Programs and Courses

Numbering and Classification

The credit value of each course in quarter units is indicated for each term by a number in parentheses following the title. Departments may indicate the term in which they expect to offer the course by the use of: “F” (fall), “W” (winter), “S” (spring), “Summer.” The Schedule of Classes, at classes.ucr.edu, published several weeks before each term commences, lists the courses that will actually be offered for that term, along with their class hours and locations.

The class type, such as lecture or laboratory, and number of hours per week are listed in the first line of the description. The letters “A,” “B,” “C,” and “D” are used with the course numbers to indicate sequential order; they do not necessarily indicate that an earlier quarter in the sequence is a prerequisite to the later quarters; the prerequisites (if any) of a given course are stated in the description of that course. The letter designation “E-Z” immediately following a course number — for example, HIST 191 (E-Z) — indicates different topics offered under a general title; no specific instance of such a course, for example, HIST 191E, HIST 191F, or HIST 191G, may be repeated for credit unless otherwise indicated in the course description. The letters “E” through “Z” have no sequential implications. The letters “H,” “L,” or “P” immediately following a course number usually have special designations: “H” for an honors course, “L” for a laboratory course (usually in the sciences), and “P” for a proseminar. A grade is assigned by the instructor of the course.

The letters “A,” “B,” “C,” and “D” are used with the course numbers to indicate sequential order; they do not necessarily indicate that an earlier quarter in the sequence is a prerequisite to the later quarters; the prerequisites (if any) of a given course are stated in the description of that course. The letter designation “E-Z” immediately following a course number — for example, HIST 191 (E-Z) — indicates different topics offered under a general title; no specific instance of such a course, for example, HIST 191E, HIST 191F, or HIST 191G, may be repeated for credit unless otherwise indicated in the course description. The letters “E” through “Z” have no sequential implications. The letters “H,” “L,” or “P” immediately following a course number usually have special designations: “H” for an honors course, “L” for a laboratory course (usually in the sciences), and “P” for a proseminar. A grade is assigned by the instructor of the course.

Courses are numbered as follows:

1. **Lower-division**: 001–099; generally recommended for freshmen and sophomores.
2. **Upper-division**: 100–199; normally open only to students who have completed at least one lower-division course in the subject, or six quarters/four semesters of college work. Credit in special studies courses for undergraduates is limited to 5 units per quarter.
3. **Graduate**: 200-299; normally open only to students who have completed at least 18 upper-division quarter units basic to the subject matter of the course.

The admission of undergraduates to graduate courses is limited to upper-division students who have an overall scholarship average not lower than “B”; these limits are imposed by the rules of the Graduate Division. However, graduate courses completed before attaining the baccalaureate will not be accepted in partial fulfillment of requirements for the credential or minimum requirements in the 200 series for the master’s degree, except for undergraduate students who have received approval for backdating their graduate status to cover the session during which such courses were taken. See the Backdating Units section under Policies and Regulations.

4. **Professional courses for teaching credential candidates**: 300–399.
5. **Other professional courses**: 400–499.

Cross-listed Courses

Cross-listed courses share equivalent course content but are taught by two or more departments. Cross-listed courses generally share a course number, but each course is tied to a specific subject area and department. While prerequisites, unit coverage, and grading basis are identical for cross-listed courses, it may be preferable for students in certain degree programs to enroll under only one of the available subject areas. See an academic advisor to determine which subject area is most appropriate before enrolling in a cross-listed course.

To determine which courses are cross-listed, see individual course descriptions in this catalog or visit classes.ucr.edu.

UC Extension Courses

Students may earn credit toward bachelor’s and master’s degrees at the UC through University Extension. Acceptance of such credit is based on requirements of a particular college, division or department. Generally, preference is given to credits from courses numbered 001–099 and 100–199, prefixed by XR, XL, XI, XB, etc., indicating that such courses are intended to replicate regular offerings of a campus of the UC. Also, courses organized by University Extension, numbered 001–099 and 100–199, prefixed only with an X, are acceptable.

Extension credits are treated like transfer units from approved colleges. They apply toward unit requirements for a degree, but they do not count toward the requirements for residence. Resident students in the university must have advance approval from the appropriate dean for enrollment in UC Extension courses.

Credit earned in University Extension courses is not automatically applicable toward requirements for a master’s degree or university-recommended teaching credential and is permitted only in unusual circumstances. Students desiring such credit should consult with their graduate advisors and the Graduate Division before undertaking such courses.

Abbreviations

| AHS  | Art History |
| ANTH | Anthropology |
| ART  | Art |
| AST  | Asian Studies |
| BCH  | Biochemistry |
| BIEN | Bioengineering |
| BIOD | Biology |
| BLCN | Conservation Biology |
| BLSC | Biological Sciences |
| BMSC | Biomedical Sciences |
| BPSG | Botany and Plant Sciences |
| BSAD | Business Administration |
| BSWT | Basic Writing |
| BUS  | Business Administration |
| CBNS | Cell Biology and Neuroscience |
| CEE  | Chemical and Environmental Engineering |
| CHEM | Chemistry |
| CHFY | CHASS 1st Year |
| CHN  | Chinese |
| CLA  | Classical Studies |
| CMDB | Cell, Molecular, and Developmental Biology |
| CPAC | Comparative Ancient |
| CPLT | Comparative Literature |
| CRWT | Creative Writing |
| CS   | Computer Science |
| DANCE | Dance |
| ECON | Economics |
| EDUC | Education |
| EE   | Electrical Engineering |
| ENGL | English |
| ENGR | Engineering |
| ENRI | Environmental Sciences |
| ENTM | Entomology |
| ETX  | Environmental Toxicology |
| ENV  | Environmental Engineering |
| ETST | Ethnic Studies |
| EUR  | European Culture |
| FREN | French |
| GBST | Global Studies |
| GEN  | Genetics |
| GEO  | Geosciences |
| GER  | German |
| GRK  | Greek |
| HASS | Humanities, Arts, and Social Sciences |
| HISA | History of the Americas |
| HISE | History of Europe |
| HIST | History |
| HNPG | Honors Program |
| ITAL | Italian |
| JPN  | Japanese |
| KOR  | Korean |
| LABR | Labor Studies |
| LATN | Latin |
| LING | Linguistics |
| LNCR | Learning Center |
| LNST | Latin American Studies |
| LGBS | Lesbian, Gay, Bisexual, Intersexual, and Transgender Studies |
| LTGL | Literatures and Languages |
| LWSD | Law and Society |
| MATH | Mathematics |
| MBCL | Microbiology |
| ME   | Mechanical Engineering |
| MCSR | Media and Cultural Studies |
| MGMT | Management |
| MISE | Materials Science and Engineering |
| MUS  | Music |
| MASC | Natural and Agricultural Sciences |
| NEM  | Nematology |
| NRSC | Neuroscience |
| PBPL | Public Policy |
| PHIL | Philosophy |
| PHYS | Physics |
| PLPA | Plant Pathology |
| PORT | Portuguese |
| POSC | Political Science |
| PSYC | Psychology |
| RLST | Religious Studies |
| RUSN | Russian Studies |
| SEAS | Southeast Asian Studies |
| SOC  | Sociology |
| SPN  | Spanish |
| STAT | Statistics |
| SWSC | Soil and Water Sciences |
| TAG  | Tagalog |
| THEA | Theatre |
| URST | Urban Studies |
| VNM  | Vietnamese |
| WMST | Women's Studies |
| WRLT | World Literature |
Anthropology

Subject abbreviation: ANTH
College of Humanities, Arts, and Social Sciences

Thomas C. Patterson, Ph.D., Chair
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(951) 827-5524; anthropology.ucr.edu

Professors
Wendy Ashmore, Ph.D.
Christine Ward Gailey, Ph.D.
(Anthropology/Women’s Studies)
David B. Krongenfeld, Ph.D.
Yolanda Moses, Ph.D.
Sally Allen Ness, Ph.D.
Susan Osman, Ph.D.
Thomas C. Patterson, Ph.D.
Anne Sutherland, Ph.D.
Karl A. Taube, Ph.D.
Philip J. Wilke, Ph.D.

Professors Emeriti
Eugene N. Anderson, Ph.D.
Alan R. Beals, Ph.D.
Sylvia M. Broadbent, Ph.D.
Alan G. Fix, Ph.D.
Michael Kearney, Ph.D.
Martin Orans, Ph.D.
R. E. Taylor, Jr., Ph.D.
Carlos G. Vélez-Ibáñez, Ph.D.

Associate Professor
Scott L. Fedick, Ph.D.

Assistant Professors
Derick Fay, Ph.D.
T.S. Harvey, Ph.D.
Sang-Hee Lee, Ph.D.
Juliet McMullin, Ph.D.
Paul Ryer, Ph.D.
Christina Schwenkel, Ph.D.

Majors
Anthropologists study the way diverse groups of people understand and live in various settings ranging from urban environments to rural villages all over the world. They are interested in such questions as, What does it mean to be human? What activities define the social life of groups and how are they related? How do the members of groups communicate? What is the material evidence for their social and biological history? What are the historical, social, political, economic, and environmental forces that have helped to shape the experiences of particular groups of people, both in the past and in the contemporary world? and, How do human societies change and why? Anthropologists apply this knowledge for the benefit of the peoples whose communities they study.

Anthropology includes four broad subfields:
1. Sociocultural anthropology, the comparative study of communities in their local and global contexts
2. Archaeology, the investigation of past societies through their material and written remains
3. Biological anthropology, which focuses on the evolution of human beings as a species and the interaction of human biological variability with culture
4. Linguistic anthropology, which explores the interconnections of language, culture, thought, and social structure

Career Opportunities
Anthropology prepares students for dealing with the challenges of an increasingly international economy, transnationally connected communities, and multicultural citizens. Besides helping students hone and refine analytical skills and critical thinking, anthropology helps them recognize the impact of cultural dynamics on interpersonal communication and on the social structures that affect everyone’s daily lives.

Anthropology majors interested in pursuing graduate studies are excellent candidates for programs in anthropology, business, law, journalism, medicine, social work, urban planning, and almost any other profession that calls for working with people from a variety of backgrounds and in a number of different settings.

The skills and knowledge learned as an undergraduate anthropology major help students understand the connections between people. Anthropology majors who are not planning to pursue graduate or professional studies immediately can forge careers as teachers at the primary and secondary levels; interviewers; recruiters in executive and specialized employment agencies; staff and managers in various local, state, and federal governmental agencies as well as in a variety of national and international non-governmental organizations and community development organizations; archaeological field or laboratory technicians; intercultural communications professionals in hospitals and other organizations; or union organizers.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The Department of Anthropology offers the B.A. and B.S. degrees in Anthropology and the B.A. degree in Anthropology/Law and Society. The B.S. program is intended for those planning professional careers in anthropology or in the related fields mentioned above. The B.A. programs are intended for those desiring a broad liberal arts curriculum.

Anthropology Major
The major requirements for the B.A. and B.S. degrees in Anthropology are as follows:

1. Lower-division requirements (four courses at least 16 units)
   a) ANTH 001, ANTH 002, and either ANTH 003 or ANTH 005
   b) LING 020

2. Upper-division requirements
   a) Nine courses (at least 36 units) of upper-division Anthropology for the B.A.; 10 courses (at least 40 units) for the B.S.
   b) At least one upper-division course in each of the subdisciplines of anthropology:
      (1) Archaeology
      (2) Biological anthropology
      (3) Cultural and social anthropology
      (4) Linguistics

Note Students are strongly urged to take the lower-division requirements in the first two years of university study. Students intending to major in anthropology should work closely with a faculty advisor in planning their programs.

Anthropology/Law and Society Major
The major requirements for the B.A. degree in Anthropology/Law and Society are as follows:

1. Anthropology requirements
   All requirements for the B.A. in Anthropology. See Anthropology major above for specific requirements.

2. Law and Society requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWSO 100
   c) One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
   d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
   e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, PSYC 186, SOC 147, SOC 149, SOC 180
   f) LWSO 193, Senior Seminar

Note For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (Anthropology requirements and Law and Society requirements).

Minor
The Department of Anthropology offers a minor in Anthropology which consists of six upper-division courses (at least 24 units) and appropriate prerequisites as needed.

The courses are to be selected as follows:

1. Two upper-division courses in cultural anthropology from ANTH 102/ AHS 102, ANTH 121, ANTH 122, ANTH 124, ANTH 125, ANTH 127, ANTH 131, ANTH 132, ANTH 134, ANTH 135, ANTH 137, ANTH 138, ANTH 139, ANTH 144, ANTH 149/WMST 149, ANTH 160, ANTH 162, ANTH 163, ANTH 173 (ANTH 001 is the normal lower-division prerequisite for these courses.)
   2. Two upper-division courses from any one of the following subdisciplinary areas: (These courses normally entail an appropriate lower-division course in the given subdiscipline.)
a) Archaeology
   (1) Prerequisite: ANTH 003 or ANTH 005
   (2) Courses: ANTH 110, ANTH 111, ANTH 113, ANTH 117A, ANTH 117B, ANTH 118, ANTH 172, ANTH 178/WMST 178

b) Physical/Biological Anthropology
   (1) Prerequisite: ANTH 002
   (2) Courses: ANTH 107, ANTH 129, ANTH 146/PSYC 146, ANTH 150, ANTH 158, ANTH 159

c) Linguistic Anthropology
   (1) Prerequisite: LING 020
   (2) Courses: ANTH 120, ANTH 123, ANTH 167/LING 167

3. One area course from ANTH 115 (E-Z), ANTH 140 (E-Z), ANTH 161/LNST 161, ANTH 164/LNST 164, ANTH 168/ETST 148/LNST 168, ANTH 186/LNST 186

4. One methodological course from ANTH 112, ANTH 114A, ANTH 116, ANTH 155, ANTH 171, ANTH 180A, ANTH 183, ANTH 185

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR's International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program
The Department of Anthropology offers the M.A., M.S., and Ph.D. degrees in Anthropology.

Doctoral Degree
The graduate program transforms scholars into professional anthropologists who will variously engage in research, teaching, policy-related and/or administrative activities that benefit the people with whom they work. The program focuses on how people living in various settings participate in and adapt to processes of change and transformation, both historically and in the contemporary world. The faculty is committed to an integrated, socially engaged concept of the discipline. The traditional subfields — sociocultural anthropology, biological anthropology, archaeology, and linguistics — are crosscut by a series of concentrations that constitute areas of strength. The most developed concentrations are (1) the applied anthropology of transnational processes (inequality, migration) and the border and binational communities associated with globalization and the internalization of capital; (2) the archaeology of Mesoamerica and Western North America; (3) cultural and political ecology, and (4) Latin America. The department has close working relationships with other programs on campus.

The department is dedicated to educating the next generation of professional anthropologists. The faculty consists of active research scholars with solid records of publication, conducting original research, obtaining extramural grants, and placing graduate students in regional, national, and international labor markets. Aware of the current structures of employment, faculty prepare students to pursue both academic and nonacademic careers.

Admission
Applicants must supply GRE General Test scores, official transcripts from all institutions attended since high school, three letters of recommendation, a writing sample, and a personal statement specifying why they wish to undertake and complete graduate training at the UCR Department of Anthropology.

Course Requirements
During their first year, students complete the year-long seminar sequence ANTH 200A, ANTH 200B, and ANTH 200C (Core Theory in Anthropology). Students must acquire a basic understanding of three of the four subfields (sociocultural anthropology, biological anthropology, archaeology, and linguistics). To fulfill the breadth requirement, students must take at least two courses in two of the subfields outside their subfield of specialization. At least one course in each of the two subfields must be a graduate-level course. For students not specializing in sociocultural anthropology, one of the subfields selected for the breadth requirement must be sociocultural.

Language Requirement
Students must demonstrate at least a reading knowledge in one language other than English. In some cases, the student’s advisor may require knowledge of a second language. The choice of language(s) and the method of demonstrating competence should be determined in consultation with the student’s advisor. All students must file a Statement of Plan to Fulfill the Language Requirement by the end of the second quarter of their first year in residency. This includes students who are fully bilingual or whose primary language is not English. Competency may be demonstrated by the following:

1. Placing higher than level 3 in the Language Placement Examination,
2. Receiving a grade of at least “B” or “S” in a reading skills course or level 3 traditional language course, or
3. Alternative certification

In addition, students who plan to conduct fieldwork in a non-English setting must acquire conversational skills in the appropriate language before commencing fieldwork. Because language acquisition is a slow process, students are encouraged to begin language training early in their graduate program.

Methodological Skills Requirement
Students must demonstrate competency in a qualitative or quantitative methodological skill such as GIS, lithic analysis, statistics, or hieroglyphic analysis. The choice of methodological skill should be determined in consultation with the student’s advisor. All students must file a Statement of Plan to Fulfill the Methodological Skills Requirement by the end of the second quarter of their first year in residency.

Master's Examination
Students take the master's examination during the week of spring-quarter examinations of their first year. The examination is based on the material covered in the ANTH 200A, ANTH 200B, and ANTH 200C sequence and is required of all students, including those holding a master's degree from another institution. Depending on the student's performance on the test, the faculty will recommend one of the following:

1. Pass with Distinction or High Pass
   Automatic continuation in the Ph.D. program and award of the master's degree under Graduate Division Plan II.
2. Pass
   Awarding of the master's degree under Graduate Division Plan II, but a successful retake (Pass with Distinction or High Pass) is required to continue in the Ph.D. program.
3. Fail
   Master's degree not awarded, but one retake within six months is allowed for potential awarding of the master's degree under Graduate Division Plan II.

The Preliminary Research Statement
The Preliminary Research Statement is designed to present the research orientation for an intended dissertation topic and to explain how the student intends to develop and pursue the area of research. The statement should present a comprehensive plan of study and a timeline covering the remainder of the student's graduate career, and outline intended areas, theories, and methods. It should be considered a precursor to the materials developed later in the research proposal and the written qualifying examination. Designating a dissertation committee is part of completing the statement.

The Written Qualifying Examination
The Written Qualifying Examination is a research paper written during a specified two-week period. The examination question is generated by the faculty advisor in consultation with the student and the dissertation committee, and must be approved by the department before the student can begin the examination.
The Research Proposal prepares students to undertake dissertation research and provides, in part, the basis for the oral qualifying examination. The length and format of the proposal should be similar to that of a proposal for a major funding agency.

Students must give a Public Oral Presentation to the department, at the James Young Colloquium, or at a national or international meeting. This presentation is intended to provide the student with experience in presenting research papers in a public context.

The Oral Qualifying Examination involves a demonstration of general competence in anthropology, combined with an extended discussion of the proposed dissertation research (preparation, methodology, significance, etc.). Once students have satisfactorily fulfilled the courses requirement (including breadth requirement), language requirement, methodological skills requirement, master’s examination, preliminary research statement, written qualifying examination, research proposal, public presentation, and oral qualifying examination, they are advanced to candidacy for the Ph.D. and formally begin research for the dissertation.

Dissertation and Final Oral Examination (Dissertation Defense) After advancement to candidacy, students complete a dissertation representing original research within their field of specialization. Dissertations generally require a year of field research followed by an additional year of data analysis and write-up. After completing the dissertation (or a substantial portion of it), students present an oral, public defense of the dissertation.

Master’s Degree

The M.A. degree in Anthropology is normally awarded as part of the Ph.D. program, rather than as a separate degree objective.

Plan II (Comprehensive Examination). Candidates complete 36 units, of which at least 18 must be 200-series courses and must include the ANTH 200A, ANTH 200B, and ANTH 200C sequence, and pass a written comprehensive examination prepared by a departmental committee.

M.A. in Anthropology and Education

The M.A. is offered in cooperation with the Graduate School of Education; see the listing under Education or inquire at either office for further information.

M.S. Degree

Plan I (Thesis) Candidates must complete 56 units, of which at least 24 must be 200-series courses; courses for the area of specialization as specified by the department; and an acceptable thesis.

Lower-Division Courses

ANTH 001. Cultural Anthropology (4) Lecture, 3 hours; discussion, 1 hour. Basic contributions of anthropological theory to the understanding of human behavior and culture and the explanation of similarities and differences among human societies. The relevance of materials drawn from tribal and peasant culture to problems of the modern world. Discussion sections stress the application of anthropological methods to research problems. Credit is awarded for only one of ANTH 001 or ANTH 001H.

ANTH 001H. Honors Cultural Anthropology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ANTH 001. Basic contributions of anthropology to the understanding of human behavior and culture and to the explanation of similarities and differences among human societies. The relevance of materials drawn from tribal and peasant cultures to problems of the modern world. Discussion sections stress the application of anthropological methods to research problems. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ANTH 001 or ANTH 001H.

ANTH 002. Biological Anthropology (5) Lecture, 3 hours; discussion, 1 hour; individual study, 3 hours. A survey of past and contemporary human variation and evolution considered from the perspective of the fossil record, inferences from nonhuman primate biology and social behavior, and the forces of evolution.

ANTH 003. World Prehistory (4) Lecture, 3 hours; discussion, 1 hour. Examines the cultural history of humankind, from the beginning of tool-using behavior in the Old World to the rise of complex social and political systems (civilizations) in both the Old and New World.

ANTH 004. World Civilizations (4) Lecture, 3 hours; consultation, 1 hour. A survey of archaeological, anthropological, and historical perspectives relating to the study of the nature, origins, and development of civilizations in both the Old and New World. The history and culture of ancient Mesopotamia, Egypt, Mesoamerica (Mexico), and Peru will be emphasized.

ANTH 005. Introduction to Archaeology (5) Lecture, 3 hours; discussion, 1 hour; individual study, 3 hours. A general introduction to the aims and methods of archaeology, in the field and in the laboratory. Briefly surveys world prehistory as revealed by these methods.

ANTH 006. Introduction to World Music (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A survey of people, identity, and music making, includes listening to music from many cultural contexts. Also covers a variety of scholarly topics in world music. Cross-listed with MUS 006.

ANTH 010. Mysteries of the Ancient Maya (4) Lecture, 3 hours; outside research, 3 hours. An introduction to all aspects of the ancient Maya civilization of southern Mexico and Central America. The course will explore Maya origins, political organization, agriculture, art, religion, architecture, hieroglyphic writing, and the unexplained collapse of the civilization.

ANTH 012. Great Discoveries in Archaeology (4) Lecture, 3 hours; extra reading and written exercises, 3 hours. Introduces the methods and goals of archaeology through examples of “great discoveries” that have altered our understanding about the past. Explores discoveries from around the world, including such well-known examples as King Tut’s tomb, Pompeii, and the lost cities of the ancient Maya. Also covers lesser-known recent finds and the application of modern scientific technologies in archaeology.

ANTH 020. Culture, Health, and Healing (4) Lecture, 3 hours; consultation, 1 hour. Surveys health, disease, curing, and nutrition in a cross-cultural perspective. Covers how different cultural groups consider disease, health maintenance, and healing; how traditional beliefs about health and nutrition arise; and what we can and cannot learn from traditional health-seeking practices.

ANTH 027. Art of Pre-Columbian America (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. A survey course intended to provide an up-to-date background to the ancient art of Mexico, Central America, and the Andean region of western South America. The various peoples and art of pre-Columbian America are discussed according to the three broad cultural regions of Mesoamerica, the Intermediate Area (lower Central America and northwestern South America), and the Andean area. Lectures are illustrated with slides of particular sites and important examples of pre-Columbian art. Cross-listed with AHS 027.

ANTH 030. People, Plants, and Animals (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. An introduction to anthropological investigations of human uses of biotic resources. The course focuses on management: worldwide comparisons of strategies for domesticating, using, and conserving plants and animals; and worldwide search for better and more sustainable strategies.

Upper-Division Courses

ANTH 100. History of Anthropological Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. A survey of the history of theory in anthropology and the development of the discipline. Focuses on useful ideas from these theories and methods anthropologists have developed to study other societies.

ANTH 101. Contemporary Anthropological Theory (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Explores the core ideas in modern anthropology about culture and society. Covers basic issues of contemporary theory since the 1980s. Explores the new methodologies and application of theory to ethnography.

ANTH 102. Anthropology of Art (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Anthropological approaches to the study of art in traditional non-Western societies. Through specific readings and case studies from four geographic regions (North America, Southeast Asia, Oceania, and West Africa), the dynamic role of art in traditional societies is illustrated. Cross-listed with AHS 102.

