exempt from nonresident tuition until he or she has resided in California the minimum time necessary to become a resident may be eligible for a resident classification.

(9) *Graduate of California high school.* A student who attended high school in California for three or more years (9th grade included) and graduated from a California high school (or attained the equivalent) may be exempt from nonresident tuition. You are not eligible for this exemption if you are a nonimmigrant alien.

(10) *Congressional Medal of Honor recipient.* An undergraduate student under age 27 who is the recipient of the Congressional Medal of Honor or a child of a recipient who at the time of his or her death was a California resident may be eligible for an exemption.

(11) *Surviving dependent of California resident killed in 9/11 terrorist attacks.* An undergraduate student who is the surviving dependent of a California resident who was killed in the 9/11/01 terrorist attacks on the World Trade Center, the Pentagon Building, or the crash of United Airlines Flight 93 may be eligible for an exemption.

Temporary Absences

If you are a nonresident student who is in the process of establishing a residence for tuition purposes and you return to your former home during noninstructional periods, your presence in the state will be presumed to be solely for educational purposes and only convincing evidence to the contrary will rebut this presumption. Students who are in the state solely for educational purposes will not be classified as residents for tuition purposes regardless of the length of their stay.

If you are a student who has been classified as a resident for tuition purposes and you leave the state temporarily, your absence could result in the loss of your California residence. The burden will be on you (or on your parents if you are a minor) to verify that you did nothing inconsistent with your claim of a continuing California residence during your absence. Steps that you (or your parents) should take to retain a California residence include:

(1) *Continue to use a California permanent address on all records*—educational, employment, military, etc.

(2) *Continue to satisfy California tax obligations.* If you are claiming California residence, you are liable for payment of income taxes on your total income from the date that you establish your residence in the state, including income earned in another state or country.

(3) *Retain your California voter's registration and vote by absentee ballot.*

(4) *Maintain a California driver's license and vehicle registration.* If it is necessary to change your driver's

license or vehicle registration, you must change them back within the time prescribed by law.

Petitioning for Change of Classification

You must petition in person at the Office of the Registrar for a change of classification from nonresident to resident status. All changes of status must be initiated prior to the first day of classes for the term for which you intend to be classified as a resident.

Time Limitation on Providing Documentation

If additional documentation is required for residence classification but is not readily accessible, you will have until the end of the applicable term to provide it.

Incorrect Classification

If you are incorrectly classified as a resident, your classification will be corrected and you will be required to pay the nonresident tuition you have not paid. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to university discipline. Resident students who become nonresidents must immediately notify the campus residence deputy.

Inquiries and Appeals

Inquiries regarding residence requirements, determination, and/or recognized exceptions should be directed to the Residence Deputy, Office of the Registrar, 190 Hahn Student Services Building, University of California, Santa Cruz, 1156 High Street, Santa Cruz, CA 95064-1077, (831) 459-2754, or to the Legal Analyst—Residence Matters, Office of the General Counsel, 1111 Franklin Street, 8th Floor, Oakland, CA 94607-5200. No other university personnel are authorized to supply information relative to residence requirements for tuition purposes.

You are cautioned that this summary is not a complete explanation of the law regarding residence. Note that changes may be made in the residence requirements between the publication of this statement and the relevant residence determination date. Any student, following a final decision on residence classification by the residence deputy, may appeal in writing to the Legal Analyst within 30 days of notification of the residence deputy's final decision.

Privacy Notice

All of the information requested on the Statement of Legal Residence form is required [by the authority of Standing Order 110.2 (a)–(d) of the Regents of the University of California] for determining whether or not you are a legal resident for tuition purposes. You have the right to inspect university records containing the residence information requested on this form. The records are maintained by the Office of the Registrar, 190 Hahn Student Services Building, University of California, Santa Cruz, 1156 High Street, Santa Cruz, CA 95064-1077, (831) 459-2754.

Appendix B: University Police

The University Police have the same authority and responsibility, by law, as municipal police departments. In emergencies, call 9-1-1, 24 hours a day, from campus or private phones. If you need information, or if you need to report a theft, assault, or other crime, call (831) 459-2231, also 24 hours a day. Officers patrol the campus on foot, bicycle, motorcycle, or by car. They answer calls related to crimes, collisions, injuries, and complaints. The lost-and-found service is located in the Police Office. Office hours are Monday through Friday, 8 A.M. to 5 P.M. The Police Office is located near the main entrance to campus.

The Parking Enforcement Office (for paying parking citations and requesting special parking consideration) is in the same location. Citation payments may be made in person Monday through Friday, 8 A.M. to 5 P.M.

Crime Awareness and Campus Security Act

In compliance with the federal Crime Awareness and Campus Security Act, UCSC publishes information on campus security and crime statistics. The information is posted on the web: www2.ucsc.edu/police.

Appendix C: Drug-Free Schools and Communities Act

In compliance with the federal Drug-Free Schools and Communities Act, UCSC annually notifies students, faculty, and staff of policies, procedures, and potential consequences related to unlawful possession, use, or distribution of drugs and alcohol on campus. This notice is distributed to students through the colleges and the Graduate Studies Division, and to faculty and staff through campus mail. The university also conducts a biannual review of programs related to drugs and alcohol to determine effectiveness, implement changes, and ensure that disciplinary sanctions are consistently enforced. This review is conducted by the Office of the Vice Chancellor for Student Affairs, (831) 459-4446.

Appendix D: Smoking on Campus Policy

To protect the rights of the nonsmoking campus community to breathe smoke-free air, UCSC has adopted a policy that bans smoking in areas occupied by the nonsmoking population. The policy applies to residential and nonresidential university buildings and vehicles and to all individuals on the campus. Smoking is prohibited inside the residence halls (including student rooms) as well as residence hall lounges, inside individual apartments, community rooms, bathrooms, lounges, cafés and dining halls. Additionally, smoking is prohibited in all indoor public spaces at UC Santa Cruz—both academic and residential. The nonsmoking policy includes exterior stairways, decks and balconies. Smoking outside is permitted only

in designated areas, 25 feet away from all buildings and air intakes. For more detailed information about the smoking policy see the web: ehs.ucsc.edu (under Environmental Health and Safety [EH&S] Administration, Policies). Tobacco products will not be sold on campus either through vending machines or campus establishments. UCSC supports and assists efforts to stop smoking by providing literature and referrals to community cessation programs. Students may obtain information about the programs from the Cowell Student Health Center (831) 459-2211.

Appendix E: Policies and Regulations

The *Student Policies and Regulations Handbook*, the Code of Student Conduct, and related appendices may be accessed at www2.ucsc.edu/judicial. The *Student Policies and Regulations Handbook* is also available in alternate formats such as enlarged print, braille, audiocassette, or electronic disc from Student Judicial Affairs. Topics include:

- Policy on Nondiscrimination
- Policy on Speech and Advocacy
- Policy on Use of University Properties
- Policy on Campus Emergencies
- Registered Campus Organizations
- University Obligations and Student Rights
- Policy on Student Governments
- Policy on Campus-Based Student Fees
- Policy on Student Conduct and Discipline
- Policy on Student Grievance Procedures
- Policy on Student Participation in Governance
- Policies Applying to the Disclosure of Information from Student Records
- Guidelines Applying to Nondiscrimination on the Basis of Disability
- University of California Authorized Student Governments
- University of California: Use of the University's Name—State of California Education Code, Section 92000
- Nondiscrimination Policy Statement for University of California Publications Regarding Student-Related Matters
- UCSC Alcohol and Drug Policy
- University of California Policy on Hazing
- UCSC Sex Offense Policy
- UCSC Academic Dishonesty Policy
- UCSC Policy on Sexual Orientation Harassment/Discrimination
- UCSC Guidelines for Speakers and Public Events for Students and Campus Organizations
- UCSC Computer Guidelines: Policies for Use of UCSC Computing Facilities
- UCSC Smoking Policy: Policy for a Smoke-Free Environment
- UCSC Public Nudity and Sexually Offensive Conduct Policy
- UCSC Hate/Bias Incident Policy

- UCSC Procedures for Ensuring Adequate Interim Protection from Retaliation or Intimidation for Complainant(s), Witness(es), and other Individuals
- UCSC Policy on Academic Integrity for Graduate Students

For further information, stop by 125 Hahn Student Services Building or call (831) 459-1738.