ANTH 103. Introduction to Visual Anthropology (4) Seminar; 3 hours; outside research and projects, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. An introduction to the field of visual anthropology. Examines the similarities and differences between ethnographic film, critical studies, and written ethnographies. Explores the politics of representing other cultures visually. Cross-listed with MCS 103.
ANTH 104. Human Social Organization (4) Lecture, 3 hours; individual consultation as needed, 1 hour. An introduction to the study of families, clans, castes, classes, bureaucracies, factions, parties and other forms of human organization. Various aspects of recruitment, social control, communication, social ranking, exchange and conflict are discussed.

ANTH 105. Organizations as Cultural Systems (4) Lecture, 6 hours; extra reading and written exercises, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the role of culture in the formation and management of complex bureaucratic organizations. Covers types of organizations and organizational cultures, the impact of the cultural environment, and problems posed by rapid cultural change. Offered in summer only. Cross-listed with BUS 158.

ANTH 107. Evolution of the Capacity for Culture (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or ANTH 002 or ANTH 003 or relevant preparation in psychology or biology or consent of instructor. An examination of the evolution of the biological and social capacities that have made culture the central attribute of the human species. Topics include the evolution of human diet, tool-making, the family and kinship, and language.

ANTH 108. Anthropology of Global Media (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the global production, transmission, and consumption of mass media in diverse national and transnational contexts. Includes debates over the power of media, construction of knowledge of others, affective responses to images of violence, practices of self-representation; and the ways in which consumers accept, reject and negotiate media messages.

ANTH 109. Women, Politics, and Social Movements: Global Perspectives (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to “Third World" women's politics. Covers women's politics from a global perspective. Although international in breadth, emphasis is placed on South Asia, sub-Saharan Africa, and the Caribbean. Cross-listed with WMST 109.

ANTH 110. Prehistoric Agriculture (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural perspective on prehistoric agriculture as resource management, economic system, and political tool. Archaeological methods and theory of reconstructing agricultural systems and their role in prehistoric societies.

ANTH 111. People of the New World (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An archaeological perspective on spatial behavior from architectural design to regional economic systems. Provides an introduction to a broad range of issues and analytical perspectives with an emphasis on theoretical approaches and case studies.

ANTH 113. Ancient Households and Communities (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H; ANTH 003 or ANTH 005; or consent of instructor. Explores archaeological perspectives on households and communities. Discusses their composition, function, and meaning. Illustrates with specific cases from diverse cultural contexts. Topics include everyday life in ancient households and communities, social and economic reproduction, and long-term stability and change.

ANTH 114A. Lithic Technology I (4) Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): consent of instructor and either ANTH 003 or ANTH 005. Introduction to the technology of core-and-flake stone tools. Principles of fracture, quarrying, reduction, heat treatment, core technology, and production and use of flaked stone tools in core-and-flake assemblages. Assemble formation processes and their interpretation.

ANTH 114B. Lithic Technology II (4) Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): ANTH 114A and consent of instructor. The technology of core-and-blade industries, ground-stone industries, and millstone industries. Percussion- and pressure-blade reduction sequences and strategies, emphasizing quarrying, initial reduction, core production, blade production, and production and use of tools from blades. Technology and production of ground-stone tools, and the quarrying of raw material and production of millstones. Assemble formation processes and their interpretation.

ANTH 114C. Lithic Analysis (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ANTH 114A, ANTH 114B, or consent of instructor. Characterization, analysis, and interpretation of stone tool assemblages, with emphasis ondebitage.

ANTH 115. (E-Z). Archaeological Interpretations (4) for hours and prerequisites, see segment descriptions. Study of the prehistory of different regions of the world. Emphasis is on the method and theory underlying archaeological investigations of the nature of people and culture and the course of human development.

ANTH 115E. North American Prehistory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. Interpretation of the archaeological record of North America from initial peopling of the continent to the historic period.

ANTH 115M. Prehistory of California (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. A survey of prehistoric cultures of California from the earliest settlement to the historic period.

ANTH 115Q. Great Basin Culture History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 and either upper-division standing or consent of instructor. Prehistory and ethnography of the Great Basin. Topics include the earliest dated archaeological Lith-stage manifestations, regional and temporal expressions of the Western Archaic, Formative Anasazi and Fremont developments, and the Numic peoples. Emphasis will be on technology and cultural ecology.

ANTH 115R. Archaeology of Eastern Mesoamerica (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. An introduction to Mayan archaeology intended to provide an overview of ancient Maya cultural history from the Formative period to the time of Spanish contact. During the course, particular Maya sites will be described in detail.

ANTH 115S. Archaeology of Western Mesoamerica (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. An introduction to the archaeology and cultural history of the New World nuclear area of Western Mesoamerica from the occupation of this area before 10,000 years ago to the arrival of Spanish Europeans in A.D. 1519.

ANTH 115T. Prehistory of the Southwest (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. Surveys the prehistoric cultures of the American Southwest from earliest settlement to the historic period.

ANTH 115U. Andean Prehistory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. A description of Andean culture history, emphasizing Peru, from the earliest documentation of human occupation to the Spanish conquest of the Inca. Topics include origins of food production, early ceremonial architecture, Paracas textiles, the Nasca lines, Moche iconography and ritual, and Inca architecture. Discussion of major sites and their architecture, ceramics, sculpture, and other archaeological remains.

ANTH 115X. Ancient Oaxaca (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H, ANTH 003 or ANTH 005; or consent of instructor. Explores current understanding about ancient Zapotec, Mixtec, and neighboring cultures in Oaxaca, Mexico, the location of the earliest Mesoamerican state system and one of its earliest cities.

ANTH 116. Dating Methods in Archaeology and Paleoanthropology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. A descriptive introduction to Quaternary physical dating methods and their application in archaeology and paleoanthropology.

ANTH 117A. History of Old World Archaeology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. A review of the intellectual, social, and historical background to the development of prehistoric and historic archaeology of the Old World (Africa and Eurasia), including the historical context to the rise of human paleontological and paleoanthropological studies. Particular attention is given to the evolution of ideas about prehistoric and historic chronology.

ANTH 117B. History of New World Archaeology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. A review of the intellectual, social, and historical background to the development of prehistoric and historic archaeology of the colonial and industrial New World (Western Hemisphere and Oceania). Particular attention is given to the evolution of ideas about prehistoric and historic chronology.

ANTH 118. Origins of Cities (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or ANTH 003 or ANTH 005 or consent of instructor. Explores new forms of social, economic, and political organization that developed with the advent of cities. Examines case studies of the rise of urbanism in both the Old and New Worlds to investigate how and why cities emerged and consolidated.

ANTH 119. The Anthropology of Tourism (4) Lecture, 3 hours; extra reading, 1 hour; field, 1 hour; term paper, 1 hour. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Surveys the central problems and issues in the anthropological study of tourism.
Main topics include the place of tourism in the global economy, the impact of tourism on cultural identity and culture change, environmental issues in tourism development, and tourism as a form of cross- and multicultural communication. Credit is awarded for only one of ANTH 119 or ANTH 280.

ANTH 120. Language and Culture (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): ANTH 001 or ANTH 001H, LING 020, upper-division standing, or consent of instructor. Covers the interrelations among language, culture, and habitual behavior; the classification of languages; and anthropological uses of linguistic evidence.

ANTH 121. Anthropological Theories of the Arts (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Anthropological theories of the arts with emphasis on folk and traditional forms. Oral and written literature will be featured, but theories of musical, visual, and other arts will be discussed.

ANTH 122. Economic Anthropology (4) Lecture, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H, ECON 001; or consent of instructor. An approach to the problem of economic development based on the perspectives furnished by anthropological investigations in the less industrialized societies.

ANTH 123. Linguistic Anthropology (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): LING 020, or consent of the instructor. Course will cover the application of linguistic techniques to studies of other symbolic and social fields, the analysis of semantic systems, and the use of linguistic techniques for prehistory.


ANTH 125. Kinship Organization (4) Lecture, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. An introduction to theories of social organization through consideration of relationships among kin.

ANTH 126. Southeast Asian Performance (4) Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the roles and genres of expressive culture in Southeast Asia, including dance, music, theater, film, and digital culture. Performance is discussed both as a time-honored and as a contemporary medium for cultural production, from the courts to everyday experience. Material will be drawn from the Philippines, Malaysia, Indonesia, Thailand, Laos, Cambodia, Vietnam, Burma, Singapore, and the Southeast Asian diaspora. Cross-listed with AST 123, DNCE 123, and MUS 123.

ANTH 127. Political Anthropology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Examines the intersections of power and sexual politics. Social and political differences are produced, perpetuated, and challenged in societies around the world. Studies the politics of culture, ethnicity, nationalism, and power.

ANTH 128. Performing Arts of Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in four major geocultural regions of Asia: Central, East, South, and Southeast. No western music training is required. Course is repeatable to a maximum of 8 units. Cross-listed with AST 128, DNCE 128, MUS 128, and THEA 176.

ANTH 129. Human Evolutionary Ecology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Application of evolutionary ecological theory to the understanding of human social behaviors and culture. Topics include foraging strategies and habitat use and cooperation and competition concerning resources in social groups.

ANTH 130. Cross-Cultural Perspectives on Dance (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Course will survey anthropological writings on dance traditions found around the world. With a view to understanding dance from a global perspective, topics covered include dance as an expression of social organization and social change, dance as religious experience, and dance as play/sport. Cross-listed with DNCE 130.

ANTH 131. Applied Anthropology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Applies anthropology to current issues such as community development, education, health, public administration, and conflict.

ANTH 132. Cultural Ecology (4) Lecture, 3 hours; outside research; 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Application of evolutionary ecological theory to the understanding of human social behaviors and culture. Topics include foraging strategies and habitat use and cooperation and competition concerning resources in social groups.

ANTH 134. Anthropology of Resource Management (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Anthropological approaches to the study of resource use and management in cross-cultural perspectives. Issues include conservation, development, sustainability, and common property management. Special attention is paid to management of plant and animal resources in foraging, farming and fishing communities.

ANTH 135. Nutritional Anthropology (4) Lecture, 3 hours; consultation, 1 hour. Food and nutrition in culture; world problems of malnutrition and nutritional improvement and how anthropology can contribute to their solution; explanations of cultural foodways; development and change of human eating patterns.

ANTH 136. Anthropological Perspectives on Gender in Southeast Asia (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the intersections of gender, power and sexuality in post-colonial Southeast Asia. Reviews early ethnographic claims of gender equality. Addresses current anthropological literature on the effects of colonialism, capitalism and globalization on gender roles and gender relations within national and transnational contexts.

ANTH 137. Anthropology: The American Tradition (4) Lecture, 3 hours; outside research, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the many varied native cultures of the Greater Southwest. Major differences as well as similarities in the forms of language, social organization, religion, and material culture occurring in the Greater Southwest will be defined and described. The peoples of the Greater Southwest are considered, not only in terms of the ethnographic present, but also through a diachronic perspective, from the prehistoric past through the Spanish colonial era to the present.

ANTH 140F. California Indian Peoples (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A survey of the life-ways of Indian peoples of California at the time of Euro-American contact, the history and effects of contact, and contemporary conditions.

ANTH 140G. Anthropological Perspectives in Africa (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A number of African cultures are carefully examined in terms of three or four anthropological topics, such as: subsistence patterns, social organization, and religious systems. The treatment of these cultures follows a brief overview of the geography, history, and linguistic patterns of Africa.

ANTH 140-L. Cultures of Southeast Asia (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): ANTH 001 or ANTH 001H or equivalent. Anthropological interpretations of culture and society in southeast Asia, including Indonesia; topics include prehistory, ethnic groups, social organization and structure, human ecology, folk and high culture, etc.

ANTH 140U. The Andes, Past and Present (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H, upper-division standing; or consent of instructor. Provides an overview of Andean society, past and present. Examines the colonial matrix in which Iberman and Andean social, political, and cultural forms came together. Uses ethnographies, indigenous narratives, and film about contemporary Andean society to address issues of class, ethnicity, gender, and the politics of representation.
have renegotiated their relationships with medicine through health movements and alternative healing practices. Cross-listed with WMST 185.

**ANTH 144. Hunters and Gatherers (4)** Lecture, 3 hours; consultation, 1 hour. An overview of hunter-gatherer cultures including a survey of selected ethnographic cases with special emphasis on the relevance of the hunting-gathering way for anthropological theory. Topics will include: subsistence strategies, the organization of bands, and models for prehistoric populations.

**ANTH 145. Sexualities and Culture (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): WMST 001 or consent of instructor. Examines the field of sexuality studies using a comparative, cross-cultural approach. Emphasizes the relation between culture, history, and political economy in the emergence of sexual practices and sexualized identities. Examines theories of sexuality and identity, with particular attention to violence, human rights, and political agency. Cross-listed with WMST 103.

**ANTH 146. Primat Social Behavior (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 002 or PSYC 002. Considers social organization and behavior in monkeys and apes, with emphasis on the adaptive aspects of social patterns and the relevance of primate studies to human evolution. Cross-listed with PSYC 146.

**ANTH 147. Reproduction: Policies, Politics, and Practices (4)** Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing. Examines reproductive policies, politics, and practices from a cross-cultural and historical perspective. Discusses political and economic processes and sociocultural dynamics, population control, sex preference, infanticide and neonatal neglect, adoption and foster parenting, abortion, technologically assisted conception, and gestational surrogacy. Cross-listed with WMST 140.

**ANTH 148. Gender and the State (4)** Lecture, 3 hours; extra reading, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the various meanings of gender as it is articulated in, reproduced by, and shaped within the state. Discusses gender-state relations, the engendering of politics, state functions, policy, and politics in various historical, political, cultural, and social contexts. Cross-listed with WMST 150.

**ANTH 149. Gender, Kinship, and Social Change (4)** Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): WMST 001. Examines theories of gender and kinship, the formulation of gender hierarchies and their uneven development, and the dynamics of “family” and gender in stratified social formations. Analyzes the relationship between family forms and political and economic processes. Cross-listed with WMST 149.

**ANTH 150. Human Microevolution (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): ANTH 002; relevant preparation in the life sciences; or consent of instructor. Covers methods of classical and population genetics applied to the understanding of evolution and variation in contemporary human populations.

**ANTH 152. Evolution of the First Hominids (4)** Lecture, 3 hours; outside research, 1 hour. Prerequisite(s): ANTH 002 or consent of instructor. Examines human evolution in the first five million years; examines the fossil record and incorporates data from paleoanthropology and genetics. Topics include hominoid evolution in the Miocene, origin models of the human lineage, and the first ancestral humans.

**ANTH 153. Evolution of the Genus Homo (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 002 or consent of instructor. Explores human evolution in the last two million years; examines the fossil record and incorporates data from archaeology and genetics. Topics include origins of genus Homo, world-wide dispersals, Neandertals, and origins of modern humans.

**ANTH 154. Research Methods in Biological Anthropology (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 002 or consent of instructor. Introduces quantitative research methods in biological anthropology. Topics include the history of scientific approach in American anthropology, statistics, data resampling, evolution, and variation.

**ANTH 155. Human Osteology (4)** Lecture, 2 hours; discussion, 1 hour; outside research, 3 hours. Prerequisite(s): consent of instructor. An in-depth study of the human skeleton, including bone biology, functional morphology, fragment identification, reconstruction, forensic methods, and curation techniques. Useful for anthropologists and those intending careers in medicine, physical therapy, and forensics.

**ANTH 156. Advanced Osteology (4)** Lecture, 2 hours; discussion, 1 hour; outside research, 3 hours. Prerequisite(s): ANTH 155 or consent of instructor. Further study of the human skeleton, emphasizing applications in anthropological contexts and preparation for professional careers in archaeology, forensics, and paleontology.

**ANTH 158. Biological Approaches to Medical Anthropology (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 002 or consent of instructor. Introduces medical anthropology from the biological perspective. Explores topics on evolution, health, and medicine; human biological variation in relation to disease; bioarchaeology; and the history of health. Takes the integrative and multidisciplinary approach.

**ANTH 159. Demographic Anthropology (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or ANTH 003 or ANTH 005 or consent of instructor. Applies demographic theory and methods to problems in cultural, archaeological, and biological anthropology.

**ANTH 160. Political Economy of Health (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Examines critical medical anthropology. Focuses on the linkages between political economy, health, and healthcare systems in modern societies. Considers the effects of poverty, occupation, and environmental transformation in particular social contexts. Looks at four case studies: the political economy of HIV/AIDS, poverty, famine, and nuclear regulation.

**ANTH 161. Indigenous People and the State in Latin America (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Reviews the historical processes and regional circumstances that have governed relations between indigenous peoples and Latin American states. Studies concepts of nationalism, ethnicity, and the state in the context of indigenous efforts to resist assimilation and to gain limited autonomy. Compares with the problems and prospects of multiracial societies worldwide. Cross-listed with LNST 161.

**ANTH 162. Culture and Medicine (4)** Lecture, 3 hours; consultation, 1 hour. Interrelations of health, disease, and culture; cross-cultural comparisons of “health,”

**ANTH 140P. Cultures of the Pacific (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or consent of instructor. Overview of contemporary societies, focusing on the contribution of Mesoamerican ethnography to the understanding of the cultures and societies of Mexico in historical and global perspective. Emphasis on agrarian communities and the contributions of Mesoamerican ethnography to general anthropological theory.

**ANTH 140T. The Peoples of Mexico in Historical and Global Perspective (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Survey of the cultures and societies of Mexico in historical and global perspective. Emphasis on agrarian communities and the contributions of Mesoamerican ethnography to general anthropological theory.

**ANTH 140V. Agriculture and Rural Society in Mexico: Past and Present (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The evolution of rural Mexico: from origins of Mesoamerican agriculture to the rise of high civilizations; from the establishment of the colonial system to the demise of colonial agricultural institutions; from the revolution of 1910 to the enactment of land reform and development programs. The role of peasantry in the making of the modern state is emphasized.

**ANTH 141. Database Design for Anthropology (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing in Anthropology; consent of instructor. A study of the skills necessary for design and development of databases for anthropological and archaeological data. Covers assessing requirements for, planning, designing, and constructing databases that are easily connected to and used by database management and geographic information systems software.

**ANTH 142. Geographic Information Systems (GIS) Software for Anthropology (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing in Anthropology; consent of instructor. Provides students with a focused background in geographic information systems (GIS) theory and practical software applications for anthropology. Addresses spatial ontological concepts and showcases how they have been applied to anthropological issues around the world. Includes hands-on experience in the use of GIS and related software.

**ANTH 143. Gender, Race, and Medicine (4)** Lecture, 3 hours; written work, 1 hour; extra reading, 1 hour; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores the relationship between Western medicine and women, racial minorities, and non-Western citizens. Investigates how gender ideology, racial inequity, and colonialism shape the medical representation of bodies, sexuality, and pathology. Examines how patients
“disease” and “curing” concepts; effects of cultural behavior on health and illness. Special focus on traditional societies and their belief systems, and on the effects of cultural change (historical and modern) on illness and curing.

**ANTH 163. Transnational and Global Communities (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical survey of recent anthropological and related research and theory concerning transnational and global sociocultural processes. Special emphasis on transnational, diasporic, and other unbound communities; borderlands; and the impact of global media and communication on transnational migration on community and identity.

**ANTH 164. Gender and Development in Latin America (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Discusses the role and contribution of Latin American and Caribbean women within their societies. The effects of national economic development policies upon their status and their participation in and integration into the policy-making process are emphasized. Cross-listed with LNST 164 and WMST 164.

**ANTH 165. Cognitive Anthropology (4)** Lecture, 3 hours; consultation, 1 hour. The structure of the knowledge of cultural domains; systems of knowledge in different cultures examined in the light of theories of how people learn them, store them, and use them.

**ANTH 166. Cultural Perspectives of Cancer (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Examines how cancer has been perceived and described by biomedical and public health practitioners, anthropologists, and social scientists. Interdisciplinary approach focuses on the historical, political, and cultural dimensions that inform our understanding of cancer in particular and disease in general. Topics include illness narratives, risk, epidemiology, and unequal disease distribution and treatment.

**ANTH 167. Structural/Descriptive Linguistics (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): LING 200 or consent of instructor. An overview, from the original sources, of the contribution of major figures and schools in linguistics from Saussure through early Chomsky. Cross-listed with LING 167.

**ANTH 168. Caribbean Culture and Society (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of the Caribbean region from a historical, cultural, and political perspective. Emphasis on contemporary issues affecting the Caribbean, and the struggle of its people to maintain their identities. Cross-listed with ETST 148 and LNST 168.

**ANTH 169. From the Maghreb to the Middle East (4)** Lecture, 3 hours; written work, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): ANTH 001 or ANTH 001H or GBST 001 or GBST 002 or consent of instructor. An introduction to the peoples and societies of North Africa and the Middle East. Follows the travels of Ibn Battutah, Ibn Khaldun, and Rafik al Tahtawi. Topics include religion, migration, gender, political organization, the global Middle East, Orientalism, and cultural production. Cross-listed with GBST 169.

**ANTH 170. Ethnobotany (4)** Lecture, 2 hours; seminar, 1 hour; discussion, 1 hour. Prerequisite(s): BIOL 104/BPSC 104, or consent of instructor. Introduces students to ethnobotanical research by reviewing selected ethnobotanical studies. Topics covered by lectures include fundamental principles of ethnobotany, the search for new medicines and other products made from plants, the role of humans in plant evolution, and the impact of plants on human cultures. Discussions focus on the past and present role of humans in plant conservation and the search for sustainable management practices in agriculture and forestry. Seminars by invited guests and enrolled students present selected topics in ethnobotany. Cross-listed with BPSC 170.

**ANTH 171. Field Course in Maya Archaeology (4-12)** Lecture, 2 hours; laboratory, 3-6 hours; field, 3-24 hours. Prerequisite(s): either ANTH 003 or ANTH 005 and consent of instructor. Archaeological surveying and excavation, including training in site mapping, use of satellite-based Global Positioning Systems, natural resource surveying, and field laboratory techniques.

**ANTH 172. Archaeological Theory and Method (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. A historical survey of conceptual and methodological approaches to understanding the archaeological record. Topics include a priori assumptions, unit concepts, goals, models, and research strategy.

**ANTH 173. Social Meanings of Space (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the range of meanings attached to spaces and places, from small-scale expressions such as houses to larger ones such as cities and landscapes. Explores how spaces can reflect and foster social conflict or social unity. Through a study of diverse cultural traditions, considers both the architecture and occupied but “unbuilt” spaces in ancient and current societies.

**ANTH 174. Anthropology and Film (4)** Lecture, 3 hours; extra reading, 30 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. Explores the history of anthropological representations of culture through film and the debates over the production of ethnographic knowledge. Examines shifts in film from a product of ethnographic research to an object of anthropological inquiry. Studies include horror, war, ethnographic, and indigenous films in relation to race, class, gender, sexuality, and nationhood.

**ANTH 175A. Anthropological Research: Basic Techniques (4)** Lecture, 3 hours; consultation, 1 hour. Includes basic data gathering procedures in anthropological field work such as censuses, maps, surveys and genealogies.

**ANTH 175B. Anthropological Research: Specialized Techniques (4)** Lecture, 3 hours. Includes ethnographic field techniques such as the aggregation of open-ended data, frame elicitation, componential analysis, collection of quantitative data, behavioral observation, and social-cultural inferences from geographical and spatial distributions.

**ANTH 176. Music Cultures of Southeast Asia (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in the Philippines, Indonesia, Malaysia, Thailand, Myanmar (Burma), Laos, Cambodia, and Vietnam. Designed for the student interested in the performing arts and cultures of mainland and insular Southeast Asia. No Western music background is required. Cross-listed with AST 127, DNCE 127, ETST 172, and MUS 127.

**ANTH 177. Gender, Sexuality, and Music in Cross-Cultural Perspectives (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of gendered performance genres from a number of cultures. Seeks to familiarize the student with gender-specific music and notions of gender that are often constructed, maintained, transmitted, and transformed through music and performance. Designed for students interested in music, anthropology, and gender studies. Cross-listed with MUS 126 and WMST 126.