Appendix F: Graduate Student–Faculty Adviser Relationship Guidelines

The University of California, Santa Cruz, expects professional, fair, and frequent communication between graduate students and their advisers. Open communication and mutual respect should be the foundation of the relationship between a graduate student and faculty adviser. The graduate adviser and the graduate student should discuss their student-adviser relationship early, and clearly communicate mutual and agreeable expectations from the beginning. Regular interactions, especially face-to-face meetings, are essential in ensuring that expectations and goals are met.

In an optimal learning environment, the faculty adviser should provide timely and constructive feedback on performance and expectations; timely and sufficient warning of inadequate performance; appropriate recognition of a student's intellectual contributions; and academic and professional advice on all stages of the graduate career. The graduate student should be an active participant in seeking advice and getting feedback on progress, keeping the faculty adviser informed of plans, progress, and obstacles, and contributing during regular progress assessments. The faculty adviser and the student each have the duty and responsibility to initiate meetings as necessary to foster and protect the success of the relationship.

Professionalism and fairness should guide the graduate student–faculty adviser relationship. Graduate students and faculty should avoid relationships that conflict with their particular roles and responsibilities. Faculty advisers and graduate students are bound by policies that prohibit discrimination and harassment. (See pages 17–18, Appendix E, and inside back cover.) Graduate students may be entitled to accommodations under the Americans with Disabilities Act. (See pages 17–18, Appendix E, and inside back cover.) When concerns and conflicts arise, they should be raised and attended to professionally, honestly, and promptly. Retaliation and discrimination against students for raising concerns are prohibited.

If something happens that upsets the faculty adviser–graduate student relationship and cannot be resolved either by direct or indirect discussion, a graduate student can seek assistance from a trusted faculty member, the dean of graduate studies, the graduate director, the department chair, the ombudsman, and/or counseling and psychological services. Graduate students may request confidentiality. Many departments have developed processes to address a range of potential

concerns. For information about grievance and appeal procedures, see pages 17–18 and Appendix E. For a description of additional informal and formal grievance and appeal processes available to UCSC graduate students, please refer to the *Graduate Student Handbook* at www.graddiv.ucsc.edu.

Appendix G: Student Judicial Affairs

Student Judicial Affairs is responsible for the adjudication of all nonacademic student and student organization misconduct for UCSC. In this capacity, Student Judicial Affairs administers the Code of Student Conduct in accordance with Section 100.00 of the *Student Policies and Regulations Handbook*. Allegations of misconduct may be brought by students, faculty, staff, police, visitors to the campus, and members of our local community. Allegations should be made in writing and delivered to Student Judicial Affairs.

Upon receipt of an allegation, Student Judicial Affairs will review the merits of the allegation and then conduct an investigation to determine if a violation has occurred. If no violation can be proven, the matter will be dropped. If a violation is proven, then an appropriate sanction will be recommended to the student or student organization for their review and acceptance. If the recommendation is unacceptable, the student or student organization may request a formal hearing or file a written appeal. If you have a question about a possible violation, university policy, or your rights in the discipline process, please feel free to contact the office for a phone consultation or to schedule an appointment.

Student Judicial Affairs serves as the Americans with Disabilities Act (ADA) compliance resolution office for grievances of alleged discrimination based on disability or handicap. In addition, Student Judicial Affairs is the resource office for grievances of alleged discrimination based on race, color, national origin, or sexual orientation, and for incidents of hate/bias.

The Office of Student Judicial Affairs is located in 245 Hahn Student Services Building and can be reached by phone at (831) 459-4446, by fax at 459-3188, or via e-mail at SJA@ucsc.edu. Web: www2.ucsc.edu/judicial.

Appendix H: Ombuds Office

The Ombuds Office is an impartial and confidential resource available to all members of the UCSC community. The office assists students, staff, and faculty in achieving informal resolution of complaints and conflicts that stem from UCSC policies, procedures, practices, and intracampus relationships. The office seeks fair and equitable solutions to problems, using the principles of informality, impartiality, independence, and confidentiality.

The Ombuds Office operates independently of administrative authorities and protects the privacy of all contacts and communications to the office. When appropriate, Ombuds staff encourage direct interaction between involved parties and may provide mediation services upon request. Ombuds staff are impartial when listening to concerns, providing options, and resolving complaints.

Services include providing information on campus resources, policies, and procedures, making appropriate referrals, and facilitating difficult conversations. The office is not involved in formal grievance or disciplinary processes, and cannot set aside any university policy or rule. Speaking to the Ombuds about a concern does not constitute “notice” to the university that the problem exists.