**ANTH 178. Gender and Archaeology (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or ANTH 005 or WMST 001 or consent instructor. Considers gender roles in ancient and historically recent human societies, as well as how gender has shaped archaeological investigation. Cross-listed with WMST 178.

**ANTH 179. Gender, War, and Militarism (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines politics of militarization in relation to gender, race, and sexuality in national and international contexts of war. Explores ideologies and representations of masculinity and femininity in discourses of militarism. Topics include war crimes; contestations over historical memory; effects of militarization on gender roles; cults of heroism; and peace activism.

**ANTH 180A. Introduction to Anthropological Methods and Techniques (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or ANTH 003 or ANTH 005; a major or minor in Anthropology, or consent of instructor. Strongly recommended for anthropology majors and minors. Surveys methods and techniques utilized in archaeology, cultural anthropology, and physical anthropology. Explores the epistemology of scientific discourse; debates in ethnography, linguistics, and processual and poststructural archaeology; and techniques in physical anthropology, with an emphasis on demographic, epidemiological, and genetic analysis.

**ANTH 180B. Research Methods and Techniques in Cultural Anthropology (4)** Lecture, 3 hours; fieldwork, 30 hours per quarter. Prerequisite(s): ANTH 180A or consent of instructor. Considers gender roles in anthropological research and secondary data, and coding and analysis of qualitative data.

**ANTH 180C. Anthropological Field Research (4)** Lecture, 2 hours; outside research, 6 hours. Prerequisite(s): ANTH 180A; ANTH 180B or ANTH 183 or ANTH 184 or ANTH 185; or consent of instructor. Introduces students to the process and problems of conducting field research in the local region. Topics include construction of research problems, research design, research implementation, preparation of human subject protocols, strategies of data collection and analysis, and report preparation.

**ANTH 183. Methods of Archaeological Analysis (4)** Lecture, 2 hours; laboratory, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 003 or ANTH 005 or consent of instructor. Description and classification of archaeological materials including laboratory work in cataloging and documentation, methods used in artist typology and seriation, and the preparation of reports for publication.
ANTH 184. Field Course in Anthropology (4-16) field research, variable. Prerequisite(s): ANTH 175A or consent of the instructor. Study with a qualified professional at selected research sites with on-site supervision. In their major, with consent of instructor. Trains students in field surveying and documenting historic and aboriginal archaeological sites. Covers satellite-assisted electronic location, cadastral survey location, Universal Transverse Mercator grid coordinates, field mapping, recording environmental parameters, characterizing assemblage, assessing significance, and using archaeological information center.

ANTH 185. Field Course in Archaeology: Survey and Documentation (4) Lecture, 1 hour; discussion, 1 hour; field, 6 hours. Prerequisite(s): ANTH 003 or ANTH 005; upper-division standing; consent of instructor. Systematic and historical treatment of the people, concepts, and research that have contributed to the development of anthropology. Covers the early history of anthropology, up to the rise of structural-functionalism.

ANTH 186. People and the Environment in Latin America (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An interdisciplinary course focusing on the study of the relation between human communities and the environment in Latin America. Examines environmental problems and policies. Cross-listed with LNST 166.

ANTH 190. Special Studies (1-5) Prerequisite(s): consent of instructor. Independent study and research by qualified undergraduate students under supervision of a particular faculty member. With consent of instructor, may be repeated without duplication of credit.

ANTH 191. Seminar in Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines contemporary issues and topics in anthropology that are not part of the regular curricular offerings. Content of the course varies and is announced as the course is offered. Course is repeatable to a maximum of 16 units.

ANTH 195A. Senior Thesis (4) Optional for anthropology majors; open to senior students having a “B” average in their major, with consent of instructor. Graded In Progress (IP) until ANTH 195A, ANTH 195B, and ANTH 195C are completed, at which time a final grade is assigned.

ANTH 195B. Senior Thesis (4) Optional for anthropology majors; open to senior students having a “B” average in their major, with consent of instructor. Graded In Progress (IP) until ANTH 195A, ANTH 195B, and ANTH 195C are completed, at which time a final grade is assigned.

ANTH 195C. Senior Thesis (4) Optional for anthropology majors; open to senior students having a “B” average in their major, with consent of instructor. Graded In Progress (IP) until ANTH 195A, ANTH 195B, and ANTH 195C are completed, at which time a final grade is assigned.

ANTH 199H. Senior Honors Research (1-5) research, variable. Independent work under the direction of members of the staff. With consent of instructor, may be repeated without duplication of credit.

Graduate Courses

ANTH 200A. Core Theory in Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing in Anthropology or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about human origins, the origins of human society, the transformation of nature, work, and the built environment.

ANTH 200B. Core Theory in Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing, ANTH 200A; or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about diversity; the origins of inequality; language; power; knowledge systems; and the politics of representation.

ANTH 200C. Core Theory in Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing, ANTH 200A, ANTH 200B; or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about aesthetics, history, capitalism, imperialism, decolonization, globalization, transnationalism, cultural politics, violence, and human rights.

ANTH 203. Southeast Asian Cultures (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about the transformation of nature, work, and the built environment.

ANTH 209. Field Course in Maya Archaeology (4-12) Lecture, 2 hours; laboratory, 3-6 hours; outside research, 0-3 hours; field, 3-21 hours. Prerequisite(s): graduate standing and consent of instructor. Archaeological survey and excavation, including training in site mapping; use of satellite-based Global Positioning Systems; natural resources surveying; and field laboratory techniques. Course is repeatable to a maximum of 36 units with consent of instructor and approval of a research plan by the department chair.

ANTH 210A. Description and Inference in Anthropology (4) Seminar, 3 hours; outside research, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An examination of the modes of defining concepts and relations, developing and framing theories, and relating data to theory in anthropology; analysis of representative attempts to describe and explain behavior; and practice in carrying out simple analyses.

ANTH 210B. Professionalism in Anthropology (4) Seminar, 3 hours; outside research, 1 hour; extra reading, 1 hour; proposal preparation, 1 hour. Prerequisite(s): graduate standing and consent of instructor. Classroom, laboratory, and field instruction in the analysis of human variation and evolution, the structure of human populations, and the biocultural environments of humans. Course is repeatable as topics change.

ANTH 218. Ancient Maya History and Religion (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Along with describing major historical figures and religious concepts of the ancient Maya, this course describes the analytic approaches used for the study of ancient Maya writing and art. The pioneering work of the nineteenth century as well as the most recent findings in the ongoing process of decipherment and iconographic interpretation will be discussed. Basic background needed to begin original research and interpretation will be provided.

ANTH 220. Theoretical Archaeology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the foundational theories of archaeology, the underlying networks of assumptions, and contemporary theoretical developments in the field.

ANTH 250A. Seminar in History and Theory of Anthropology: Beginnings (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Systematic and historical treatment of the people, concepts, and research that have contributed to the development of anthropology. Covers the period in which much of anthropology was dominated by structural-functionalism, constructivism, and related approaches.

ANTH 250B. Seminar in History and Theory of Anthropology: 1920-1970 (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about the rise of social functionalism, the transformation of nature, work, and the built environment.

ANTH 250C. Seminar in History and Theory of Anthropology: 1970 to Contemporary Times (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about the rise of social functionalism, the transformation of nature, work, and the built environment.

ANTH 251. Theory and Method in Mexican Ethnography (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about the rise of social functionalism, the transformation of nature, work, and the built environment. Major streams of thought framing the substance and approaches of rural and urban ethnographies of Mexico are examined.

ANTH 252. Seminar in Archaeology (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Studies in culture history and in the data and methods of archaeological research. Course is repeatable as topics change.

ANTH 253. Seminar in Physical Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the analysis of human variation and evolution, the structure of human populations, and the biocultural environments of humans. Course is repeatable as topics change.

ANTH 255. Feminism, Gender, and Archaeology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Considers feminist perspectives on past human societies, as well as how feminism and gender have shaped archaeological research design. Examines how gender relates to careers in archaeology.

ANTH 256. Seminar in Cultural Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the foundational theories of anthropology and how these inform current discussions about the rise of social functionalism, the transformation of nature, work, and the built environment.
instructor. Provides focused coverage of concepts, theory, and methods central to various subfields in cultural anthropology. Course is repeatable as topics change.

ANTH 258. Space and Place in Archaeology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines concepts of space and place in archaeology. Explores how spaces can reflect and foster social conflict or unity through studies of diverse cultural traditions. Considers both the architecture and occupied but unbuilt spaces in ancient and current societies.

ANTH 259. Seminar in Anthropological Linguistics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Studies in the concepts, methods, and data pertinent to anthropological linguistics.

ANTH 261. Anthropology of the Body (4) Seminar, 3 hours; written work, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines cultural anthropology's treatment of the body as both a subject and object of social processes through recent and classic texts. Aims to ground theoretical inquiry in ethnographic and historical materials through the examination of bodies across time and space.

ANTH 262. Seminar in Medical Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the political and methodological underpinnings of medical anthropology, including the cultural construction of health and disease, the nature of the therapeutic process, and how social structures contribute to inequality and suffering.

ANTH 263. Seminar in Ecological Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys major topics in medical anthropology. Examines the theoretical and methodological underpinnings of medical anthropology, including the cultural construction of health and disease, the nature of the therapeutic process, and how social structures contribute to inequality and suffering.

ANTH 264. Codices of Ancient Mexico (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Major manuscripts of the pre-Hispanic and contact periods of Mesoamerica will be reviewed. Special focus will be on the ancient codices of the Maya, Aztec, Mixtec, and the unprovenienced Borgia Group.

ANTH 265. Seminar on Anthropology of Visual Culture (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. The major manuscripts of the pre-Hispanic and contact periods of Mesoamerica will be reviewed. Special focus will be on the ancient codices of the Maya, Aztec, Mixtec, and the unprovenienced Borgia Group.

ANTH 266. Seminar on History and Memory (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines contestations over historical representations and narratives, as well as the ways in which history and memory are shaped and contested by competing claims to power, legitimacy, and authenticity.

ANTH 277. Seminar in Political Ecology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines concepts of space and place in archaeology. Explores how spaces can reflect and foster social conflict or unity through studies of diverse cultural traditions. Considers both the architecture and occupied but unbuilt spaces in ancient and current societies.

ANTH 278. Seminar in Representation and the Ethnographic Text (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Critically reviews and analyzes ethnographic texts, both traditional and experimental. Examining ethnographies as a form of writing, the seminar explores the larger intellectual, theoretical, and political context in which production of ethnographies occurs.

ANTH 279. Seminar in Political Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Reviewing different forms of stratification and power in society, this seminar critically reviews and analyzes a broad range of materials, debates, and contemporary trends within political anthropology.

ANTH 280. Seminar in Anthropology of Tourism (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the political and methodological underpinnings of medical anthropology, including the cultural construction of health and disease, the nature of the therapeutic process, and how social structures contribute to inequality and suffering.

ANTH 290. Directed Studies (1-6) Independent study by graduate students under supervision of a particular faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

ANTH 291. Individual Studies in Coordinated Areas (1-6) Prerequisite(s): graduate standing. A program of study designed to advise and assist candidates who are preparing for doctoral examination. The following rules apply: 1) a student may take up to 12 units for the Basic Requirements; 2) a student may take up to 8 units for the Comprehensive Requirements. Graded Satisfactory (S) or No Credit (NC).

ANTH 292. Concurrent Analytical Studies in Anthropology (1-4) Each ANTH 292 course will be taken concurrently with some 100-series course, but on an individual basis. It will be devoted to completion of a graduate paper based on research or criticism related to the 100-series course. Faculty guidance and evaluation will be provided throughout the quarter. Satisfactory (S) or No Credit (NC) grading is not available. May be repeated with different topic.

ANTH 297. Directed Research (1-6) Individual research by graduate students directed by a particular faculty member. Graded Satisfactory (S) or No Credit (NC).

ANTH 299. Research for Thesis or Dissertation (1-12) Field training and directed research in preparation for and completion of doctoral dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

ANTH 301. Directed Studies in the Teaching of Anthropology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines concepts of space and place in archaeology. Explores how spaces can reflect and foster social conflict or unity through studies of diverse cultural traditions. Considers both the architecture and occupied but unbuilt spaces in ancient and current societies.

ANTH 302. Teaching Practicum (1-4) Prerequisite(s): limited to departmental teaching assistants; graduate standing. ANTH 301, or consent of instructor. Supervised teaching in upper- and lower-division Anthropology courses. Required of all teaching assistants. Grades: satisfactory or no credit. May be repeated for credit.
ART 004/MCS 004, ART 005, ART 007/MCS 007

c) One of the following Art History courses: AHS 008/MCS 008, AHS 017A, AHS 017B, AHS 017C, or AHS 021/URST 021

2. Upper-division requirements (48 units)

a) ART 160

b) One of the following Art History courses: AHS 135, AHS 136/MCS 137, AHS 176/MCS 176, AHS 180, AHS 181, AHS 182, AHS 184/URST 184, AHS 185/URST 185, AHS 186 or any other upper-division Art History course that covers the period 1945 to present

c) ART 180

d) A minimum of 32 additional units of upper-division Art course work

e) ART 195 (Senior Thesis) or ART 185 (Senior Thesis Seminar)

To fulfill ART 195 or ART 185, students must complete a preliminary review of work with a formal presentation of a thesis project to a faculty committee two quarters prior to actual enrollment in ART 195 or ART 185. Students graduating in Spring must take ART 185. Students graduating in Fall or Winter must take ART 195 to fulfill their senior thesis requirement. Students are encouraged to determine their faculty thesis advisor before the term of their preliminary review. Students enroll in ART 195 or ART 185 during their final term before graduating.

Note A maximum of 12 upper-division transfer units of established equivalency in Art courses is accepted for credit. Equivalent transfer units in lower-division studio art course work and lower- and upper-division Art History course work is also accepted for credit toward the major in the respective lower- or upper-division category.

A minimum of 36 units of Art must be taken in residence (UCR Department of Art) to fulfill this major.

Education Abroad Program

The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program

The Art Department offers the Master of Fine Arts (M.F.A.) degree in Visual Art.

Master of Fine Arts

The program’s primary goal is to provide a context for research and production of contemporary art at the highest level. The M.F.A. in Visual Art is interdisciplinary, and students can draw on the resources of other departments on campus, including the UCR/California Museum of Photography.

The program emphasizes digital imaging, photography, and video, but students are free to work in any medium. The core of the program is independent creative work done in consultation with faculty. Creative work can be digital imaging, film or video works, installations, painting, performances, photography, sculpture, or any visual medium.

Admission Applicants must have a B.A. or B.F.A. degree. They must submit an application including all required support documents, a portfolio of their work, and three letters of recommendation. The GRE is not required. Students without any visual arts background may be required to complete courses in Studio Art and Art History subsequent to admission.

Plan I (Thesis) The M.F.A. is a Plan I (thesis) master’s degree program, requiring 72 units in graduate or approved upper-division undergraduate courses that must be completed with at least a letter grade of “B” or “Satisfactory.”

Required courses include 48 units in graduate courses in theory and criticism, as well as individual projects and tutorials:

1. Three courses of ART 285, Graduate Critique
2. ART 230, Contemporary Critical Issues
3. ART 240, Critical Theory
4. ART 299, Research for Thesis
5. Art History Graduate Seminar
6. Five courses of ART 290, Individual Tutorial

Of the remaining 24 units in elective courses, at least one additional course must be in Art History or Media and Cultural Studies, and at least two additional courses must be taken from a department other than art. These courses may be graduate or undergraduate courses.

MFA students receive a degree in Visual Art. The course of field study is not characterized by medium.

Students participate on yearly reviews during the Winter quarters of their first and second year.

The thesis requirement is met by the student’s M.F.A. thesis exhibition, accompanied by a written thesis on the work exhibited. A graduate thesis committee reviews the thesis. The committee is composed of four faculty members, at least three from the Department of Art. The fourth faculty member may be from another department at any UC Campus. Persons who are not UC Senate members may be appointed only with the approval of the Graduate Dean. Nominations that require this approval should be forwarded to the Graduate Division by the end of the student’s second year.

Foreign Language Requirement None

Teaching Requirement None; however, students are given opportunities to teach and are encouraged to do so.

Normative Time to Degree Nine quarters

Lower-Division Courses

ART 001. Beginning Drawing and Design (4) Lecture, 2 hours; studio, 4 hours. Introduction to the materials, techniques, and expressive properties of drawing and design. Includes lectures, studio exercises and outside assignments.

ART 002. Beginning Painting and Design (4) Lecture, 2 hours; studio, 4 hours. Introductory course in the media, techniques, and expressive properties of painting and design. Includes lectures, studio exercises and outside assignments.

ART 003. Introduction to Photographic Processes (5) Lecture, 3 hours; studio, 4 hours. Introduction to the basic principles of photography as fine art. Focuses on technological and conceptual evolution from analog to digital practice. Addresses a range of technological approaches to photography from traditional analog processes to digital image capture, organization/archiving, and printing. Explores historical and contemporary approaches to creating meaningful photographs.

ART 004. Introduction to Video Art (5) Lecture, 3 hours; studio, 3 hours; screening, 3 hours. Prerequisite(s): none. An introduction to video as an art form based in production and contemporary media theory. Covers basic production techniques, operation of the camcorder, and the fundamentals of live-action production and editing. Examines documentary, experimental, and other applications of the media arts in relation to contemporary art practice, installation, and performance. Cross-listed with MCS 004.

ART 005. Beginning Sculpture and Three-Dimensional Design (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): none. Introduction to the basic skills required to make three-dimensional and sculptural objects. Covers concept building, planning, design, brainstorming, materials, techniques, and basic contemporary sculpture history and theory. Lectures address work of contemporary artists and contemporary concepts of three-dimensional design. Studio assignments introduce new concepts and materials. Equipment is provided.

ART 006. Introduction to Contemporary Critical Issues in Art (4) Lecture, 3 hours; discussion, 1 hour. Examines basic principles and methodologies of theory as applied to the interpretation and creation of works of art. Includes screenings. Cross-listed with MCS 006.

ART 007. Introduction to Digital Photography (4) F, W, S Lecture, 3 hours; laboratory, 3 hours. Introduction to creating art by utilizing the Macintosh computer. Emphasizes the personal, theoretical, and conceptual implications of such work within the broader field of contemporary art. Course is repeatable to a maximum of 8 units. Cross-listed with MCS 007.
ART 008. Current Topics in Contemporary Art (4) Lecture, 3 hours; field, 3 hours. Examines visual arts as contemporary phenomena. Study of recent exhibits of contemporary art, the way art is culturally distributed, and the intersection of the conceptual dialogue surrounding significant contemporary art. Visits to nearby museums and major art galleries are required.

ART 009. Introductory Web-Based Art: Site Creation and Navigation (4) F Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): none. An introduction to the technology and critical issues of Web-based art. Covers Web-site creation software and conceptual and navigational ideas. Prerequisite: none. An introduction to the design process for film, television, and theater. Addresses the influence design has on the viewer, as well as how looks are achieved in different media. Cross-listed with MCS 028 and THEA 038.

ART 026. Painting without a Trace: Introduction to Vector-Based Image Making and Printing (4) Lecture, 2 hours; laboratory, 4 hours; individual study, 2 hours. Introduces students to two-dimensional, digitally based "drawing" or "painting," and printing (nonphotographic) as well as digital software such as Adobe Illustrator, Macromedia Freehand and Corel Painter to create "paintings" without the use of traditional paint. Examines the relation of this "new" medium to traditional painting and drawing. Explores the interaction among painting, photography, and digital media. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination.

ART 066. Immaterial Sculpture: Introduction to Three-Dimensional Digital Modeling (4) Lecture, 2 hours; laboratory, 4 hours; individual study, 2 hours. Covers basic skills necessary to create three-dimensional digital images and models. Introduces presentation options, including computer-based and inkjet printing. Examines the relation of this "new" medium to traditional sculpture. Software covered may include Maya, 3D Studio Max, and Lightwave 3D. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination.

ART 070 (E-Z). Digital Imaging Software for the Visual Arts (2) Lecture, 10 hours per quarter; laboratory, 30 hours per quarter, individual laboratory, 4 hours per quarter. Prerequisite(s): ART 007/MCS 007 or consent of instructor. Trains the student in basic, digital image manipulation software skills in preparation for digital image applications across varied media. E. Introduction to Image Manipulation (PhotoShop); F. Introduction to Video Editing (FinalCut Pro, Avid, Media 100); G. Introduction to Web Authoring (Dreamweaver, QuickTime); I. Introduction to Graphic Design and Desktop Publishing (Quark). Each segment is repeatable as topics change to a maximum of 8 units.

ART 071 (E-Z). Photographic Materials and Processes (2) Lecture, 15 hours per quarter; laboratory, 15 hours per quarter. Prerequisite(s): ART 003 or consent of instructor. In-depth instruction of conventional (i.e., nondigital) photographic processes.

ART 073. Painting and three-dimensional materials (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): ART 001 and ART 002 or equivalent and consent of instructor. An intermediate course of study. Subject: primarily still life, landscape and non-figurative images; purpose: a fuller understanding of the technical and expressive aspects of drawing. Studio exercises and in-studio lectures. Course is repeatable to a maximum of 8 units.

ART 075 (E-Z). Sculpture Materials and Processes (2) Workshop, 10 hours per quarter; laboratory, 3 hours. Each topic focuses on a single art-making process. Provides in-depth understanding for the beginning sculpture student and a project-derived technique. E. Metal; F. Mold-Making; G. Plaster and Clay; J. Wood. Each segment is repeatable to a maximum of 8 units.

ART 102. Intermediate Drawing (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 001 and ART 002 or equivalent and consent of instructor. An intermediate course of study. Subject: primarily still life, landscape and non-figurative images; purpose: a fuller understanding of the technical and expressive aspects of drawing. Studio exercises and in-studio lectures. Course is repeatable to a maximum of 8 units.

ART 103. Advanced Drawing (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 102: Intermediate Drawing, or equivalent and consent of instructor. An advanced course of study in drawing techniques and the employment of the drawing medium as a terminal means of artistic expression. Course is repeatable to a maximum of 12 units.

ART 104. Life Drawing (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 001 and ART 002 or equivalent and consent of instructor. Media to be pencile, charcoal, pen and ink; subject, primarily the figure; purpose, a fuller understanding of the figure and figure composition; method combines lectures with exercises in studio and outside assignments. Course is repeatable to a maximum of 12 units.

ART 110. Intermediate Painting (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 001 and ART 002 or equivalent and consent of instructor. Subject primarily still-life, landscape and figure; its purpose a fuller understanding of the technical aspects of painting; its method studio exercises, in-studio lectures and outside assignments. Course may be repeated for credit to a total of 12 units.

ART 111. Advanced Painting (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 110 and consent of instructor. Advanced problems in figurative and nonfigurative painting. Emphasis on the development of personal direction. Investigation of the individual student's relation to contemporary ideas in painting. In-studio lectures, studio exercises, and outside assignments. May be repeated for credit to a total of 12 units.

ART 112 (E-Z). Painting Materials and Processes (2) Lecture, 1 hour; studio, 2.5 hours; field trip, 4 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. A series of workshops focusing on selected technical skills or approaches to painting. Includes field trips to view examples of techniques. E. Supports, Grounds, Underpainting, and Glazing; F. Glazing, Varnishing, and Layering; G. Big Collaborative Painting. Each segment is repeatable to a maximum of 12 units.

ART 115. Intermediate Sculpture (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): ART 005. Develops the necessary critical and imaginative faculties for making sculpture. Through project assignments, students explore associations between materials, forms, and context to construct or deconstruct ideas. Audiovisual presentations, readings, and group critiques survey twentieth-century modern sculpture and more recent practices. Examines the artist's role in the cultural landscape of spectacle and entertainment. Course is repeatable to a maximum of 12 units.

ART 120. Printmaking (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 001 and ART 002, or equivalent and consent of instructor. A studio course in graphic expression using traditional printmaking processes with emphasis on intaglio and relief techniques. Studio exercises, lectures, and outside assignments. Course is repeatable to a total of 12 units.

ART 122 (E-Z). Advanced Printmaking Workshop (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 120 and consent of instructor. Designed to provide concentrated study and practical experience in a single graphic medium. In any one course instruction will focus in lithography, serigraphy, intaglio, or relief processes as determined by the instructor. E. Lithography, Serigraphy, Intaglio; F. Lithography. May be repeated for credit to a total of 8 units.

ART 125. Sculpture Hybrid: Furniture, Architecture, Decoration (FAD) (4) Lecture, 3 hours; laboratory, 3 hours; consultation, .5-1.5 hours per quarter. Prerequisite(s): ART 005, ART 115; or consent of instructor. Introduces the sculptural object that exists as or in relationship to furniture, architecture, and interior decoration. Includes an overview of work that defies classification as art or design such as the Bauhaus movement, through utopian American mid-century design and architecture and Italian-based Memphis design, to contemporary art-making practices. Explores theoretical challenges inherent in this art-making strategy.

ART 131. Intermediate Photography and Digital Technology (4) F Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): ART 003, ART 007/MCS 007. Covers the complete cycle of photographic production from scanning to output. Emphasizes developing skill in creating digital photographic imagery for creative, cultural expression. Software and some digital equipment are provided. Students are required to furnish their own 35mm single lens reflex (SLR) or digital cameras and zip disks. Course is repeatable to a maximum of 8 units. Cross-listed with MCS 131.

ART 132. Art Workshop (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 001 and ART 002 or equivalent, a minimum of 12 upper-division units in Art, and consent of instructor. Emphasis on interrelations of the arts. Development of individual projects in varied media as facilities permit. Studio exercises, lectures, and outside assignments. May be repeated for credit to a total of 12 units.

ART 134. Mixed Media (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): ART 001 and ART 002. Exploration into experimental methods for creating an image; techniques of frottage, collage, photo transfer, modeling and mold making, assemblage.

ART 135. Intermedia: Art, Media, and Culture (4) Lecture, 2 hours; screening, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of production, photography, video, film, television, installation, and other related "intermedias." Focuses on artworks within and without the mass media: how they are constructed, documented, analyzed, and viewed in the larger context of culture. Cross-listed with MCS 135.

ART 136. Installation and Site-Specific Art (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): consent of instructor. Focuses on performance, photo installation, computer art, video/film, site-specific installation, sculpture, and/or other intermedia. Concentrates on production and analysis of site-specific art. Course is repeatable to a maximum of 8 units. Cross-listed with MCS 136.
ART 137. Advanced Sculpture (4) F, W, S Lecture, 3 hours; studio, 3 hours. Prerequisite(s): ART 115. Focuses on self-directed individual sculpture projects. Course is repeatable to a maximum of 12 units.

ART 139. Intermediate Web-Based Art: Animation, Audio, and Interactivity (4) W Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ART 009 or consent of instructor. Explores the conceptual and creative possibilities of Web-based animation, audio, and interactive software at the intermediate level. Addresses the complex interconnections and unique quality of Internet-based art. Course is repeatable to a maximum of 8 units.

ART 140. Intermediate Analog Photography (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 003 or equivalent. Focuses on projects and assignments to develop individual creative approaches in analog photography and strengthen controls and techniques in black and white printing. Students are required to furnish their own analog film cameras. Course is repeatable to a maximum of 8 units.

ART 143. Advanced Digital Imaging Technology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ART 003. ART 131/MCS 131. Covers advanced digital imaging technologies such as large-format scanning, printing, color correction, retouching, and color management. Emphasis is on technical skills. Includes individualized assignments and group critiques. Course is repeatable to a maximum of 12 units. Zaki

ART 145. Advanced Photography Workshop (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 140; consent of instructor. A study of experimental advanced photographic techniques, including examination of critical and creative problems. Course is repeatable to a maximum of 12 units.

ART 146 (E-Z). Topics in Advanced Photography (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 140; consent of instructor. An advanced studio course designed to focus on selected special techniques or approaches to photography. Subject matter is determined by the instructor and may vary. K. Polaroid Photography; L. The Book and the Photograph; M. Dye Transfer; N. Current Art Practices; O. Suburbia and the Urban Edge; P. Fabricated to Be Photographed and the Directorial Mode; Q. Sycamore Canyon Photographic Project. ART 146Q is repeatable to a maximum of 12 units.

ART 150. Intermediate Video Art (5) Lecture, 3 hours; studio, 3 hours; screening, 3 hours. Prerequisite(s): ART 004/MCS 004. Designed to continue work done in ART 004/MCS 004. Covers advanced editing techniques and theory, storyboard, and sound design. Application of media arts to contemporary art practice and new genres, including installation, documentary, experimental, and performance. Equipment provided. Course is repeatable to a maximum of 10 units. Cross-listed with MCS 150.

ART 155. Advanced Video and Film Art (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ART 150/MCS 150. Examines media arts in the context of contemporary art practice and digital video and film genres. Addresses issues of installation, experimentation, documentary, and performance. Explores various conceptual and methodological issues connected with time-based media. Course is repeatable to a maximum of 12 units.

ART 160. Intermediate Art Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ART 006/MCS 006 is recommended. Addresses current critical and theoretical issues in modern and contemporary art. Examines student's art production in light of contemporary art practice and in relation to the interpretation and creation of art. Includes issues of race, gender, politics, aesthetics, class, and sexuality. Cross-listed with MCS 160.

ART 161. Special Topics in Art Criticism and Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ART 006/MCS 006 and ART 160/MCS 160 with grades of “C” or better or consent of instructor. Advanced topics in contemporary currents in art theory and criticism. Examines the critical reception, analysis, and theoretical underpinning of works of art via selected topics from contemporary and historical issues in the visual arts. Course is repeatable to a maximum of 12 units. Cross-listed with MCS 163.

ART 162. Special Topics in New Genres of Art Practice (4) F, S Lecture, 2 hours; studio, 4 hours. Prerequisite(s): ART 006/MCS 006 and a beginning studio art course with grades of “C” or better or consent of instructor. Through group critiques, readings and discussions, explores art making while introducing significant and recent practices in cultural production. Course is repeatable to a maximum of 12 units.

ART 165. Painting without a Trace: Intermediate Vector-Based Image Making and Printing (4) Lecture, 2 hours; laboratory, 4 hours; individual study, 2 hours. Prerequisite(s): ART 065. Continues the investigation of two-dimensional digitally based “drawing”, “painting”, and printing (nonphotographic). Possibilities in combining traditional and digital painting techniques. Examines the relation to this “new” medium to traditional painting and drawing. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable to a maximum of 8 units.

ART 166. Intermediate and Advanced Three-Dimensional Digital Modeling and Animation (4) Lecture, 2 hours; individual study, 2 hours. Prerequisite(s): ART 066. Covers intermediate and advanced three-dimensional digital modeling and animation. Emphasis is on creating animated short digital films in the spirit of avant-garde film. Examines students to contemporary and historical sources of creative animation. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable to a maximum of 8 units.

ART 167. Intermediate Digital Media: Web Authoring (4) Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): ART 007/MCS 007 or consent of instructor. Examines the histories, myths, and technical particulars of the Web from the artist's perspective. Includes art projects that are site-specific to the Internet. Examines issues including access, interface design, activism, multiple narratives, programming, and code. Does not cover software training or commercial graphic design.

ART 168. Intermediate Digital Media: Interactive Technology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): digital art course or consent of instructor. Create interactive digital artworks in both time-based and environmental forms; explore issues including interactivity, interface design, activism, and multiple narratives. Does not cover software training or commercial graphic design.

ART 169 (E-Z). Digital Imaging Software for the Visual Arts: Intermediate Software Skills (1) Lecture, 6 hours per quarter; laboratory, 12 hours per quarter. Prerequisite(s): ART 007/MCS 007 or consent of instructor. Covers digital imaging application across varied media. Includes Web design, digital video editing, video compositing and effects, Web authoring, digital photography, and desktop publishing. Targets specific software that aid in developing digital production skills that can be applied to a wide array of intermediate course work. E. Image Manipulation (Adobe Photoshop); F. Video Editing (Final Cut Pro, Avid, Media 100); G. Web Authoring (Dreamweaver, QuickTime); J. Graphic Design and Desktop Publishing (Quark). Each segment is repeatable to a maximum of 3 units.

ART 170. Advanced Digital Imaging (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ART 007/MCS 007; knowledge of Macintosh interface and Adobe Photoshop. Builds upon techniques initiated in ART 131/MCS 131. Emphasis on computer and electronic technology as a tool for making art. Addresses issues related to making art and the cultural implications of digital technology. Includes lectures by visiting artists, field trips, and critiques of work in progress. Course is repeatable to a maximum of 8 units. Cross-listed with MCS 175.

ART 171. Intermediate and Advanced Sculpture and Digital Technology (4) Lecture, 2 hours; laboratory, 4 hours; individual study, 2 hours. Prerequisite(s): ART 005, ART 006. Covers intermediate and advanced three-dimensional modeling and printing resulting in sculpture derived entirely from the computer. Emphasis is on individual projects with the potential to create both computer-based models and material-based sculptures. Discusses new digitally based sculptural possibilities in relation to historical sculptural practice. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable to a maximum of 8 units.

ART 175. Advanced Digital Workshop (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ART 131/MCS 131 or ART 139 or ART 150/MCS 150. Designed to encourage the development of individual projects utilizing digital technology. Areas of inquiry may include, but are not limited to, digital imaging, Web-based works, forms of digital publishing, digital video, and digital multimedia installation. Involves laboratory exercises, lectures, discussion of articles and exhibitions, and self-directed assignments. Course is repeatable to a maximum of 12 units.

ART 180. Contemporary Issues and Practice (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): any lower-division studio art course. A course structured around a sequence of three to six visiting artists, authors, and critics. Visitor presentations will be augmented by relevant articles and in-class presentations. Students generate written and oral responses to specific artists and topics. Artists and topics to be determined by the instructor. Course is repeatable to a maximum of 12 units.

ART 185. Senior Thesis Seminar (4) Seminar, 3 hours; preparatory work, 3-6 hours. Prerequisite(s): senior standing in Art; 32 units of upper-division studio art courses; review of preliminary portfolio two quarters before intended enrollment. Independent work and group seminars; completion of thesis statement and presentation of a finished body of work to faculty thesis committee. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ART 185 or ART 195.
Professional Course

ART 302. Teaching Practicum (1-4) Practicum, 2-6 hours; consultation, 1-4 hours. Prerequisite(s): graduate standing. Provides supervision of teaching in undergraduate Art courses. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Art History

Subject abbreviation: AHS
College of Humanities, Arts, and Social Sciences

Malcolm Baker, Ph.D., Chair
Department Office, 232 Arts
(951) 827-4634; arthistory.ucr.edu

Professors
Malcolm Baker, Ph.D.
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Professors Emeriti
Derickseen M. Brinkerhoff, Ph.D.
Thomas O. Peizel, Ph.D.

Associate Professors
Ginger C. Hsu, Ph.D.
Patricia A. Morton, Ph.D.

Assistant Professors
Liz Kotz, Ph.D.
Jeanette Kohl, Ph.D.
Stella Nair, Ph.D.
Kristoffer Neville, Ph.D.
Jason Weems, Ph.D.

Cooperating Faculty
Karl A. Taube, Ph.D. (Anthropology)

Major
The Art History major provides the framework for the critical study of a wide range of global visual culture from different periods of human history and in all media. The department works closely at both the undergraduate and graduate levels with the UCR California Museum of Photography to give students an opportunity to work with archival and art photographers and with the Jack and Marilyn Sweeney Art Gallery to provide access to cutting-edge multimedia works of art and to give the possibility of gaining curatorial experience.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Undergraduate Studies section.

Major Requirements

Art History Major
The major requirements for the B.A. in Art History are as follows: (52 units)

1. Lower-division requirements (12 units): one lower-division course in each of the three major areas. Note: No course that appears in more than one area can be repeated.
   a) Pre-modern: AHS 015, AHS 017A, AHS 017B, AHS 018/AST 018, AHS 027/ANTH 027
   b) Early Modern: AHS 015, AHS 017B, AHS 017C, AHS 018/AST 018, AHS 028
   c) Modern/Contemporary: AHS 008/MCS 008, AHS 017C, AHS 020/MCS 23, AHS 021/URST 021, AHS 028

2. Upper-division requirements (40 units)
   a) AHS 192
   b) Two courses in each of the major areas (24 units). Note: No course that appears in more than one area can be repeated.
      (1) Pre-modern: AHS 102/ANTH 102, AHS 112, AHS 140/AST 140, AHS 143/AST 143, AHS 144/AST 144, AHS 147, AHS 148, AHS 155, AHS 156, AHS 157, AHS 159
      (2) Early Modern: AHS 113, AHS 134/HISE 134, AHS 141/AST 141, AHS 143/AST 143, AHS 144/AST 144, AHS 146/AST 147, AHS 161, AHS 162, AHS 164, AHS 165/HISE 133/WMST 170, AHS 166/WMST 169, AHS 171, AHS 172, AHS 173, AHS 177
      (3) Modern/Contemporary: AHS 115/LNST 115, AHS 134/HISE 134, AHS 135, AHS 136/MCS 137, AHS 137/MCS 138, AHS 146/AST 147, AHS 176/MCS 176, AHS 177, AHS 180, AHS 181, AHS 182, AHS 184/URST 184, AHS 185/URST 185, AHS 186/MCS 186, AHS 187/MCS 187

   3. Twelve (12) elective units of upper-division course work in Art History chosen from the three major areas
Art History/Administrative Studies Major

The major between the departments of Art History and Business Administration provides students with training in management and the history of art.

The major requirements for the B.A. degree in Art History/Administrative Studies are as follows:

Art History requirements (48 units)

1. Lower-division requirements (12 units): one lower-division course in each of the three major areas. Note: No course that appears in more than one area can be repeated.
   a) Pre-modern: AHS 015, AHS 017A, AHS 017B, AHS 018/AST 018, AHS 027/ANTH 027
   b) Early Modern: AHS 015, AHS 017B, AHS 017C, AHS 018/AST 018, AHS 028
   c) Modern/Contemporary: AHS 008/MCS 008, AHS 017C, AHS 020/MCS 023, AHS 021/URST 021, AHS 028

2. Upper-division requirements (36 units):
   a) AHS 192, Junior and Senior Seminar (4 units)
   b) Two courses (24 units total) in each of the major areas (Pre-modern, Early Modern, Modern/Contemporary): No course that appears in more than one area can be repeated.
   c) Eight (8) elective units of upper-division course work in Art History chosen from the three major areas.

Administrative Studies requirements (37 units)

1. Lower-division requirements (17 units)
   a) BUS 010, BSAD 020A
   b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
   c) CS 008 (may be used to satisfy breadth requirements)

2. Upper-division requirements (20 units)
   a) Two courses (8 units) from the list below:
      1) ECON 102 or ECON 130 or ECON 162/BSAD 162
      2) PSYC 140 or PSYC 142
      3) SOC 150 or SOC 151 or SOC 171
      4) POSC 181 or POSC 182 or POSC 183
      5) ANTH 127 or ANTH 131
      These two courses must be outside the discipline of Art History and cannot be courses included as part of the three-course Business Administration track or their cross-listed equivalents.
   b) A three-course track (12 units) in Business Administration courses from one of the following:
      1) Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
      2) Human Resources Management/Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
      3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186
      4) Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
      5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
      7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
      8) Management Information Systems: BUS 101, BUS 171, BUS 173
      9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 122, BUS 127/STAT 127

Note: In filling the dual requirements of the major students may not count more than two courses toward both parts of their total requirements (Art History requirements and Administrative Studies requirements).

Art History/Religious Studies Major

The Art History/Religious Studies Major combines the disciplinary interest in the history of the visual arts with its related religious content and background.

Major Requirements

The major requirements for the B.A. degree in Art History/Religious Studies are as follows:

Asian Concentration (52 units)

1. Lower-division requirements (12 units)
   AHS 015, AST 030/CHN 030, RLST 005

2. Upper-division requirements (40 units)
   a) Art History (16 units): AHS 140/AST 140, AHS 141/AST 141, AHS 143/AST 143, CPLT 141
   b) Religious Studies (24 units): choose from RLST 101, RLST 103, RLST 105, RLST 106, RLST 142/AST 142/CHN 142, RLST 144/CPLT 144

3. Optional 190-level work in either Art History or Religious Studies

Minor

The minor upper-division requirements are designed to encourage study across art-historical and religious areas, while providing the opportunity for some concentration in one specific area.

Requirements for the minor in Art History are as follows:

1. Lower-division requirements (8 units): One lower-division course from two of the three major areas. Note: No course that appears in more than one area can be repeated.
   a) Pre-modern: AHS 015, AHS 017A, AHS 017B, AHS 018/AST 018, AHS 027/ANTH 027
   b) Early Modern: AHS 015, AHS 017B, AHS 017C, AHS 018/AST 018, AHS 028
   c) Modern/Contemporary: AHS 008/MCS 008, AHS 017C, AHS 020/MCS 023, AHS 021/URST 021, AHS 028

2. Upper-division requirements: Sixteen (16) upper-division units selected from the three areas listed under the major (No more than 8 units may be selected from any one area.)

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.
Graduate Program

The Department of Art History offers the M.A. degree in Art History.

Master’s Degree

For graduate study, the department offers upper-division and graduate courses in the history of European, U.S., Central and Latin American, and Asian (primarily Chinese) visual culture from ancient to contemporary times (including the history of photography), emphasizing the interpretation of visual culture in its historical and cultural context. The master’s degree may be completed in two years; the first year focuses on course work, the second on researching and writing a thesis. The study of works of art, visual culture imagery, and archival material is facilitated by regional museums, libraries, and collections, including, most notably, the campus’s own California Museum of Photography. Students are encouraged to enroll in arts internships offered by institutions across Southern California (including the Los Angeles County Museum of Art, the J. Paul Getty Institute and Museum, the Museum of Contemporary Art, the Japanese American National Museum, the Huntington Library, and the dozens of other institutions in the area) and can receive course credit for doing so.

Admission

The graduate committee meets once a year to consider applications to the program (due January 5 for financial aid consideration; all prospective students are strongly encouraged to apply by that date). Only fall quarter admission is available. All applicants must submit scores for the GRE General Test.

Plan I (Thesis)

The curriculum is divided into three broad areas of study: pre-modern, early modern, and modern/contemporary. The courses in each of the three areas are distributed as follows:

Pre-modern: AHS 102/ANTH 102, AHS 112, AHS 140/AST 140, AHS 143/AST 143, AHS 144/AST 144, AHS 147, AHS 148, AHS 155, AHS 156, AHS 157, AHS 159, AHS 272, AHS 285

Early-modern: AHS 113, AHS 134/HISE 134, AHS 141/AST 141, AHS 143/AST 143, AHS 144/AST 144, AHS 146/AST 147, AHS 161, AHS 162, AHS 164, AHS 165/HISE 133/WMST 170, AHS 166/WMST 169, AHS 171, AHS 172, AHS 173, AHS 177, AHS 252, AHS 260, AHS 267, AHS 273, AHS 274, AHS 285


Students must complete 40 units of course work, of which at least 24 units must be earned in graduate courses. In addition to AHS 251P (Proseminar in Methodology), students must take one graduate seminar in their area of specialization and two graduate seminars outside their chosen area. To fulfill the 20 units (two graduate seminars plus three additional graduate or upper-division courses) required for breadth, students must take courses in as many historical periods, cultural traditions, and geographic areas as possible. The graduate advisor oversees the selection of courses, making sure that at least two fulfill this historical-cultural-geographical diversity by being in areas (as defined above) outside of that in which the student is specializing. To fulfill degree requirements, students may also take courses— with the approval of the graduate advisor—in visual culture offered by the departments of Anthropology, Media and Cultural Studies, or other departments or programs at UCR or other UC campuses.

Students may take as many units of AHS 297 and AHS 299 (thesis research and writing) as desired, but only 12 of these units may be applied to the 24 graduate units required for the degree.

The thesis is the culminating requirement for the degree. Students must complete a successful oral oral discussion (the “Thesis Meeting”) prior to filing the completed thesis. The thesis should be filed within one year after completing all formal course work.

Language Requirement

Students must demonstrate proficiency in one research language (in addition to English) appropriate to their area of study. The relevant language is chosen in consultation with the graduate advisor and, if possible, the potential M.A. thesis advisor. Ideally, the student should acquire this language proficiency before entering the program. If this is not the case, the language requirement should be fulfilled before the fourth quarter in residence. This requirement is meant to provide the student with an understanding of a foreign language so that the student can perform graduate level research in this language. Since most Ph.D. programs have additional language requirements, students planning to obtain a Ph.D. are strongly urged to consult with their graduate and thesis advisors regarding additional foreign language requirements.

To satisfy the language requirement, the student has several options, which are outlined in the department’s Graduate Student Handbook. Most commonly, students, while enrolled as graduate students, complete, with a grade of “B” or better, a UC language course equivalent to one of the following UCR classes:

- CHN 006
- FREN 004
- GER 004
- ITAL 004
- JPN 006
- SPN 006

Lower-Division Courses

AHS 007. World Art: Images, Issues, and Ideas (4)
Lecture, 3 hours; discussion, 1 hour, extra reading, 2 hours. Prerequisite(s): none. An introduction to artistic achievements of the world’s cultures and ways in which they can be viewed. Considers such issues as the use of artworks as historical documents; connections between “high art” and popular culture; and the relationship between artist, viewer, artistic tradition, and society.

AHS 008. Modern Western Visual Culture (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Focus is on broadly defined cultural practices, including painting, photography, video, architecture, and film. Introduces major historical, aesthetic, and theoretical issues in twentieth-century visual culture with an eye toward political and social themes relevant to contemporary life. Cross-listed with MCS 008. Kotz

AHS 015. Arts of Asia (4)
Lecture, 3 hours; discussion, 1 hour; outside research, 2 hours. Prerequisite(s): none. A survey of the major monuments and themes of the visual arts of India, China, and Japan. Topics include recent archaeological discoveries, Buddhist art, Hindu sculpture and architecture, Zen in art, and the development of Asian pictorial art.

AHS 017A. History of Western Art: Prehistoric to Byzantine (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours. Prerequisite(s): none. A survey of the visual arts of the ancient Near East and Egypt, the Greek world, and the Roman and Byzantine empires. Topics include the growth of urbanism, art as an expression of religious and political beliefs, and cultural contact as a source of artistic change.

AHS 017B. History of Western Art: Medieval to Renaissance (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours. Prerequisite(s): none. A survey of the visual arts of Europe in the Middle Ages and Renaissance. Topics include the religious and political functions of art in the reestablishment of high civilization and the increased status of the individual artist. Rudolph

AHS 017C. History of Western Art: Baroque to Modern (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours. Prerequisite(s):none. A survey of the visual arts of Europe and America from 1600 through the present. Topics include the religious and political roles of art, the rise of secular imagery, the increased role of women in the arts, and the impact of popular culture and photography, and the other new media in the visual arts.

AHS 018. Introduction to Writing and Painting in China (4)
Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): none. An introduction to Chinese calligraphy and painting, focusing on their development in history and their practice in Chinese society. Topics include the development of writing technique and style, the integration of writing and painting, and the world around the Chinese artist. Cross-listed with AST 018. Hsu

AHS 020. Introduction to Media Art (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the impact of media technology on the visual arts, from photography to the Internet. Addresses mechanical reproduction, perception, gender, sexuality, identity, interactivity, cybertechnics, and popular culture. Cross-listed with MCS 023.

AHS 021. Introduction to Architecture and Urbanism (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the built environment including buildings, gardens, and cities, examined in terms of historical, cultural, social, technological, and political issues.
Upper-Division Courses

AHS 102. Anthropology of Art (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Anthropological approaches to the study of art in traditional non-Western societies. Through specific readings and case studies from four geographic regions (North America, Southeast Asia, Oceania, and West Africa), the dynamics of art in traditional societies is illustrated. Cross-listed with ANTH 102. Taube

AHS 112. The Art of the Aztec Empire (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 027/ANTH 027 or upper-division standing or consent of instructor. Introduction to the art of the Aztec Empire, including architecture, sculpture, ceramics, painting, lacquer, and feather work. Through a close study of objects, explores the relationship between art and ritual and the imperial state.

AHS 113. Sixteenth-Century Mexico: An Art of Two Worlds (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 028 or upper-division standing or consent of instructor. Explores the art of the sixteenth-century Mexico, with concentration on the Mexican and European traditions. Cross-listed with LNST 115.