The Ombuds can be reached at (831) 459-2073. Call for further information or for an appointment. All inquiries are confidential. The Ombuds Office is located in the Physical Sciences Building, Room 417; e-mail ombuds-lmc@ucsc.edu. Web: www2.ucsc.edu/ombudsman.

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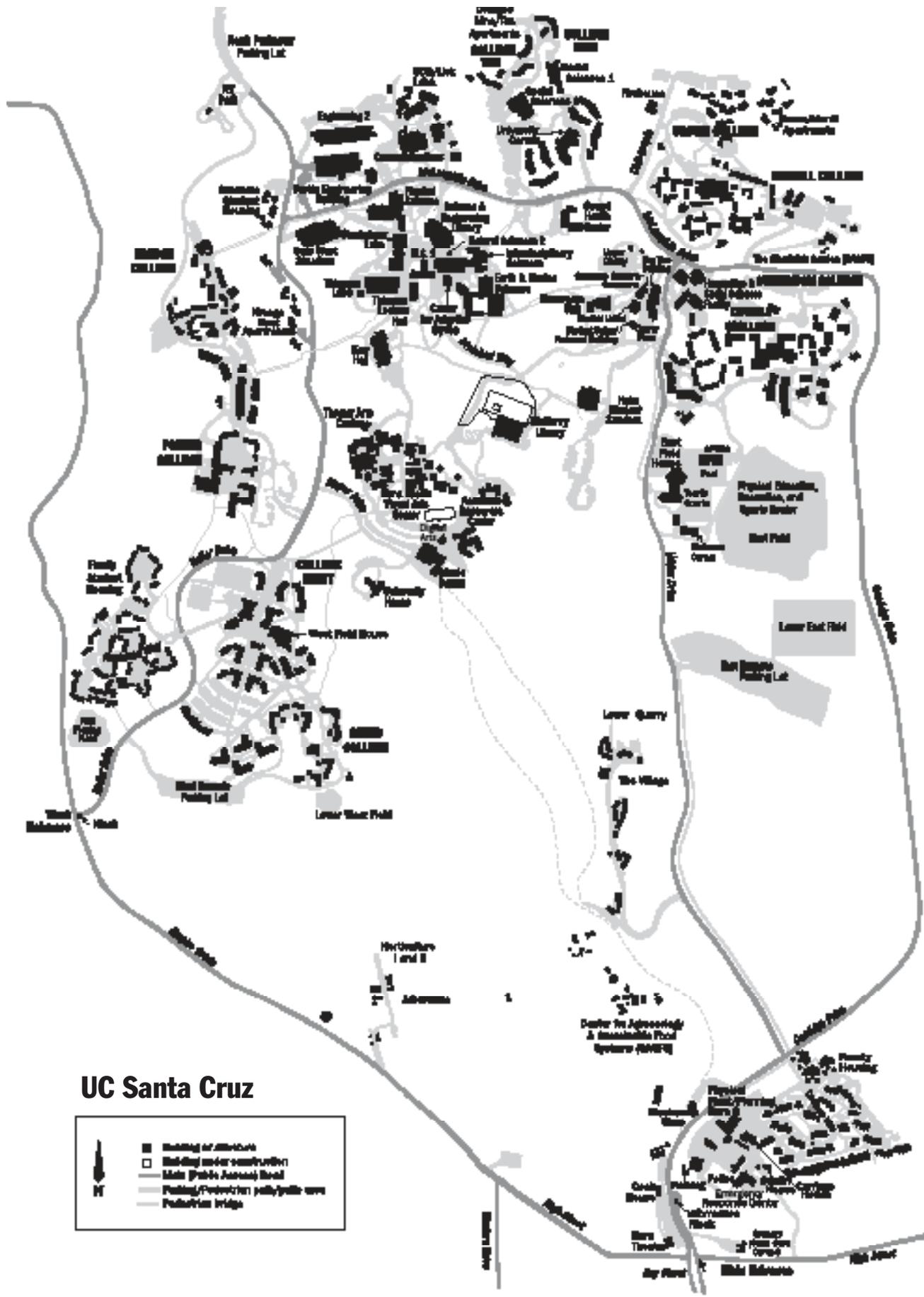
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