AHS 116. Architecture and Arts of the Andes (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 027/ANTH 027 or upper-division standing or consent of instructor. Introduction to the architecture, art, and material culture of the Andes from ancient times to the present. Focuses on the diverse and rich architectural heritage of an important building center in the Americas. Addresses architecture's relationship to artistic and material production, such as painting, pottery, sculpture, city planning, and textiles. Taube

AHS 120. Berlin Metropolis in Literature, Film, Music, and Art (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction of the German avant-garde of the twentieth century. Explores expressionism, New Objectivity, the Bauhaus movement, the manifestation of an anti-art in dadaism, and Epic Theatre. Studies works of Franz Kafka in the context of his implicit criticism of the avant-gardist movements of his time. Course is conducted in English. Cross-listed with CPLT 110B, EUR 110B, GER 110B, and MCS 178.

AHS 121. From Expressionism to Epic Theatre: Benn, Brecht, Kafka, and the Bauhaus (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction of the German avant-garde of the twentieth century. Explores expressionism, New Objectivity, the Bauhaus movement, the manifestation of an anti-art in dadaism, and Epic Theatre. Studies works of Franz Kafka in the context of his implicit criticism of the avant-gardist movements of his time. Course is conducted in English. Cross-listed with CPLT 138, EUR 138, GER 138, and MCS 182.

AHS 134. Art and Society: Patrons and Museums (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores how patrons and museums have influenced the production and reception of art. Topics include patronage, collecting, and audience for art in Renaissance Italy; modern American megapatraps, such as the Gettys and Rockefellers; and multimedia museum programs used to educate a wider public in the visual arts. Cross-listed with HISE 134.

AHS 135. Postmedia Art (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Covers heterogeneous movements, theories, and practices from the 1960s to the present that have collectively challenged the doctrine of medium specificity. Topics may include dematerialization, conceptual and postconceptual art, performance and body art, earthworks, process art, and experimental sound and radio. Rogers

AHS 136. History of Video Art (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Explores the evolution of video art from the invention of the Portapak and early video collectives to the current ubiquity of video installation, single-channel, and multimedia art. Emphasis is on video art in the United States. Cross-listed with MCS 137. Rogers

AHS 137. History of Experimental Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. A survey of cinema outside of the economic, institutional, and aesthetic imperatives of mainstream film production. Covers an array of alternative film movements, including surrealist and dada, Soviet avant-garde, the Cine 16 Group, French new wave, North American avant-garde, and the artist's film. Cross-listed with MCS 138.

AHS 140. Chinese Painting of the Song and Yuan Dynasties (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. The history of Chinese painting from the beginning of the fourteenth century, with concentration on the Song and Yuan dynasties (A.D. 960-1367). The development of themes, subjects, styles, theories, and purposes discussed in their cultural and historical contexts. Cross-listed with AST 140. Hsu

AHS 141. Chinese Painting of the Ming and Qing Dynasties (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. The history of Chinese painting from the fourteenth to the eighteenth century. Investigates new pictorial genres, art theories, political environment, popular taste, and the changing social role of the artist. Cross-listed with AST 141. Hsu

AHS 143. Text and Image in Chinese Painting (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. Examines the art of writing and painting in China, focusing on the close relationship between written language and pictorial image. Reading knowledge of the Chinese language is not necessary. Cross-listed with AST 143. Hsu

AHS 144. Japanese Painting: Twelfth to Nineteenth Century (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. Major developments in the pictorial art of Japan from the twelfth to the nineteenth century. Emphasis on the social and cultural contexts of painting, pictorial genres, and pivotal artists and styles. Cross-listed with AST 144. Hsu

AHS 146. The Japanese House (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. History of the traditional Japanese house from prehistoric times to the nineteenth century. Examples used to place the Japanese house within the general history of Japanese architecture and within its social and cultural context. Cross-listed with AST 147. Morton

AHS 147. The Art of Greece (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 017A or upper-division standing or consent of instructor. The architecture, sculpture, painting, and minor arts of Ancient Greece from the earliest Archaic period through the Hellenistic age.

AHS 148. The Art of Rome (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 017A or upper-division standing or consent of instructor. The architecture, sculpture, painting, and minor arts of Ancient Rome from the Republic through the Age of Constantine with a consideration of the problems of the relationship of Hellenistic art to that of Rome.

AHS 155. Cultures in Conflict: Art at the Fall of the Roman Empire (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017A or upper-division standing or consent of instructor. Covers architecture, mosaic, wall painting, manuscript illumination, and sculpture from the origins of Christianity to the final dissolution of the Roman Empire. Stresses the role of art in the co-optation of the Church by the Empire and in the aftermath of its fall. Rudolph

AHS 156. Memory of Empire: the Art of Early Medieval Europe (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Covers manuscript illumination, barbarian jewelry, architecture, and sculpture from the fall of the Roman Empire, through the Carolingian Empire, to the tenth century. Stresses the interplay between indigenous Germanic and "foreign" classical traditions. Rudolph
AHS 157. The Medieval Pilgrimage and the Art of Romanesque France (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Covers architecture, sculpture, and illuminated manuscripts of the eleventh and twelfth centuries. Stresses the role of the pilgrimage and of politics during the period of the revival of monumental architecture and of perhaps the greatest public sculpture of the Middle Ages. Rudolph

AHS 159. The Gothic Cathedral in its Urban Context (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Covers architecture, sculpture, and stained glass in the twelfth and thirteenth centuries. Stresses the political origins and social setting of public art during this period of the reestablishment of urban culture with its resultant social tensions. Rudolph

AHS 161. Italian Renaissance: Fifteenth- and Sixteenth-Century Florence (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Surveys all media—paintings, sculpture, architecture, and gardens—with their historical and cultural context. Rudolph

AHS 162. Italian Renaissance: Fifteenth- and Sixteenth-Century Rome (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Surveys all media—paintings, sculpture, architecture, and gardens—with their historical and cultural context. Rudolph

AHS 164. The Northern Renaissance (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Surveys the paintings of the Netherlands and Germany within its historical and cultural context. Rudolph

AHS 165. Women Artists in Renaissance Europe, 1400-1600 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Surveys the lives and work of women artists in Renaissance Europe from perspectives offered by the latest scholarly literature. Key topics considered are circumstances under which it was possible for women to become artists, how these women evolved from artists practicing in the cloistered convent to artists participating in the competitive public market place, what they painted, and who their patrons were. Cross-listed with HISE 133 and WMST 170.

AHS 166. Gender, Identity, and Visual Display in Washington, D.C. (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): admission to the UCR Washington Center Program. Examines the image of women and the role of women in fashioning visual culture through museums and collections in Washington, D.C. Investigates the representation of women in art; the woman artist; and women as patrons, donors, and decorators in Washington. Cross-listed with WMST 169.

AHS 171. The Church, the Court, and the People: Art in Seventeenth-Century Europe (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017B or AHS 017C or upper-division standing or consent of instructor. A study of the dominant trends and figures of the Italian, French, Spanish, Flemish, and Dutch Baroque, including Caravaggio, Bernini, Velazquez, and Rembrandt. Emphasis is on such issues as the development of illusionistic ceiling decoration, the theoretical basis of Baroque art, and the sacred and political uses of art.

AHS 172. Baroque Rome (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. An in-depth examination of Roman art in the seventeenth century. Studies painting, sculpture, architecture, and urban planning in their political and religious contexts, with special emphasis on the ecclesiastical and private patrons who transformed Rome into one of the world's most important cities.

AHS 173. Rococo to Revolution: Art in Eighteenth-Century Europe (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Examines major developments in eighteenth-century painting, sculpture, and interior decoration from the emergence of the Rococo to the dawn of Neoclassicism. Explores the response of art to new forms of patronage, the erotics of eighteenth-century art, and how art functioned as social and political commentary.

AHS 174. Dutch Art and Culture in the Seventeenth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Examines the artistic production of the Northern Netherlands in the seventeenth century, a period of exploration, invention, and growing wealth, as well as of uncertainty and war. Neville

AHS 176. Pictorialism to New Media: A History of Twentieth-Century Photography (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. A study of photographic practices from 1900 to the present. Topics include pictorialist "art" photographs created around 1900, the subsequent refinement of styles and content in modernism, and the expansion of photographic practices into the digital realm. Examines technological, conceptual, aesthetic, economic, and social issues. Cross-listed with MCS 176.

AHS 177. American Art: Colonial Period to 1900 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Painting and architecture in the United States from the Colonial period to 1900. Neville

AHS 178. The Modern City (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the modern city from the Industrial Revolution to the present. Explores the history and theory of modern urbanism through case studies of metropolitan areas with a rich urban culture, architecture, and morphologic features. Investigates approaches to the problems of the large urban agglomeration in the context of social, political, and cultural conditions. Cross-listed with URST 178.

AHS 180. Modern European Art: Nineteenth Century (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Painting and sculpture in Europe from the French Revolution to the Franco-Prussian War. Introduces students to the ideas and concepts of modern European art and traces artistic developments from Neoclassicism to the emergence of Impressionism in a broad cultural, social, and political context. Forster-Hahn

AHS 181. Modern Art II: Art in Europe, 1870-1945 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Traces the history of the modern movement from Impressionism to the end of World War II. Discussion focuses on the arts in their interrelationships to the political events and social conditions of the period and emphasizes the perpetuation of modernism in Europe under Fascism and Communism. Forster-Hahn

AHS 182. Visual Art and Visual Theory after 1945 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Examines visual art since 1945 primarily from Europe and the United States, tracing developments in all media within a historical and theoretical context. Focuses on the rise of postmodernism, analyzing work in relation to theories of representation and cultural identity.

AHS 184. Modern Architecture (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017B or AHS 021/URST 021 or upper-division standing or consent of instructor. Modern architecture and its sources from 1800. Cross-listed with URST 184. Morton

AHS 185. Architectural Theory from Vitruvius to Venturi (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017A or AHS 017B or AHS 017C or AHS 021/URST 021 or upper-division standing or consent of instructor. History of architectural thought from Vitruvius to the present, with emphasis on the modern period. Surveys the major themes of architectural theory and investigates the relationships between ideas about architecture and architectural production. Cross-listed with URST 185. Morton

AHS 186. Media and Movements: Film, Video, Photography, and the Visual Arts (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Focuses on key cultural movements or developments in Europe and the United States over the past century. Provides a thematic history of the avant-grade and experimental arts, including painting, sculpture, photography, video, film, performance, installation, and new media art. Cross-listed with MCS 186.

AHS 187. Visual Culture and Art History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017A or AHS 017B or AHS 017C or AHS 021/URST 021 or upper-division standing or consent of instructor. Examines the broader concept of visual culture as it relates to the history of the visual arts. Focuses on four conceptual areas: visuality, identity, media culture, and politics/ethics. Cross-listed with MCS 187.

AHS 190. Special Studies (1-5) To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable to a maximum of 12 units.

AHS 192. Junior and Senior Seminar in Art History (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing in Art History. Critical study of selected topics in the history of art and its methods. Topics vary. Course is repeatable to a maximum of 12 units.

AHS 195H. Senior Honors Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): admission to the University Honors Program or consent of the Art History Department. Independent research and preparation of a senior honors thesis completed under the supervision of a faculty member. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 8 units.

AHS 198-I. Individual Internship (1-12) research, variable. Prerequisite(s): consent of instructor and upper-division standing. Individual study or apprenticeship in a museum, art library, or slide and photo archive in order to gain practical experience and skills for future professional work. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.
Graduate Courses

AHS 251P. Proseminar in Methodology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): AHS 251P or consent of instructor. An introduction to the history and methodologies of Art History. Covers the methodologies, models, and approaches of different periods from Vasari to the present. Course is repeatable as topics change.

AHS 252. History and Ideology of the Museum (4) Seminar, 3 hours. Prerequisite(s): AHS 251P or consent of instructor. From princely collection to public museum: a history of collecting and the evolution of the museum as a cultural institution in the western world. An investigation of sources, documents and historiography complemented by a study of museums and collections in the Los Angeles area. Forster-Hahn

AHS 260. Seminar in Latin American Art (4) Seminar, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the history and theory of Latin American art from the European conquest to the present. Course is repeatable as topics change.

AHS 267. Seminar in Later Chinese Art (4) Seminar, 3 hours; outside research, 3 hours; research paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Special topics in later Chinese art. Course is repeatable as topics change. Hsu

AHS 272. Seminar in Medieval Art (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Selected issues of the function of art within medieval social, political, theological, and intellectual culture. Course is repeatable as topics change. Rudolph

AHS 273. Seminar in Renaissance Art (4) Seminar, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Special topics in Italian and/or Northern Renaissance art. Course is repeatable as topics change. Neville

AHS 274. Seminar in Seventeenth- and Eighteenth-Century Art (4) Seminar, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the history and theory of eighteenth-century European and/or American art. Course is repeatable as topics change. Forster-Hahn

AHS 277. Seminar in Twentieth-Century Art (4) Seminar, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the history and theory of twentieth-century European and/or American art. Course is repeatable as topics change. Forster-Hahn

AHS 278. Seminar in Modern Architecture (4) Seminar, 3 hours; outside research, 3 hours; research paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the history and theory of twentieth-century architecture and urbanism. Course is repeatable as topics change. Morton

AHS 282. Seminar in New Media (4) Seminar, 3 hours; outside research, 3 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the history and theory of photography, film, video, and digital media. Course is repeatable as topics change. Rogers

AHS 283. Seminar in History of Photography (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Selected topics in the history of photography, with an emphasis on new theories and histories of photographic practice. Students encouraged to do research projects drawing on the collections of the UCR/California Museum of Photography. Course is repeatable as topics change. Kitz

AHS 284. Seminar in Contemporary Art and Theory (4) Seminar, 3 hours; individual study, 3 hours; research paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Studies of selected topics in contemporary art, photography, and related media, with an emphasis on critical theories of representation and issues of practice. Course is repeatable as topics change.

AHS 285. Getty Consortium Seminar (4) F, W, S Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An intramural seminar at the Getty Research Institute. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as topics change.

AHS 290. Directed Studies (1-6) research. Prerequisite(s): consent of instructor. Independent work under a staff member's supervision in a particular field. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

AHS 292. Concurrent Analytical Studies (1-4) Outside research, 3-12 hours. Prerequisite(s): graduate standing and consent of instructor. To be taken concurrently with a 100-series course, but on an individual basis. It will be devoted to research, criticism, and written work of graduate order commensurate with the number of units elected. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

AHS 297. Directed Research (1-6) research. Prerequisite(s): consent of instructor, completion of language requirement and one seminar. Research study or exploratory work toward the development of the thesis. Graded Satisfactory (S) or No Credit (NC)

AHS 298-I. Individual Internship (1-4) research, variable. Prerequisite(s): graduate standing and consent of instructor. Independent study or apprenticeship in a museum, art library, or slide and photo archive in order to gain practical experience and skills for future professional work. Graded Satisfactory (S) or No Credit (NC). Repeatable to a total of 12 units. Not more than 8 units count toward the 40 units required for the M.A.

AHS 299. Research for Thesis (1-12) variable hours. Prerequisite(s): consent of instructor, completion of language requirement and one seminar. Thesis research and writing. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

AHS 302. Teaching Practicum (1-4) Lecture, 1-4 hours; clinic, 1 hour. Prerequisite(s): limited to departmental teaching assistants; graduate standing. Supervised teaching in upper- and lower-division Art History courses. Required of all Art History teaching assistants. Credit not applicable toward degree unit requirements. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

Asian Studies

Subject abbreviation: AST

College of Humanities, Arts, and Social Sciences

Vivian-Lee Nyitray, Ph.D., Chair
Committee Office, 2417 Humanities and Social Sciences
(951) 827-2743; asianstudies.ucr.edu

Committee in Charge
Mariam Beeri Lam, Ph.D. (Comparative Literature and Foreign Languages)
Lynda Beil, Ph.D. (History)
Jing-Song Chen, Ph.D.
Lucille Chia, Ph.D. (History)
Piya Chatterjee, Ph.D. (Anthropology)
Kuei Chiu
Michael Foster, Ph.D.
Yoshiko Hain, Ph.D. (Comparative Literature and Foreign Languages)
Ginger Hsu, Ph.D. (Art History)
Masako Ishii-Kuntz, Ph.D. (Sociology)
Margherita Long, Ph.D. (Comparative Literature and Foreign Languages)
René Lysoff, Ph.D. (Music)
Hendrik Maier, Ph.D. (Comparative Literature and Foreign Languages)
Justin McDaniel, Ph.D. (Religious Studies)
Sally Ness, Ph.D. (Anthropology)
Lisa Raphals, Ph.D. (Comparative Literature and Foreign Languages)
Parama Roy (English)
Kyoko Sagawa, Ph.D. (Comparative Literature and Foreign Languages)
Eric Schwindt-Bayer, Ph.D. (Philosophy)
Yenna Wu, Ph.D. (Comparative Literature and Foreign Languages)
Deborah Wong, Ph.D. (Music)
Helen Xu
Yang Ye, Ph.D. (Comparative Literature and Foreign Languages)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major

The Asian Studies major affords students the opportunity to study Asia from an interdisciplinary perspective, drawing on courses and faculty from various departments of the College of Humanities, Arts, and Social Sciences. Students are strongly encouraged to consider participating in the Education Abroad Program offered through the UC in various Asian locales, including China, Taiwan, Hong Kong, Japan, Vietnam, Singapore, the Philippines, India, and Korea. Students may also participate in the undergraduate internship exchange program, which allows any UC student to apply for study for one term at other UC campuses. Both options provide rich opportunities to participate in additional course work on Asia that may be counted toward the major.
University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The requirements for the B.A. degree in Asian Studies are as follows:

East Asian Studies Option
Students who choose the East Asian Studies option must focus primarily on China, Japan, and Korea and are strongly encouraged to choose a disciplinary focus in either Art History, History, Comparative Literature and Foreign Languages, or Religious Studies. Students interested in East Asian diaspora communities are also encouraged to consider a secondary disciplinary focus in Ethnic Studies, leading to a minor in Asian American Studies. Students planning graduate work in Asian Studies are encouraged to write a senior thesis during the first or second quarter of their senior year. (This is a substantial paper based on original research; ideally, primary documents are consulted in the course of conducting the research.)

1. Lower-division requirements (12 units plus language requirement)

a) Two years of basic language instruction in either Chinese (CHN 001, CHN 002, CHN 003, CHN 004, CHN 005, CHN 006, CHN 020A, CHN 020B, CHN 090 or its equivalents); Japanese (JPN 001, JPN 002, JPN 003, JPN 004, JPN 005, JPN 006, or JPN 090 or its equivalents); or Korean (KOR 001, KOR 002, KOR 003, KOR 004, KOR 005, KOR 090 or its equivalents)

Note The sequences CHN 001, CHN 002, CHN 003, CHN 004; CHN 020A, CHN 020B; JPN 001, JPN 002, JPN 003, JPN 004; or KOR 001, KOR 002, KOR 003, KOR 004 may also be used to fulfill the language breadth requirement in the College of Humanities, Arts, and Social Sciences.

b) AST 045E/HIST 045E

c) At least 8 units from the following:

AST 090, AST 018/AHS 018, AST 022/MCS 022/CHN 022, AST 030/CHN 030, AST 032/JPN 032, AST 034/JPN 034, AST 040/CHN 040, AST 045F/HIST 045F, AST 046/CHN 046, AST 048/CHN 048, AST 062/CPLT 062, AST 063/CPLT 063, AST 064/VNM 064, AST 065/AHS 015, CPLT 029, ETST 005, ETST 005H, HIST 030, HIST 044/RLST 044, JPN 035, RLST 005, RLST 005H

2. Upper-division requirements (36 units)

a) At least 28 units from the following courses dealing with China, Japan, and Korea:
AST 190, AST 107/CHN 107/RLST 107, AST 135/CHN 135, AST 136/CHN 136,
AST 140/AHS 140, AST 141/AHS 141, AST 142/CHN 142/RLST 142, AST 143/AHS 143, AST 144/AHS 144, AST 147/CHN 146, AST 148/CHN 148, AST 151/JPN 151, AST 152 (E-Z)/JPN 152 (E-Z), AST 153 (E-Z)/JPN 153 (E-Z), AST 154 (E-Z)/JPN 154 (E-Z), AST 169/MUS 169 (maximum of 4 units), AST 184/MCS 184/JPN 184, AST 185/CHN 185/MCS 169, AST 190, AST 195, CPAC 130G, CPAC 131, CHN 101A, CHN 101B, CHN 101C, CHN 104, CHN 105, CHN 108, CHN 110 (E-Z), CHN 115 (E-Z), CHN 190, CPLT 142 (E-Z)/WMST 142 (E-Z), ECON 179, HIST 180, HIST 181, HIST 182, HIST 191W, JPN 101A, JPN 101B, JPN 101C, JPN 150/AST 150, JPN 190, RLST 103, RLST 105, RLST 106

b) At least 8 units from the following courses focused comparatively on East Asia, Europe, and Asian American:
AST 128/ANTH 128/DANCE 128/MUS 128/ETST 128/THEA 128, AST 190, AST 195, CPLT 141, CPLT 143/FREN 143, CPLT 144/RLST 144, ENGL 121 (E-Z) (see program chair for approval of particular segment)
ETST 110 (E-Z), ETST 133, ETST 137, ETST 140, ETST 144, ETST 150, PHIL 110, POSC 130, SOC 136

Note A maximum of 12 units in East Asian language courses over and above those fulfilling the lower-division prerequisites are allowed in fulfilling the 36-unit requirement.

Comparative Asian Studies Option
The option focuses on the historical interactions and cultural similarities and differences among East, Northeast, South, Southeast, and Central Asia peoples, including those constituting transnational and/or diaspora communities throughout the world. Students interested in Asian diaspora communities in America are encouraged to consider a secondary disciplinary focus in Ethnic Studies, leading to a minor or a second major in Asian American Studies. Students planning graduate work in Asian Studies are encouraged to write a senior thesis during the first or second quarter of their senior year. (This is a substantial paper based on original research; ideally, primary documents are consulted in the course of conducting the research, and the topic should deal with a comparative theme within Asian Studies.)

1. Lower-division requirements (12 units plus language requirement)

a) Two years of basic language instruction in any Asian language (This requirement may be fulfilled by language courses currently offered at UCR such as Chinese, Japanese, or Korean, or by courses in other East, Northeast, South, Southeast, West, or Central Asian languages taken at other accredited institutions subject to the approval of the chair of the Asian Studies Committee.)

b) At least 12 units from the following:

AHS 015, AST 018/AHS 018, AST 022/MCS 022/JPN 022, AST 030/CHN 030, AST 032/JPN 032, AST 034/JPN 034 AST 040/CHN 040, AST 045F/HIST 045F, AST 046/CHN 046, AST 048/CHN 048, AST 062/CPLT 062, AST 063/CPLT 063, AST 064/VNM 064, AST 065/AHS 015, CPLT 029, ETST 005, ETST 005H, HIST 030, HIST 044/RLST 044, JPN 035, RLST 005, RLST 005H

2. Upper-division requirements (36 units)

a) At least 12 units from the following:

AST 127/ANTH 176/DANCE 127/ETST 172/MUS 127, AST 128/ANTH 128/DANCE 128/MUS 128/ETST 128/THEA 128, AST 190, AST 195, CPLT 143/FREN 143, CPLT 144/RLST 144, ENGL 121 (E-Z) (see program chair for approval of particular segment)
POS 030

b) Twenty-four units (24) taken from at least two or more of the following five area groupings:

(1) Asian America: AST 124/MUS 124, ENGL 139, ENGL 139T, ETST 106, ETST 110 (E-Z), ETST 133, ETST 137, ETST 138, ETST 139, ETST 140, ETST 143A, ETST 143B, ETST 144, ETST 150, SOC 136

(2) China: AST 107/CHN 107/RLST 107, AST 140/AHS 140, AST 141/AHS 141, AST 142/CHN 142/RLST 142, AST 143/AHS 143, AST 135/CHN 135, AST 136/CHN 136, AST 148/CHN 148, AST 185/CHN 185/MCS 169, CHN 105, CHN 108, CHN 110 (E-Z), CHN 115 (E-Z), CHN 190, HIST 180, HIST 181, HIST 182, HIST 191W, RLST 103

(3) Japan/Korea: AST 144/AHS 144, AST 147/AHS 146, AST 151/JPN 151, AST 154 (E-Z)/JPN 154 (E-Z), AST 155 (E-Z)/JPN 155 (E-Z), AST 156 (E-Z)/JPN 156 (E-Z), AST 169/MUS 169 (4 units maximum), AST 184/MCS 184/JPN 184, CPLT 142 (E-Z)/WMST 142 (E-Z), JPN 150, JPN 190, RLST 105

(4) Southeast Asia: ANTH 140-I, AST 127/ANTH 176/DANCE 127/ETST 172/MUS 127, AST 162/ANTH 187/VNM 162, AST 163/CPLT 163, AST 165 (E-Z)/VNM 165 (E-Z)/WMST 165 (E-Z), AST 168/MUS 168 (4 units maximum, AST 170/MUS 170 (4 units maximum)

(5) Other East, Northeast, South, Southeast, West, or Central Asia:
Lower-Division Courses

AST 018. Introduction to Writing and Painting in China (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): none. An introduction to Chinese calligraphy and painting, focusing on their development in history and their practice in Chinese society. Topics include the development of writing technique and style, the integration of writing and painting, and the world around the Chinese artist. Cross-listed with AHS 018.

AST 022. Introduction to Japanese Film (4) Lecture, 3 hours; screening, 2 hours. Prerequisite(s): none. An introduction to Japanese film and to watching and writing about Japanese film. Works studied range from the samurai epics of Kurosawa to recent anime. All films have subtitles. No previous knowledge of Japanese language or culture is required. Cross-listed with FVC 022 and JPN 022. Bolton

AST 030. Introduction to Chinese Civilization (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): none. An introduction to Chinese civilization through an interplay of philosophical, historical, religious, and literary readings from the ancient times through the modern age. Uses audiovisual media. All work is in English. Cross-listed with CHN 030.

AST 032. Introduction to Japanese Folklore (4) Lecture, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): none. Focuses on narrative genres of myth, legend, and folklore, with attention paid to festivals, folk craft, belief systems, and the development of folklore studies (minzokugakushu) as an academic discipline. Examines the relationship of folklore to ethnic and national identity. Cross-listed with JPN 032.

AST 034. Early Japanese Civilization (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): none. An introduction to Japanese civilization from earliest times to the dawn of the twentieth century. Devotes particular attention to aesthetic activity and to the relationship between history, culture, and the arts. Cross-listed with JPN 034.

AST 040. Masterworks of Chinese Literature (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. Reading and discussion of selected great works of Chinese literature (in English translation) with attention to cultural contexts. Various critical methods and approaches are used. Cross-listed with CHN 040.

AST 045 (E-Z). Topics in Asian History (4) Lecture, 3 hours; consultation, 1 hour; extra reading, 3 hours. Prerequisite(s): none. An introduction to regional histories and cultures of Asia. E. Premodern China and Japan; F. Contemporary China; G. India in the Western Imagination. Cross-listed with HST 045 (E-Z).

AST 046. Responses to Political Repression in Modern Chinese Literature and Film (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An examination of the various responses to political repression in China during the second half of the twentieth century through selected literary and artistic representations. Cross-listed with CHN 046.

AST 048. Chinese Cinema (4) Lecture, 2 hours; discussion, 1 hour; screening, 2 hours; outside research, 1 hour. Prerequisite(s): none. Study of selected films from China and Taiwan with attention to cultural context. Questions addressed may include the following: What do we look for in a film? What are the film’s interrelations with theatre, photography, and literature? How do we understand the film as an art form? Cross-listed with CHN 048.

AST 062. Introduction to Southeast Asian Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introduction to modern and contemporary Southeast Asian literature and culture, with a focus on individual national histories. Explores the relationship between aesthetics, politics, and academic scholarship. Readings are in translation; classes are conducted in English. Cross-listed with CPLT 062.

AST 063. Reading Southeast Asian Stories (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introduction to the modern short story in Southeast Asia, with a focus on literariness and the act of reading. Readings are in translation; classes are conducted in English. Course is repeatable as content changes to a maximum of 8 units. Cross-listed with CPLT 063.

AST 064. Introduction to Vietnamese and Diasporic Film Culture (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Engages students in critical viewing strategies and analytical visual critique. Explores the revival of film production in Vietnam following the Vietnam War, with a focus on the meanings of production, state control, and international distribution. Readings are in translation; classes are conducted in English. Cross-listed with FVC 049 and VNM 064.

AST 065. Introduction to Southeast Asian Cultures (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introduction to the world of Southeast Asia, with an emphasis on aspects of local cultures.

AST 090. Special Studies (1-5) Individual study, 3-15 hours. To be taken with the consent of the Chair of the Program as a means of meeting special curricular problems. Course is repeatable.

Upper-Division Courses

AST 107. Taoist Traditions (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AST 030/CHN 030 or upper-division standing or consent of instructor. A survey of the ancient and modern mystical and philosophical aspects of Taoism as well as the living religious tradition, their relationships to each other, and their expression in Chinese culture and civilization. Topics include the Tao Te Ching, the Chuang-tzu , the Taoist canon, meditation, immortality, alchemy, and ritual. Cross-listed with CHN 107 and RLST 107.

AST 123. Southeast Asian Performance (4) Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the roles and genres of expressive culture in Southeast Asia, including dance, music, theater, film, and digital culture. Performance is discussed both as a time-honored and as a contemporary medium for cultural production, from the courts to everyday experience. Material will be drawn from the Philippines, Malaysia, Indonesia, Thailand, Laos, Cambodia, Vietnam, Burma, Singapore, and the Southeast Asian diaspora. Cross-listed with ANTH 126, DNCE 123, and MUS 123.

AST 124. Music of Asian America (4) Lecture, 3 hours; music listening, 1 hour; individual study, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores music as a window on the cultural politics of Asian America. Examines expressive culture as a constitutive site for ethnic identities and emergent political formations. Covers musics of Asian immigrants and of subsequent generations, including Asian American jazz and hip-hop. Cross-listed with MUS 124.

AST 127. Music Cultures of Southeast Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in the Philippines, Indonesia, Malaysia, Thailand, Myanmar (Burma), Laos, Cambodia, and Vietnam. Designed for
the student interested in the performing arts and cultures of mainland and insular Southeast Asia. No Western music background is required. Cross-listed with ANTH 176, DNCE 127, ETST 172, and MUS 127.

AST 128. Performing Arts of Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in four major geographic regions of Asia: Central, East, South and Southeast. No Western music training is required. Course is repeatable to a maximum of 8 units. Cross-listed with ANTH 128, DNCE 128, MUS 128, and THEA 176.

AST 131. Readings in the Origins of Science in China and Greece (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the ancient scientific traditions of China and Greece and compares to modern scientific categories. Includes ideas about nature, the body, and systematic accounts of the natural world. Cross-listed with CHN 131, CLA 131, and CPAC 131.

AST 132. Medical Traditions in China and Greece (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A comparative examination of the development of Western medical traditions in classical Greece and the origins and development of the Chinese medical systems now referred to as traditional Chinese medicine, with specific attention to their cultural and social contexts. Cross-listed with CHN 132, CLA 132, and CPAC 132.

AST 135. Great Novels of China (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines a broad array of short stories from the Tang to the Qing dynasties (approximately ninth to eighteenth century). Investigates love, marriage, family, gender, and social norms in the representation of women in Chinese literature. No knowledge of Chinese required. Cross-listed with CHN 135.

AST 136. Family and Gender in the Chinese Short Story (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines a broad array of short stories from the Tang to the Qing dynasties (approximately ninth to eighteenth century). Investigates love, marriage, family, gender and social norms in the representation of women in Chinese literature. No knowledge of Chinese required. Cross-listed with CHN 136.

AST 140. Chinese Painting of the Song and Yuan Dynasties (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. The history of early Chinese painting, from the beginning to the fourteenth century, with concentration on the Song and Yuan dynasties (A.D. 960-1367). The development of themes, subjects, styles, and the representation of women in Chinese literature. No knowledge of Chinese required. Cross-listed with CHN 136.

AST 141. Chinese Painting of the Ming and Qing Dynasties (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 015 or equivalent or upper-division standing or consent of instructor. The history of later Chinese painting (from the fourteenth to the eighteenth century). Investigates new pictorial genres, art theory, political environment, popular taste, and the changing social role of the artist. Cross-listed with AHS 141.

AST 142. Chuang-tzu (4) Lecture, 1 hour; discussion, 2 hours; outside research, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): RLST 005 or RLST 005H or AST 107/CHN 107/RLST 107 or consent of instructor. An examination of chaos, epistemological and linguistic relativism, fate, skill, and the character of the sage in perhaps the most significant of Chinese Taoist texts, the Chuang-tzu. Discussion of the structure and style of this literary masterpiece. Students with knowledge of classical Chinese may arrange additional work through special studies. Cross-listed with CHN 142 and RLST 142.

AST 143. Test and Image in Chinese Painting (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. Examines the art of writing and painting in China, focusing on the close relationship between written language and pictorial image. Reading knowledge of the Chinese language is not necessary. Cross-listed with AHS 143.

AST 144. Japanese Painting: Twelfth to Nineteenth Century (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. Major developments in the pictorial art of Japan from the twelfth to the nineteenth century. Emphasis on the social and cultural contexts of painting, pictorial genres, and the representation of artists and styles. Cross-listed with AHS 144.

AST 145. Militarism and Hegemony in the Ancient World (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative study of ancient warfare and hegemony in two or more civilizations of the ancient world. Perspectives may include social and political contexts, gender and war, acquisition of empire, religious wars, and weapons, strategies and tactics in theory and practice. Study of primary source material in texts and visual arts. Cross-listed with CHN 141, CLA 141, CPAC 141, and POSC 140.

AST 147. The Japanese House (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 015 or upper-division standing or consent of instructor. The history of the traditional Japanese house from prehistoric times to the nineteenth century. Examples used to place the Japanese house within the general history of Japanese architecture and within its social and cultural context. Cross-listed with AHS 146.

AST 148. Chinese Poetry and Poetics in Translation (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examination of traditional Chinese poetry through the study of selected major texts, emphasizing forms, themes, and Chinese poetics in its close relation to the development of Chinese literature. Classes are conducted in English. Cross-listed with CHN 148.

AST 150. In Women's Hands: Reading Japanese Women Writers (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines major works of Japanese women writers from Heian (ninth century) to contemporary, focusing on themes, genres, representations of gender, ideas of love and romance, and feminine aesthetics. Readings include fiction, poetry, essays, and drama, with the main emphasis on fictional writing. Classes are conducted in English. Cross-listed with JPN 150.

AST 151. Early Japanese Literature (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An in-depth introduction to early Japanese literature. Focuses on fiction, from early poem tales and court romances to warrior tales and stories of the floating world. Careful attention is given to the works’ historical and cultural backgrounds and visual and artistic dimensions. All works are read in English translation, Course is repeatable as content changes. Cross-listed with JPN 151.

AST 152 (E-Z). Themes in Modern Japanese Literature (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to modern Japanese literature in translation, as seen through the lens of a particular theme or issue. All materials read or viewed in English. E. The End of the World in Japanese Literature; F. The Mask in Japanese Fiction; G. Love and Death; J. Classics and Canon; K. Dreams and Other Virtual Worlds. Cross-listed with JPN 152 (E-Z).

AST 153 (E-Z). Themes in Early Japanese Literature (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to early Japanese literature, as seen through the lens of a particular theme or issue. All works are read in English translation. E. Supernatural Japan; F. Warrior Japan; G. The Culture of the Floating World; Tokugawa Period Literature, Drama, and Art. Cross-listed with JPN 153 (E-Z).

AST 154 (E-Z). Themes in the Folklore and Popular Culture of Japan (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include myth, legend, folk tale, folk performance, festival, ritual, and the development of popular or commercial culture. Considers literary versus oral tradition, ethnic identity, authenticity, nationalism, modernity, commodification, and the invention of tradition. E. Ancient Myth to Contemporary Legend: A Study of Japanese Folk Narrative; F. History of Japanese Popular Culture. Cross-listed with JPN 154 (E-Z).

AST 161. Translating Modern Southeast Asian Texts (4) Lecture, 3 hours; term paper, 1.5 hours; written work, 1.5 hours. Prerequisite(s): upper-division standing; knowledge of one Southeast Asian language is recommended. An introduction to translating modern Southeast Asian texts into English. Presents translations of texts from Vietnam, Indonesia, and the Philippines in a context of theory. Materials are in English. Course is repeatable as content changes.

AST 162. Vietnamese Literary History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. A historical analysis of Vietnamese literature from its oral tradition to contemporary fiction, with close readings of major authors. Follows the formation of the nation-state and engage with the French, Chinese, Japanese, and Americans. No knowledge of Vietnamese is required. Readings are in translation or bilingual editions; classes are conducted in English. Cross-listed with HIST 187 and VNMN 162.

AST 163. Nationalism and the Novel (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the novel and its role within nationalism as a representative summary or mirror of the nation. Cross-listed with CPLT 163.

AST 164. Vietnamese American Culture (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the pervasive aspects of Vietnamese American culture, including shared histories, acculturation patterns, class diversity, identity struggles, community-building literary and cultural production, youth issues, and cultural survival. Introduces foundational literature, visual culture, and scholarship in the field. Cross-listed with VNMN 164.

instructor. An exploration of Vietnamese literature in translation, as seen through the lens of a particular theme or issue. Segments pay particular attention to the implications of gender and sexuality on nation formation. All materials are read or viewed in English. E. Women and War. Cross-listed with VNM 165 (E-Z) and WMST 165 (E-Z).

AST 166. Vietnam and the Philippines (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the comparative national histories of Vietnam and the Philippines by way of great literary works in various genres: poetry, short fiction, and novels. All materials are read in English. Cross-listed with CPLT 166 and VNM 166.

AST 167. Postcolonial Literature and Criticism in Southeast Asia and Taiwan (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores how the theoretical concepts of postcolonial criticism inform and challenge the literature of Southeast Asia and South Asia, as the literature itself pushes the limits of the criticism. Addresses themes of nation, identity, space, gender, history, transnationalism, neocolonialism, tourism, and education. Cross-listed with CPLT 167.

AST 168. Javanese Gamelan Ensemble: Beginning (2) Prerequisite(s): upper-division standing and consent of instructor. Study and performance of the Central Javanese gamelan, consisting mainly of gongs and gong-chime instruments. Readings and discussions focus on Javanese culture. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with MUS 168.

AST 169. Taiko Ensemble (1) Studio, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Study and performance of Japanese drumming. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with MUS 169.

AST 170. Rondalla Ensemble (1-2) Studio, 2-4 hours. Prerequisite(s): upper-division standing or consent of instructor. Study and performance of the Filipino rondalla, an ensemble consisting of various sizes of lute-like and guitar-like instruments. Discussions focus on Filipino culture. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with MUS 170.

AST 184. Japanese Film and Visual Culture (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigates popular visual culture in Japan primarily through film, from the early masters to contemporary directors. Additional material may be drawn from fields such as theatre, television, visual art, architecture, and illustrated fiction. All materials are read or viewed in English. Course is repeatable to a maximum of 12 units. Cross-listed with FVC 184 and JPN 184.

AST 185. New Chinese Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of representative films from the People’s Republic of China, with a focus on those made during the last decade. Conducted in English; most films have English subtitles. Cross-listed with CHN 185 and FVC 185.

AST 186. Hong Kong Cinema: Gender, Genre, and the “New Wave” (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): FVC 020 or upper-division standing or consent of instructor. Examines contemporary Hong Kong films, specifically the “New Wave” genre. Particular focus is on the sociopolitical conditions of Hong Kong and its relations with Great Britain and China, the linkages of which set the stage for the films and thematic concerns. Cross-listed with FVC 168.

AST 187. Vietnamese and Overseas Vietnamese Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): FVC 020 or upper-division standing or consent of instructor. Explores how Vietnamese people and the Vietnamese diaspora seek to imagine a sense of community in the postwar era through contemporary film and video. Examines the thematics of return, longing, and exile. Reviews some of the texts’ bold expressions of gender, sexuality, and identity. Cross-listed with FVC 167.

AST 188 (E-Z). Topics in Chinese History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing; HIST 180 or HIST 181 or HIST 182; or consent of instructor. An in-depth look at important topics in Chinese history. E. Chinese Food Culture. Cross-listed with HIST 188 (E-Z).

AST 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing or consent of instructor. To be taken with the consent of the Chair of the Program as a means of meeting special curricular problems. Course is repeatable.

AST 195. Senior Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): consent of instructor and senior standing. Preparation of a substantial paper based on original research. The student works independently with a faculty member. Course is repeatable to a maximum of 12 units.

Biochemistry

Subject abbreviation: BCH
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Professors Emeriti

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Associate Professors

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Ernest Martinez, Ph.D.
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Assistant Professors

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Senior Lecturer

Miriam Ziegler, Ph.D.

Lecturer

Rosaleen Gibbons, Ph.D.

Affiliated Emeritus

Irving L. Eaks, Ph.D.

Cooperating Faculty

Michael E. Adams, Ph.D. (Entomology/Cell Biology and Neuroscience)
Peter W. Atkinson, Ph.D. (Entomology)
Jeffrey Bachant, Ph.D. (Cell Biology and Neuroscience)
Julia Bailey-Serres, Ph.D. (Botany and Plant Sciences)
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Patricia S. Springer, Ph.D. (Botany and Plant Sciences)
Michael B. Stemerman, M.D. (Biomedical Sciences)
Christopher Y. Switzer, Ph.D. (Chemistry)
Linda L. Walling, Ph.D. (Botany and Plant Sciences)
Raphael Zidovetzki, Ph.D. (Cell Biology and Neuroscience)

Major

The three emphases areas within the Biochemistry major are Chemistry, Biology, and Medical Sciences. The Biology and Chemistry emphases are for students interested in postgraduate education or employment in the basic areas of the discipline of Biochemistry. The goal of the Medical Sciences emphasis is to prepare students for admission to postbaccalaureate education in the health professions. The Biology, Chemistry, and Medical Sciences emphases focus on the development of laboratory and critical thinking skills, and hands-on laboratory
experience. In addition, participation in an independent research project (BCH 197) or research tutorial (BCH 190), carried out under the supervision of a faculty member, is encouraged. Internships in industry (BCH 198-I) are also available, and often lead to valuable job experience and employment opportunities.

The department offers both B.A. and B.S. degrees. The major and emphasis requirements are the same for both, and most students choose the B.S. degree. The B.A. degree requires 12 additional units of Humanities and Social Sciences courses, and 16 units or a course 4 equivalency level of a foreign language (see College Breadth Requirements).

Transfer Students
Transfer students majoring in Biochemistry must complete at least three of the following full-year sequences, which must include first-year calculus and general chemistry:

1. First-year calculus, equivalent to MATH 009A, MATH 009B, MATH 009C
2. General chemistry, equivalent to CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
3. Organic chemistry (must be completed with a minimum grade of “B” in each term)
4. General biology, equivalent to BIOL 005A, BIOL 05LA, and BIOL 005B (and BIOL 005C, if available)
5. General physics (calculus-based) equivalent to PHYS 002A, PHYS 002B, PHYS 002C or PHYS 040A, PHYS 040B, PHYS 040C

Students must have a minimum grade point average of 2.70 in transferable college courses.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college's breadth requirements. Consult with a department advisor for course planning.

Major Requirements
The major requirements and the emphasis requirements are the same for the B.A. and the B.S. degree in Biochemistry. Choose one emphasis. All upper-division courses presume completion of the life sciences core curriculum.

Biology Emphasis
1. Lower-division requirements (56-57 units)
   a) BCH 095 or equivalent
   b) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C
   c) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   d) MATH 008B or MATH 009A, MATH 009B, MATH 009C
   e) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC
2. Statistics requirement (5 units): STAT 100A
3. Upper-division requirements (59–65 units)
   a) BCH 101, BCH 102, BCH 110A, BCH 110B, BCH 110C, BCH 184
   b) At least 7 units from BCH 120, BCH 153/Biol 153/BPSC 153, BCH 162, BCH 180A, BCH 180B, BCH 180C, BCH 183, BCH 186, BCH 210, BCH 211, BCH 212, BCH 241/CHM 241
   c) BIOL 102
   d) CHEM 109 or CHEM 110A; CHEM 112A, CHEM 112B, CHEM 112C
   e) Choose three biological science courses from the following:
      (1) BCH 120, BCH 153/Biol 153/BPSC 153, BCH 162, BCH 180A, BCH 180B, BCH 180C, BCH 183, BCH 186, BCH 210, BCH 211, BCH 212, BCH 241/CHM 241
      (2) BIOL 105, BIOL 108, BIOL 114, BIOL 117, BIOL 121/MOBL 121, BIOL 121L/MOBL 121L, BIOL 123/MOBL 123/PLPA 123, BIOL 124/MOBL 124, BIOL 128/CBNS 128, BIOL 151, BIOL 155/BPSC 155, BIOL 157, BIOL 159/NEM 159, BIOL 160, BIOL 161A, BIOL 161B, BIOL 171, BIOL 171L, BIOL 173/ENTM 173, BIOL 175
      (3) BIOL 104/BPSC 104, BIOL 132/BPSC 132, BIOL 143/BPSC 143, BIOL 148/BPSC 148, BIOL 155/BPSC 155, BPSC 135
      (4) BIOL 100/ENTM 100, BIOL 173/ENTM 173, ENTM 128
      (5) CBNS 101, CBNS 106, CBNS 116, CBNS 120/PYSC 120, CBNS 120L/PSYC 120L, CBNS 124/PSYC 124, CBNS 125/PSYC 125, CBNS 150/ENTX 150, CBNS 169
      (6) ENSC 100, ENSC 155
      (7) ENSC 101, CBNS 150/ENTX 150
4. BCH 190 or BCH 197 are available as elective courses to juniors who have completed BCH 102 and to seniors. No more than 9 units of courses numbered 190–199 may be counted toward the major.

Medical Sciences Emphasis
1. Lower-division requirements (54-55 units)
   a) BCH 095 or equivalent
   b) BCH 096, BCH 098-I
   c) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C
   d) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   e) MATH 008B or MATH 009A, MATH 009B
   f) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC
2. Statistics requirement (5 units): STAT 100A
3. Upper-division requirements (58–59 units)
   a) BCH 101, BCH 102, BCH 110A, BCH 110B, BCH 110C, BCH 184
   b) At least 7 units from BCH 120, BCH 153/Biol 153/BPSC 153, BCH 162, BCH 180A, BCH 180B, BCH 180C, BCH 183, BCH 186, BCH 210, BCH 211, BCH 212, BCH 241/CHM 241
   c) BIOL 102
   d) CHEM 109 or CHEM 110A; CHEM 112A, CHEM 112B, CHEM 112C
   e) Two courses from CHEM 110B, CHEM 113, CHEM 125, CHEM 150A, CHEM 150B, CHEM 166 (BCH 241/CHM 241 and other graduate courses may be substituted by students with a GPA of 3.00 or better with permission of the instructor and the faculty advisor.)
4. BCH 190 or BCH 197 are available as elective courses to juniors who have completed BCH 102 and to seniors. No more than 9 units of courses numbered 190–199 may be counted toward the major.

Note: A maximum of 12 units of 190–199 courses may be counted toward the 180 unit graduation requirement. All courses used towards the Biochemistry major requirements must be taken for letter grades.
Graduate Program

The Department of Biochemistry offers a graduate program leading to the M.S. or Ph.D. degree in Biochemistry and Molecular Biology. This program emphasizes basic biochemistry with research specializations in the areas of molecular biology, physical biochemistry, molecular endocrinology, plant biochemistry and molecular biology, signal transduction, and biomedical research. It is designed for students who are planning a career of research and teaching in biochemistry at colleges and universities or who wish to engage in biochemical investigations of fundamental or applied nature in private, governmental or commercial laboratories.

Admission

Students who have completed a bachelor’s degree in physical, biological, chemical, or agricultural sciences are invited to apply to the program. Regardless of the area of their major for the baccalaureate degree, students should have taken the following courses prior to beginning graduate study in biochemistry or plan to make up deficiencies soon after entering graduate school:

1. One year of calculus
2. One year of general physics
3. One year of organic chemistry
4. An introductory course in physical chemistry
5. At least two courses in biology at the upper-division level, including genetics

Students should arrange to take the GRE, General Test in time for their scores to be submitted with their application.

Doctoral Degree

The Department of Biochemistry offers the Ph.D. degree in Biochemistry and Molecular Biology.

Course Work

Students’ course requirements are determined in consultation with a three-member advisory committee appointed for them upon their arrival. The advisory committee suggests an individualized course program involving classes in biochemistry and subsidiary fields of study, chosen from any of the physical, biological, or agricultural sciences. Although an adequate course preparation is a requisite part of the training program, the department encourages early involvement of the students in research directed toward their dissertations.

At the end of the second quarter, students select major professors and are ready to initiate a research project. At the end of the first year, students submit a written report describing their research efforts and relating them to current biochemical work in related areas.

Written and Oral Qualifying Examinations

After the second year, students take a comprehensive written qualifying examination, then submit and orally defend a research report in which they describe the research they have performed thus far and develop a plan for their complete dissertation research project. This fulfills the Graduate Division’s requirement for an oral qualifying examination; Students completing these requirements are advanced to candidacy for the Ph.D. degree.

Dissertation and Final Oral Examination

Following completion of their research, students submit a written dissertation and conclude their studies with an oral defense of the dissertation. As part of the program, each student is required to serve at least two quarters as a teaching assistant.

Normative Time to Degree

15 quarters

Master’s Degree

In addition to the Ph.D. program, the department offers two plans for the master’s degree (Plan I, Thesis; Plan II, Comprehensive Examination). Both plans require completion of at least 36 course units; for Plan I, a maximum of 12 units may be for thesis research.

Lower-Division Courses

BCH 010. Introduction to Nutrition (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to the biological basis of human nutrition in the context of plant-animal-microorganism cycles and the characteristics of different food classes. The effects of nutritional needs, food availability, and the expanding human population are discussed. Students record and evaluate their own diet.

BCH 095. Topics in Biochemistry for Career Planning (1) Seminar, 1 hour. Prerequisite(s): lower-division standing in Biochemistry. Topics include analysis of academic aspects of career goals and options; curriculum planning; undergraduate research opportunities; preparation for postgraduate education; laboratory experiences and evaluation of data; ethics in education and research; research problems in contemporary biochemistry; and modern experimental approaches in biochemistry. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of BCH 095, NASC 091, or NASC 093.

BCH 096. Introduction to Humanitarian and Healthcare Service (1) Lecture, 8 hours per quarter; consultation, 2 hours per quarter. Prerequisite(s): a major in Biochemistry with an emphasis in Medical Sciences. Acquaints students with opportunities for volunteer activities in the humanitarian and healthcare arenas in southern California. Provides students with the opportunity to validate their commitment to a career in the healthcare arena. Requires a term paper. Graded Satisfactory (S) or No Credit (NC).

BCH 097. Research Tutorial in Biochemistry (1) Laboratory, 3 hours. Prerequisite(s): lower-division standing, minimum grade point average of 3.5, approval of undergraduate advisor and consent of instructor. Laboratory tutorial in Biochemistry. To provide biochemistry laboratory experience for exceptional lower-division students. A written report is required at the end of each quarter. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 3 units.

BCH 098-L Individual Internship in a Humanitarian or Healthcare Arena (1) Internship, 3 hours; term paper, 10 hours per quarter. Prerequisite(s): a major in Biochemistry with an emphasis in Medical Sciences; BCH 096. Gives Biochemistry majors with a Medical Sciences emphasis real-world experience providing community service in a humanitarian or healthcare arena. Requires a written report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 2 units.

Upper-Division Courses

BCH 100. Elementary Biochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005C, CHEM 112C (BIOL 005C and CHEM 112C may be taken concurrently). An introduction to the chemistry and molecular biology of living organisms based on a study of the structure, function, and metabolism of small molecules and macromolecules of biological significance. Examines selected animals, plants, and microorganisms to develop a general understanding of structure-function relationships, enzyme action, regulation, bioenergetics, intermediary metabolism, and molecular biology. Credit is not awarded for BCH 100 if it has already been awarded for BCH 110A, BCH 110B, or BCH 110C.

BCH 101. Biochemical Laboratory: Fundamentals (3) Laboratory, 3 hours; lecture, 1 hour; discussion, 1 hour. Prerequisite(s): CHEM 112A (may be taken concurrently) or consent of instructor. Introduces basic biochemistry wet laboratory techniques for biological samples, including micropipetting, volumetric relationships, dilutions, pH measurement, buffer preparation, spectrophotometry, gel permeation chromatography, and ion-exchange chromatography as well as use of molecular graphics for investigation of macromolecular structure-function relationships.

BCH 102. Introductory Biochemistry Laboratory (4) Lecture, 2 hours; laboratory, 8 hours. Prerequisite(s): BCH 100 with a grade of "C-" or better or BCH 110A with a grade of "C-" or better; BCH 110 with a grade of "C-" or better or CHEM 005 with a grade of "C-" or better; or consent of instructor. Introduction to biochemistry laboratory techniques including spectrophotometry, pH and buffer preparation, methods of protein determination, principles and uses of chromatography, enzyme assay, theory and measurement of radiotopes (liquid scintillation counting), SDS gel electrophoresis, and theory of centrifugation. Most experiments include a "quantitative component" upon which the student's performance is graded.

BCH 110A. General Biochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005B; CHEM 112C. Consideration of the structure and function of biological molecules including proteins, carbohydrates, lipids, and nucleic acids.

BCH 110B. General Biochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110A with a grade of "C-" or better or consent of instructor. Consideration of metabolic pathways including mechanisms and regulation of catabolism, anabolism, and bioenergetics in living organisms.

BCH 110C. General Biochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110A with a grade of "C-" or better or BCH 110B with a grade of "C-" or better or consent of instructor; BIOL 102 or concurrent enrollment in BIOL 115 or consent of instructor. Consideration of regulation of gene expression, genome replication, recombination, and repair.

BCH 120. Topics in Human Biochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 with a grade of "C-" or better or BCH 110B with a grade of "C-" or better or consent of instructor. Lectures on biochemical and molecular aspects of modern endocrinology, nutrition, metabolic diseases, and blood chemistry. Emphasis is on relation of the above topics to medicine. The discussion sections are used for presentations on topical medical problems.
BCH 153. Plant Genomics and Biotechnology Laboratory (4) Lecture, 1 hour; discussion, 1 hour; laboratory, 6 hours. Prerequisite(s): BCH 110C or BIOL 107A; upper-division standing; consent of instructor. A study of modern techniques in plant genome modification. Topics include nucleic acid cloning and sequencing; plant tissue culture and genome modification. Also explores the history of plant biotechnology; eco-growth; gene mapping; and germplasm collections. Cross-listed with BIOL 153 and BPSC 153.

BCH 162. Biochemistry and Molecular Biology Laboratory (5) Lecture, 1 hour; discussion, 1 hour; laboratory, two 4.5-hour laboratories. Prerequisite(s): BCH 102; BCH 110A, BCH 110B, BCH 110C all with grades of "C-" or better (BCH 110C may be taken concurrently); consent of instructor. Purification, quantitation, and analysis of DNA, RNA, protein, and lipid. Molecular techniques include DNA cloning, in situ hybridization, restriction mapping, PCR, and DNA sequencing. Biochemical techniques include in vitro transcription and translation, immunochromatexy, phase extraction, affinity chromatography, and gel shift assays.

BCH 180A. Methods in Gene Regulation (2) Lecture, 1 hour; seminar, 1 hour; extra reading, 2 hours; term paper, 5 hours. Prerequisite(s): upper-division standing, concurrent enrollment in BCH 197 or equivalent, or BCH 110C or BIOL 107A; or consent of instructor. Introduction and discussion of experimental approaches and modern techniques in the study of gene regulation in eukaryotes.

BCH 180B. Methods in Chromatin Research (2) Lecture, 1 hour; seminar, 1 hour; extra reading, 2 hours; term paper, 5 hours. Prerequisite(s): upper-division standing, concurrent enrollment in BCH 197 or equivalent, or BCH 110C or BIOL 107A; or consent of instructor. Introduction and discussion of the experiments and methods in studying DNA-dependent processes in the context of chromatin.

BCH 180C. Methods in Cell Signaling (2) Lecture, 1 hour; seminar, 1 hour; extra reading, 2 hours; term paper, 5 hours. Prerequisite(s): upper-division standing, concurrent enrollment in BCH 197 or equivalent, or BCH 110C or BIOL 107A; or consent of instructor. Introduction and discussion of the experimental approaches and modern techniques in the study of cell growth regulation, signal transduction, and cell death in cancer.

BCH 183. Plant Biochemistry (3) Lecture, 3 hours. Prerequisite(s): BCH 110A, BCH 110B; or BCH 100. The course is designed for the student interested in plant biochemistry who wishes to become informed about biochemical structures, systems and metabolic pathways which are unique to plants; for example, photosynthesis, nitrogen fixation, cell walls, and seed development and germination.

BCH 184. Topics in Physical Biochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 with a grade of "C-" or better, or BCH 110A with a grade of "C-" or better; CHEM 112C and either CHEM 109 or CHEM 110A; or consent of instructor. Lectures on the application of spectroscopy, imaging, and other physical methods in biochemistry including study of macromolecular structure, nucleic acid-protein interactions, subcellular structures, bioenergetics, mechanisms of enzymatic catalysis, enzyme kinetics, and metabolism.

BCH 186. Topics in Molecular Bioenergetics (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BCH 100 with a grade of "C-" or better or BCH 110B with a grade of "C-" or better; BCH 184 with a grade of "C-" or better; consent of instructor. Introduction to biological energy transduction. Describes the coupling of oxidative phosphorylation and photosynthesis to adenosine triphosphate (ATP) synthesis and the coupling of ATP hydrolysis to ion transport, chemotaxis, molecular motors, biomimetics, and other biological processes on the basis of recent structural and mechanistic studies of the protein complexes involved.

BCH 187. Fundamentals of Enzymology (3) Lecture, 3 hours. Prerequisite(s): BCH 100 or BCH 110A with a grade of C- or better. An introduction to the fundamental principles of enzymology. Specific topics include, acid-base catalysis, strain effects, transition state theory, enzyme kinetics (including iso- tope effects), enzyme dynamics and enzyme regulation. Considers in detail the reactions of several representa- tive enzymes.

BCH 188. Introduction to Oral Presentations (2) Seminar, 1 hour; discussion, 1 hour. Prerequisite(s): upper-division standing; consent of instructor. Prepares science students for oral presentations and formal research talks. Includes student presentations and discussions. Also covers the electronic prepara- tion of figures and tables.

BCH 189. Reading and Analysis of Scientific Articles (1) Lecture, 1 hour. Prerequisite(s): junior or senior standing or consent of instructor. Introduces students to the analysis of scientific articles. Students read current research papers, present the data, and learn to critique papers.

BCH 190. Special Studies (2-4) Individual study, 6-16 hours. Prerequisite(s): upper-division standing and consent of instructor. Literature review and tutorial in select modern biochemical topics. Course is repeat- able.

BCH 197. Research for Undergraduate Students (1-4) Prerequisite(s): junior status and consent of the instructor. Directed research and preparation of writ- ten report. Course is repeatable.

BCH 198-I. Internship in Biochemistry (1-12) Internship, 3-36 hours. Prerequisite(s): BCH 102, consent of instructor, upper-division standing. An internship to provide students with on-the-job bioch- emical experience in government, industrial or clini- cal laboratories. Each individual project must be approved by the Biochemistry Department and the laboratory director where the internship is to be carried out. A written report is required. Graded Satisfactory (S) or No Credit (NC). May be repeated for a total of 12 units.

Graduate Courses

BCH 204. Genome Maintenance and Stability (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110C or BIOL 107A; BCH 113 or BIOL 114 or CBNS 101; BIOL 102 is strongly recommended. Emphasizes chromosome-based processes that main- tain genome integrity and ensure accurate genome transmission during cell division. Topics are drawn from the primary literature and include chromatin structure and composition, DNA repair and recombi- nation, telomere function and chromosome mainte- nance, mitotic chromosome segregation, and check- point surveillance mechanisms. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with CMDB 204 and ENTX 204.

BCH 205. Signal Transduction Pathways in Microbes and Plants (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing in the biological sciences, BIOL 107A or BIOL 113 or BIOL 114 or CBNS 101; consent of instructor. Advanced topics in signal transduction pathways that regulate growth and development in plants and prokaryotic and eukaryotic microbes. Areas covered include two-component reg- ulatory systems; quorum sensing; signaling via small and heterotrimeric G proteins; mitogen-activated protein kinase cascades; cAMP signaling, photoreceptors; plant hormone signaling; responses to low-oxygen stress; calcium signaling; and plant pathogenesis. Cross-listed with BPSC 205, CMDB 205, GEN 205, MCB 205, and PLPA 205.

BCH 210. Biochemistry of Macromolecules (4) Lecture, 4 hours. Prerequisite(s): BCH 110A, BCH 110B, BCH 110C or equivalents; BCH 184 (may be taken concur- rently); CHEM 105; graduate standing or consent of instructor. Discussion of recent advances in the knowledge of protein structure and function, including primary, secondary, tertiary, and quaternary structures, and nucleic acids, especially with respect to new experimental approaches for analyzing their structure and function. Chemistry of the active site of enzymes.

BCH 211. Molecular Biology (3) Lecture, 3 hours. Prerequisite(s): BCH 110A, BCH 110B, BCH 110C or equivalents; graduate standing or consent of instruc- tor. Advanced topics in molecular biology of the biosynthesis and regulation of DNA, RNA, and pro- teins. Some topics covered include the following: molecular anatomy of genes and chromosomes; DNA repair and recombination; regulation of genes in the cell cycle; telomerase; RNA processing and splicing; RNA editing; regulation of normal genes and onco- genes; chaperones and protein targeting.

BCH 212. Signal Transduction and Biochemical Regulation (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BCH 110A, BCH 110B, BCH 110C or equivalents; graduate standing or consent of instruc- tor. Advanced topics in signal transduction and bio- chemical regulation. Some topics covered include the following: protein kinases and protein phosphorylation; phosphatases and their role in regulation; function of phosphorylation events in regulation of metabolism and growth; calcium and other ion channels as signal transduction mechanisms, steroid hormones receptor superfamily; immune system signal transduction events.

BCH 230 (E-Z). Advanced Topics in Biochemistry (2) Lecture, 1 hour; discussion, 1 hour. Prerequisite(s): BCH 100 or both BCH 110A and BCH 110B or con- sent of instructor. Addresses advances in a particular field of biochemistry by analysis of the recent litera- ture. E. Structure of Biological Molecules; F. Enzyme Catalysis; G. Glyco- biochemistry; H. Membrane Biochemistry; I. Cytoskeletal and Extracellular Matrix; J. Metabolism; K. Regulation of Chromatin Structure and Transcription; M. Genome Stability; N. Regulation of Protein Synthesis; O. Signal Transduction; Q. Cell Cycle Regulation; R. Biochemistry of Stress Responses; S. Biochemistry of Development and Aging; T. Molecular Basis of Genetic Diseases; U. Genomics and Proteomics; V. Emerging Topics in Biochemistry and Molecular Biology; W. Stem Cell Biology.

BCH 231. The Plant Genome (4) Lecture, 3 hours; dis- cussion, 1 hour. Prerequisite(s): BCH 100, BIOL 107A; or BCH 110A, BCH 110B, BCH 110C; or con- sent of instructor. Gives students an appreciation for the structure of the plant nuclear, chloroplast, and mitochondrial genomes. Gene structure, regulation of gene expression, transposons, and methods of gene introduction are also emphasized. Cross-listed with BPSC 231.

BCH 241. Bioorganic Chemistry (3) Lecture, 3 hours. Prerequisite(s): BCH 100 or BCH 110A; BCH 184 or CHEM 110B; CHEM 112A, CHEM 112B, CHEM 112C; graduate standing or consent of instructor. Biochemical reactions discussed from a chemical standpoint, including reactions associated with bioenergetics, biocatalysis, and enzyme catalysis. Emphasis on reaction mechanisms. Cross-listed with CHEM 241.

BCH 250. Oral Presentations in Biochemistry (2) Seminar, 1 hour; discussion, 1 hour. Prerequisite(s): graduate standing. Training and practice in the presentation of biochemical concepts in both short and long seminar formats, using blackboard, overhead projector, and slides. Presentations are immediately and critically evaluated by both faculty and staff. Limited to 10 students.

BCH 251. Graduate Seminar in Biochemistry (2) Seminar, 1 hour; discussion, 1 hour. Prerequisite(s): BCH 250. Oral reports by graduate students on current research topics in biochemistry.

BCH 252. General Seminar in Biochemistry (1) Seminar, 1 hour. Prerequisite(s): graduate standing. Oral reports by faculty, graduate students, and visiting scholars on current research topics in biochemistry. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BCH 261. Seminar in Genetics, Genomics, and Bioinformatics (1) Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Oral reports by visiting scholars, faculty, and students on current research topics in Genetics, Genomics, and Bioinformatics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with BIOL 261, BPSC 261, ENTM 261, GEN 261, and PLPA 261.

BCH 289. Special Topics in Neuroscience (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. An interdisciplinary seminar consisting of student presentations and discussion of selected topics in neuroscience. Content and instructor(s) vary each time course is offered. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BIOL 289, CHEM 289, ENTM 289, NRSC 289, and PSYC 289.

BCH 290. Directed Studies (1-4) Outside research, 3-12 hours. Prerequisite(s): graduate standing in Biochemistry; consent of instructor and graduate advisor. Experimental or literature studies on specifically selected topics undertaken under the direction of a staff member. With prior approval of the graduate advisor, M.S. students may be assigned a letter grade; other students are graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BCH 291. Individual Study in Biochemistry (1-6) Prerequisite(s): graduate standing in Biochemistry or consent of instructor. A program of studies designed to advise and assist candidates who are preparing for examinations. Open to M.S. and Ph.D. candidates; does not count toward the unit requirement for the M.S. degree. Graded Satisfactory (S) or No Credit (NC). Repeatable up to 6 units for Pre-Master’s students and up to 12 units for Ph.D. students prior to successful completion of the qualifying examination.

BCH 297. Directed Research (1-6) Prerequisite(s): graduate status in Biochemistry or consent of instructor. Directed research in preparation for dissertation projects performed prior to advancement to candidacy. Graded Satisfactory (S) or No Credit (NC).

BCH 299. Research for Thesis or Dissertation (1-12) Prerequisite(s): graduate status in Biochemistry or consent of instructor. A program of studies designed for students who are preparing for application to medical schools. Directed research in preparation for dissertation projects performed prior to advancement to candidacy. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Bioengineering

Subject abbreviation: BIEN

The Marlan and Rosemary Bourns College of Engineering

Jerome S. Schultz, Ph.D., Chair
Department Office, A231 Bourns Hall
(951) 827-4303; www bioeng ucr edu

Professors
Bahman Avarri, Ph.D.
Dimitrios Monikis, Ph.D.
Víctor G. J. Rodgers, D.Sc.
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Assistant Professors
Jayu Liao, Ph.D.
Julia Lyubovitsky, Ph.D.
Valentine Vullev, Ph.D.

Visiting Assistant Professors
Angelika Dimoka, Ph.D.

Major

The major in Bioengineering allows students to complete a B.S. degree that provides a basic education to enter the fields of bioengineering and biotechnology.

Bioengineering is rooted in physics, mathematics, chemistry, biology, and the life sciences. It is the application of a systematic, quantitative, and integrative way of thinking about and approaching the solutions of problems important to biology, health, and clinical practice.

Bioengineers develop processes and products that are important for health and treatment of diseases, new materials, protecting environments, and food production. They are employed by the pharmaceutical, biotechnology, medical device, and environmental and food industries. For students interested in medicine, the bioengineering program provides the basic courses to prepare for application to medical schools.

The objective of the bioengineering program is to produce graduates who:
- have life-long learning skills that maintain their high level of professional competence
- have the skills to apply engineering and biological principles to meet the challenges of this rapidly evolving field
- be prepared for advanced postgraduate training in bioengineering and biomedical allied fields

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www engr ucr edu/student affairs for details.

University Requirements
See Undergraduate Studies section.

College Requirements
See The Marlan and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Bioengineering major uses the following major requirements to satisfy the college’s
Natural Sciences and Mathematics breadth requirement.

1. BIOL 005A, BIOL 05LA
2. CHEM 001A, CHEM 001B, CHEM 001C
3. MATH 008B or MATH 009A

Major Requirements

1. Lower-division requirements (72 units)
   a) BIEN 010
   b) BIOL 005A, BIOL 05LA, BIOL 005B
   c) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   d) CS 010
   e) EE 001A, EE 011A
   f) MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   g) PHYS 040A, PHYS 040B, PHYS 040C

2. Upper-division requirements (84 units)
   a) BCH 100, BCH 102
   b) BIEN 105, BIEN 110, BIEN 120, BIEN 125, BIEN 130, BIEN 135, BIEN 140A/CEE 140A, BIEN 155, BIEN 159, BIEN 175A, BIEN 175B
   c) BIOL 171
   d) CHEM 112A, CHEM 112B, CHEM 112C
   e) STAT 155
   f) Technical electives (16 units): upper-division courses in engineering, biology and/or substantive courses in a field(s) related to bioengineering

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs
for a sample program.

Lower-Division Course

BIEN 010. Overview of Bioengineering (2) Lecture, 1 hour; laboratory, 3 hours. Provides an overview of the various aspects of bioengineering. Illustrates the application of engineering principles for the design of various products and processes related to the health sciences industries. Covers diagnostic instruments, artificial organs, biotechnology, and cell and tissue engineering. Designed for both engineering and non-engineering majors. Graded Satisfactory (S) or No Credit (NC).

Upper-Division Courses

BIEN 105. Circulation Physiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005B, MATH 046, PHYS 040A. Introduces tensor and vector mathematics that describe the conservation of momentum and mass transport in biological sciences, the cardiovascular system, and pulmonary system. Includes constitutive equations such as the Navier-Stokes and Casson models, significance of fluid stress in biological vessels, and the physiological relevance of fundamental parameters. Emphasizes the relationship between function and system behavior.

BIEN 110. Biomechanics of the Human Body (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C or CHEM 011C, MATH 010A, ME 010, PHYS 040B. Introduces the motion, structure and function of the musculoskeletal system, the cardiovascular system, and the pulmonary system. Topics include applied statics, kinematics, and dynamics of these systems and the mechanics of various tissues (ligament, bone, heart, blood vessels, lung). Emphasis is on the relation between function and material properties of these tissues.

BIEN 120. Biosystems and Signal Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005B, CS 010, MATH 046, PHYS 040C. Provides basic knowledge for the quantitative analysis of the dynamic behavior of biological systems. Particular applications include neural systems, control of metabolic and hormonal systems, and design of instruments for monitoring and controlling biological systems. Topics include system theory, signal properties, control theory, and transfer functions.

BIEN 125. Biotechnology and Molecular Bioengineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 or BCH 110A. Provides an overview of biochemical processes in cells and their use in developing new products and processes. Focuses on cellular processes such as metabolism, protein synthesis, enzyme behavior, and cell signaling and control from an engineering viewpoint of modeling and control.

BIEN 130. Bioinstrumentation (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 120. Introduces basic components of instruments for biological applications. Explores sources of signals and physical principles governing the design and operation of instrumentation systems used in medicine and physiological research. Topics include data acquisition and characterization; signal-to-noise concepts and safety analysis; and interaction of instrument and environment.

BIEN 130L. Bioinstrumentation Laboratory (2) Laboratory, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 130. Laboratory experience with instrumental methods of measuring biological systems. Introduces various sensors and transducers to measure physical, chemical, and biological properties. Covers reliability, dynamic behavior, and data analysis.

BIEN 135. Biophysics and Biothermodynamics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 125, MATH 046, PHYS 040B. An introduction to the application of thermodynamic principles to understanding the behavior of biological systems. Discusses biophysical properties of biomacromolecules, such as proteins, nucleic acids, carbohydrates, and lipids, and methods of characterizing their properties and interactions.

BIEN 140A. Biomaterials (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 or BCH 110A; CHEM 112C; MATH 010B; PHYS 040B. Covers the principles of materials science and engineering, with attention to topics in bioengineering. Discusses atomic structure, hard treatment, fundamentals of corrosion, manufacturing processes, and characterization of materials. Cross-listed with CEE 140A.

BIEN 140B. Biomaterials (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 140A/CEE 140A. Covers the structure-property relations of metals, ceramics, polymers, and composites, as well as hard and soft tissues such as bone, teeth, cartilage, ligament, skin, muscle, and vasculature. Focuses on behavior of materials in the physiological environment. Cross-listed with CEE 140B.

BIEN 155. Bioengineering Laboratory (2) Laboratory, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005B, CHEM 112C, PHYS 040C. Laboratory experience in cell culture, bioreactors, optical techniques, array techniques, and separation and purification methods.

BIEN 159. Dynamics of Biological Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 or BCH 110A. Covers engineering principles for the analysis and modeling of biological phenomena. Topics include molecular diffusion and transport, membranes, ligand-bioreceptor interactions, enzyme kinetics, and dynamics of metabolic pathways and the application of these principles to the design of bioreactors, bioassays, drug delivery systems, and artificial organs. Cross-listed with CEE 159. Credit is awarded for only one of BIEN 159/CEE 159 or BIEN 264/CEE 264.

BIEN 175A. Senior Design (4) Lecture, 2 hours; practicum, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 130; senior standing in Bioengineering. Preparation of formal engineering reports and statistical analysis on a series of problems illustrating methodology from various branches of applied bioengineering. Covers the entire design process: design problem definition, generation of a design specification, documentation, design review process, prototype fabrication, testing and calibration, cost estimation, and federal guidelines. Requires a term project and oral presentation. Graded In Progress (IP) until BIEN 175A and BIEN 175B are completed, at which time a final, letter grade is assigned.

BIEN 175B. Senior Design (4) Lecture, 1 hour; practicum, 6 hours; discussion, 1 hour. Prerequisite(s): BIEN 175A; senior standing in Bioengineering. Preparation of formal engineering reports and statistical analysis on a series of problems illustrating methodology from various branches of applied bioengineering. Covers the entire design process: design problem definition, generation of a design specification, documentation, design review process, prototype fabrication, testing and calibration, cost estimation, and federal guidelines. Requires a term project and oral presentation. Satisfactory (S) or No Credit (NC) grading is not available.

BIEN 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing; consent of instructor and department chair. Provides individual study to meet special curricular needs. Course is repeatable to a maximum of 9 units.

BIEN 197. Research for Undergraduates (1-4) Laboratory, 3-12 hours. Prerequisite(s): consent of instructor and Bioengineering undergraduate program advisor. Directed research on a topic relevant to bioengineering. Requires a final written report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Graduate Courses

BIEN 220. Chemical Genomics Design Studio (2) Lecture, 1 hour; practicum, 4 hours. Prerequisite(s): Course work in cell biology, genetics, combinatorial chemistry; or consent of instructor, graduate standing. Explores chemical genomic research approaches. Emphasizes critical thinking; advanced planning of time-consuming tests of hypotheses and experimental caveats, trade-offs, and options. Taught in a case-study approach, teams consist of students with engineering, biology, computational sciences, and chemical backgrounds. Teams generate an interdisciplinary chemical genomic research project. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with CMDB 220.
BIEN 223. Engineering Analysis of Physiological Systems (3) Lecture, 3 hours. Prerequisite(s): course work in basic biology, calculus, chemistry, and physics; graduate standing or consent of instructor. Provides the bioengineering approach to the physiological properties and interactions of various mammalian organ systems. Covers the nervous, muscular, cardiovascular, respiratory, and renal systems. Emphasizes the physical and engineering principles governing these systems by applying quantitative and analytical approaches. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

BIEN 224. Cellular and Molecular Engineering (3) Lecture, 2 hours; practicum, 3 hours. Prerequisite(s): graduate standing in Bioengineering or consent of instructor. Emphasizes biophysical and engineering concepts intrinsic to specific topics at the cellular and molecular level. Includes receptor-ligand dynamics in cell signaling and function; DNA replication and RNA processing; flow and transport; and other emission processes that modulate the characteristics of design of experiments, information content, causation versus correlation, and statistical analysis with respect to hypothesis testing, model development, and parameter estimation. Covers state-of-the-art experimental techniques in proteomics, transcriptomics, metabolomics, and genomics. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with CEE 249.

BIEN 225. Biophotonics: Optical Microscopy and Its Biological Applications (3) S, F, W Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Examines the fundamentals of optical system design and system integration in light microscopy. Covers design components, including focal plane detectors, detection systems, and image formation. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 226. Special Topics in Bioinstrumentation (1 or 2) Seminar, 1 hour; term paper, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on advanced technologies in bioengineering, such as spectroscopy, microscopy, magnetic resonance imaging, computed tomography, ultrasonography, and biosensors. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 227. Biophotonics: Laser-Tissue Interactions and Therapeutic Applications (3) Lecture, 2 hours; term paper, .5 hours; extra reading, 1 hour; written work, 1.5 hours. Prerequisite(s): BIOL 005C, CHEM 001C, CS 005, MATH 046, PHYS 002C, or equivalents. Provides an overview of various types of interactions between lasers and biological tissues. Addresses methods of optical properties measurements, mathematical modeling of light propagation, and selected therapeutic applications of lasers. Includes one or two field trips to medical laser centers to observe laser treatment procedures.

BIEN 228. Biophotonics: Optical Diagnosis and Measurements (3) Lecture, 2 hours; outside research, .5 hours; extra reading, 1 hour; written work, 1.5 hours. Prerequisite(s): BIEN 227. Covers the fundamentals underlying optical diagnostic procedures, including absorption and scattering-based techniques. Also addresses physics of optical tweezers and their applications in biological sciences.

BIEN 233. Computational Modeling of Biomolecules (4) Lecture, 2 hours; workshop, 2 hours. Prerequisite(s): BIOL 005B, CHEM 112B; MATH 009B or MATH 09HB; PHYS 005B; or consent of instructor. Presents emission-based analytical and bioanalytical methods and techniques. Reviews state-of-the-art instrumentation, including their applicability, limitations, and scope, as well as interpretation and meaning of the measured signals, with applications to biological systems. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes.

BIEN 249. Integration of Computational and Experimental Biology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005B; MATH 009B or MATH 09HB; graduate standing. Multidisciplinary approaches. May be taken Satisfactory (S) or No Credit (NC). Prerequisite(s): graduate standing or consent of instructor. Focuses on advanced methods of analysis and modeling of biological phenomena. Topics include molecular diffusion and transport, membranes, ligand-bioreceptor interactions, energy metabolism, and dynamics of metabolic pathways and the application of these principles to the design of bioreactors, biosassays, drug delivery systems, and artificial organs. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Cross-listed with CEE 264. Credit is awarded for only one of BIEN 199/CEE 159 or BIEN 264/CEE 264.

BIEN 251. Biophotonics: Optical Microscopy and Its Biological Applications (3) S, F, W Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Examines the fundamentals of optical system design and system integration in light microscopy. Covers design components, including focal plane detectors, detection systems, and image formation. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 252. Special Topics in Intracellular Applications (1 or 2) Seminar, 1 hour; term paper, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on advanced technologies in bioengineering, such as spectroscopy, microscopy, magnetic resonance imaging, computed tomography, ultrasonography, and biosensors. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 261. Special Topics in Biortransport (1 or 2) Seminar, 1 hour; term paper, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the fundamentals of analysis of biological transport phenomena such as drug distribution, microcirculation, membrane transport, and transport in organs and tissues. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 262. Special Topics in Biosignaling (1 or 2) Seminar, 1 hour; term paper, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on current research in cell signal- ing and control, including G protein-coupled receptors, signal transduction and cytoskeletal dynamics, and ligand interactions. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 263. Special Topics in Biocomputational (1 or 2) Seminar, 1 hour; term paper, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on current research in cell signaling and control, including G protein-coupled receptors, signal transduction and cytoskeletal dynamics, and ligand interactions. Students who submit a term paper receive credit for 2 units; other students receive credit for 1 unit. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 264. Dynamics of Biological Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Covers engineering principles for the analysis and modeling of biological phenomena. Topics include molecular diffusion and transport, membranes, ligand-bioreceptor interactions, energy metabolism, and dynamics of metabolic pathways and the application of these principles to the design of bioreactors, biosassays, drug delivery systems, and artificial organs. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Cross-listed with CEE 264. Credit is awarded for only one of BIEN 199/CEE 159 or BIEN 264/CEE 264.

BIEN 265. Special Topics in Biological Nuclear Magnetic Resonance (NMR) Spectroscopy (1 or 2) Seminar, 1 hour; term paper, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on various advanced methods for the determination of structure, dynamics, and interactions of biomolecules, using multidimensional and multinuclear NMR spectroscopy. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BIEN 266. Bioengineering Experimentation and Analysis (2) Laboratory, 3 hours; discussion, 1 hour; written work, 2 hours. Prerequisite(s): BIOL 005C, CHEM 001C, CS 005, MATH 046, PHYS 002C or equivalents or consent of instructor. Introduces measurement principles and data acquisition methods related to biochemicals and biomedical and biotechnical signals from living systems. Addresses the fundamental mechanisms underlying the operation of various sensor types and the modern instruments illustrating noise analysis, filtering, signal processing, and conditioning. Includes experiments aimed at investigating physical responses of cells and tissues to a variety of stimuli.

BIEN 268. Colloquium in Bioengineering (1) Colloquium, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Colloquia on current research topics in bioengineering and other related fields. Presented by faculty members and visiting scientists. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BIEN 269. Directed Studies (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Faculty-directed individual study of selected topics in Bioengineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units.

BIEN 270. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Provides research opportunities for selected problems in bioengineering. Conducted under faculty supervision. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

BIEN 298-I. Individual Internship (1-12) Internship, 2-24 hours; written work, 1-12 hours. Prerequisite(s): graduate standing; consent of instructor. An individual apprenticeship in bioengineering with an approved professional individual or organization and academic work under the direction of a faculty member. Requires a written report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

BIEN 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Designated for research in bioengineering for the M.S. thesis or Ph.D. dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
Bioengineering Interdepartmental Graduate Program

Jerome S. Schultz, Ph.D., Director
Department Office, A231 Bourns Hall
(951) 827-2111; jsbio@engr.ucr.edu

Participating Faculty

**Distinguished Professors**
Robert C. Haddon, Ph.D. (Chemistry)
Dallas Rabenstein, Ph.D. (Chemistry)
Natalie Raikhal, Ph.D. (Botany & Plant Sciences)
Jerome Schultz, Ph.D. (Bioengineering)

**Professors**
Michael E. Adams, Ph.D. (Cell Biology & Neurosciences/Entomology)
Bahman Anvari, Ph.D. (Bioengineering)
G. John Andersen, Ph.D. (Psychology)
Bir Bhanu, Ph.D. (Electrical Engineering)
David Bocian, Ph.D. (Chemistry)
Wilfred Chen, Ph.D. (Chemical & Environmental Engineering)
Sanjeev Gill, Ph.D. (Cell Biology & Neuroscience)
Tao Jiang, Ph.D. (Computer Science)
David Johnson, Ph.D. (Biomedical Sciences)
Cynthia K. Larive, Ph.D. (Chemistry)
Elizabeth Lord, Ph.D. (Botany & Plant Sciences)
Manuela Martins-Green, Ph.D. (Cell Biology & Neurosciences)

**Visiting Assistant Professor**
Angelika Dimoka, Ph.D. (Bioengineering)

### Program Overview

The interdepartmental graduate program is the umbrella for graduate level research effort associated with the faculty in the Department of Bioengineering as well as other faculty at UCR who have an interest in training graduate students in bioengineering. The program offers graduate instruction leading to M.S. and Ph.D. degrees in Bioengineering.

Our interdisciplinary program combines a solid fundamental foundation in biological science and engineering, and aims to equip the students with diverse communication skills and training in the most advanced quantitative bioengineering research so that they can become leaders in their respective fields. The result is a rigorous, but exceptionally interactive and welcoming educational training for Bioengineering graduate students.

The interdepartmental aspect of the program allows students to develop skills related to bioengineering with faculty in a broad range of disciplines. The research vision is to build strength from experts in biochemistry, biophysics, biology and engineering to focus on critical themes that impact bioengineering.

Contributing departments include:

The dominant research theme of the interdepartmental graduate program is BioCellular Engineering. BioCellular Engineering envisions the design and implementation of processes that incorporate biomolecular assemblies and cellular structures for the development of advanced technologies. Specifically, these efforts include: cellular control and regulation (signal transduction pathways, regulation of immune system, metabolic controls, intracellular biosensors); mathematical and in-silico computational modeling (transport and kinetics of reactive species in organelles, biomolecules and biomolecular interactions, analysis of neural systems); and macromolecular, supramolecular, and membrane biophysics.

### Masters Program

The M.S. program is ideal for professionals seeking greater depth in several areas of bioengineering. The degree requires a minimum of 36 quarter credits and may be completed in three to four academic quarters of full-time...
study. Both thesis and non-thesis options are offered for the degree program (Plan I, Thesis and Plan II, Comprehensive Examination).

Student must request permission to pursue an M.S. in Bioengineering while simultaneously pursuing a Ph.D. in a program other than Bioengineering.

Normative Time to Degree
Two years.

Plan I (Thesis)
In addition to the following requirements, all applicants must meet the requirements for Plan I as set forth in this catalog under the Graduate Studies section Master’s Degree Plan I (Thesis).

Course Requirements
Students must satisfy the core course requirements (see Core Courses). Students enroll in the interdepartmental colloquium series in Bioengineering each quarter it is offered.

Plan II (Comprehensive Examination)
This plan is designed primarily for students who do not intend to pursue a Ph.D. in Bioengineering.

In addition to the following requirements, all applicants must meet the requirements for Plan I as set forth in this catalog under the Graduate Studies section Master’s Degree Plan II (Comprehensive Examination).

Course Requirements
Students must satisfy the core course requirements (see Core Courses). Students enroll in the interdepartmental colloquium series in Bioengineering each quarter it is offered.

The comprehensive examination is prepared and administered by the Graduate Examination Committee. The student is allowed to choose between an oral and a written examination. The examination covers a broad range of topics chosen from upper division undergraduate courses and graduate courses taken by M.S. students.

Subsequent to the examination, the Graduate Examination Committee issues a passing or failing grade. Students who fail in the first attempt may retake the examination at the next scheduled comprehensive examination period. No more than two attempts to pass the exam are allowed.

The M.S. Comprehensive Examination may be held at the end of any quarters throughout the year. The committee to administer the M.S. Comprehensive Examination is selected by the Graduate Advisor and approved by the Graduate Program Committee.

Doctoral Program
The Ph.D. program is heavily integrated with research activities and is intended for well-qualified individuals who wish to pursue leadership careers in academic or industrial research. The Ph.D. program requires approximately three years of full-time study beyond the master’s degree. In consultation with a faculty advisor, Ph.D. students plan their program of study. The doctoral dissertation is based on original research in the field of specialization. An M.S. degree is not a prerequisite for entering the Ph.D. program.

The doctoral program includes a teaching requirement, an oral and written qualifying examination, and a dissertation.

Normative Time to Degree
Five years.

Course Requirements
Students must satisfy the core course requirements (see Core Courses). Students will enroll in the interdepartmental colloquium series in Bioengineering each quarter it is offered.

Written Qualifying Examination
Students in the Ph.D. program must pass a written qualifying examination that covers the fields of engineering and biology that relate to the student’s dissertation project.

Oral Qualifying Examination
Following successful completion of the written examination, candidates for the doctoral degree must pass an oral examination, normally within three quarters of the date of their written exam. The oral examination is scheduled only after the candidate has written a proposal detailing the rationale, specific aims and approaches to be undertaken for her/his dissertation research.

Dissertation
A written dissertation is completed by each student.

Candidates for the degree of Ph.D. may be required to defend the dissertation in a public, oral presentation at a time announced to members of the University community.

Core Courses
All Bioengineering graduate students are required to take at least three courses from the following six Bioengineering courses. Other courses may be substituted but must be approved by the bioengineering graduate advisor. Students from non-engineering backgrounds are also required to take BIEN 268 in addition to the courses stipulated here.

Bioengineering Core
1. BIEN 220 - Chemical Genomics Design Studio
2. BIEN 223 - Engineering Analysis of Physiological Systems
3. BIEN 224 - Cellular and Molecular Engineering
4. BIEN 249 - Integration of Computational and Experimental Biology
5. BIEN 264 - Dynamics of Biological Systems
6. BIEN 268 - Bioengineering Experimentation and Analysis
Other required courses:
1. One bioscience class chosen from: BCH 210, BCH 211, BCH 212, BIOL/CMDB 200, BIOL/CMDB 201, BIOL 203, BIOL 221, or, with consent of instructor, BMSC 229, BMSC 230, BMSC 231, BMSC 232, BMSC 234, and BMSC 235.
2. Other courses may be substituted but must be approved by the Bioengineering Graduate Advisor.
3. BIEN 286 - Colloquium in Bioengineering
   This course is required every quarter in which it is offered.

Additional courses may be required by the Advisory Committee depending on the student’s background and fields of interest.

M.S. and Ph.D. students must complete the course requirements for the programs within their first year of residence.

Course Descriptions
All Bioengineering courses are listed and described under Bioengineering.

Biological Sciences
Subject abbreviation: BLSC
College of Natural and Agricultural Sciences

__________________________. Director
Program Office, 1223 Pierce Hall
(951) 827-3579

Committee in Charge
Bradley C. Hyman, Ph.D. Bioinformatics and Genomics
Roger D. Farley, Ph.D. Biology
Thomas A. Miller, Ph.D. Cell, Molecular, and Developmental Biology
William E. Walton, Ph.D. Conservation Biology
P. Kirk Visscher, Ph.D. Entomology
Janet T. Arey, Ph.D. Environmental Toxicology
J. Daniel Hare, Ph.D. Evolution and Ecology
David A. Johnson, Ph.D. Medical Biology
James G. Borneman, Ph.D. Microbiology
Darleen A. DeMason, Ph.D. Plant Biology
Linda L. Walling, Ph.D.
Associate Dean, College of Natural and Agricultural Sciences, ex officio

Faculty, see listings for Department of Biology
Department of Botany and Plant Sciences
Department of Cell Biology and Neuroscience
Department of Entomology
Department of Environmental Sciences
Department of Nematology
Department of Plant Pathology and Microbiology

Major
Biological Sciences is an interdepartmental major that includes faculty (more than 150) from seven departments in the College of Natural and Agricultural Sciences. The major offers the B.S. degree and is unified by the Life Sciences core curriculum (see below).
Life Sciences core requirements (68-72 units)

Biological Sciences are as follows:

The major requirements for the B.S. in Biological Sciences, Colleges and Programs section. Consult with a department advisor for program planning. A student is subject to discontinuation from the major whenever the GPA in upper-division course work is below 2.0. Students finding themselves in this circumstance must meet with an advisor.

Bioinformatics and Genomics Track
Bioinformatics and Genomics are popular new fields whose emergence is catalyzed by the explosion of data made available through automated DNA sequencing. They meld in a seamless fashion genetics, molecular and cellular biology, statistics, and computer science. This curricular track has been carefully designed to be flexible so that avenues of study can be computational or experimental, or both, and therefore has wide appeal to students of varying interests. This track is unique in its ability to accommodate agricultural, microbial, and animal bioinformatics and genomics under a single programmatic umbrella and allow students to interface with instructors from a broad array of departments. The interdisciplinary nature of Bioinformatics and Genomics prepares students to be highly competitive for further graduate education or for immediate placement in biotechnology and allied industries.

1. Computer Science and Mathematics (16 units). These courses satisfy the related areas requirement.
   a) CS 010, CS 012, CS 014
   b) MATH 009C

2. Ethics and Science (4 units): At least one course from PHIL 117, PHIL 118, PHIL 161, RLST 170. This course may also satisfy a category requirement.

3. Upper-division requirements (a minimum of 45 units)
   a) BCH 110A (recommended) or BCH 100
   b) BIOL 102, BIOL 105, BIOL 107A or BCH 110C, BIOL 119
   c) STAT 100A, STAT 100B, STAT 160A, STAT 160B
   d) Breadth electives (at least one course from each area)

Note: Independent study or research in the field of bioinformatics or genomics is recommended.

Biology Track
The Biology track provides up-to-date preparation for postgraduate study and careers in the fields of medicine, health science, teaching, and research. These options require understanding and integration of the different levels and processes of biological organization. The levels include cell and molecular, organismal, community and population; important life processes are reproduction, development, and evolution. An overview is presented in the introductory courses (BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C), and emphasis is placed on the unifying principles of the discipline.

The upper-division courses are more specialized and provide in-depth examination of specific subfields of biology. From a list of courses in each area, students select three upper-division courses in cell or molecular biology, two courses in the structure and function of organisms, and two courses in a subfield with the following integrated and overlapping topics: ecology, evolution, systematics, and behavior. Hands-on learning is encouraged so that students can participate rather than just observe science in this age of technology. Among the upper-division biology courses, there must be at least two courses that have a laboratory or field component.

Students in this track also select two courses from a number of options in computer science and statistics. Statistics is needed to plan and carry out experiments, read and understand scientific literature, and interpret data in medicine and other fields of science. Computers facilitate communication and data processing and storage, and computer technology is now an integral part of modern life.

1. Upper-division requirements (a minimum of 45 units)
   a) Cell/Molecular (minimum of one course from each category)
      (1) BCH 100 or both BCH 110A and BCH 110B

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Natural and Agricultural Sciences, Colleges and Programs section.

Major Requirements
Some of the following requirements for the major may also fulfill the college's breadth requirements. Consult with a department advisor for program planning.

The major requirements for the B.S. in Biological Sciences are as follows:

1. Life Sciences core requirements (68-72 units)
   Students must complete all required courses with a grade of "C-" or better and with a cumulative GPA in the core courses of at least 2.0. Grades of "D" or "F" in two core courses, either separate courses or repetitions of the same course, are grounds for discontinuation from the major.

   a) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C, CHEM 112A, CHEM 112B, CHEM 112C
   c) MATH 008B or MATH 009A, MATH 009B
   d) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC
   e) STAT 100A
   f) BCH 100 or BCH 110A

2. As specified in the individual tracks, at least 36 upper-division units for the major and 16 units of substantive course work related to the major. Courses in Statistics and Biochemistry taken as part of the core may be included.

   A student is subject to discontinuation from the major whenever the GPA in upper-division course work is below 2.0. Students finding themselves in this circumstance must meet with an advisor.

   Bioinformatics and Genomics Track
   Bioinformatics and Genomics are popular new fields whose emergence is catalyzed by the explosion of data made available through automated DNA sequencing. They meld in a seamless fashion genetics, molecular and cellular biology, statistics, and computer science. This curricular track has been carefully designed to be flexible so that avenues of study can be computational or experimental, or both, and therefore has wide appeal to students of varying interests. This track is unique in its ability to accommodate agricultural, microbial, and animal bioinformatics and genomics under a single programmatic umbrella and allow students to interface with instructors from a broad array of departments. The interdisciplinary nature of Bioinformatics and Genomics prepares students to be highly competitive for further graduate education or for immediate placement in biotechnology and allied industries.

   1. Computer Science and Mathematics (16 units). These courses satisfy the related areas requirement.
      a) CS 010, CS 012, CS 014
      b) MATH 009C

   2. Ethics and Science (4 units): At least one course from PHIL 117, PHIL 118, PHIL 161, RLST 170. This course may also satisfy a category requirement.

   3. Upper-division requirements (a minimum of 45 units)
      a) BCH 110A (recommended) or BCH 100
      b) BIOL 102, BIOL 105, BIOL 107A or BCH 110C, BIOL 119
      c) STAT 100A, STAT 100B, STAT 160A, STAT 160B
      d) Breadth electives (at least one course from each area)

   (1) Bioinformatics and Computational Biology (CS 141 and MATH 112 recommended): CS 141, CS 166, CS 170, CS 171, MATH 112, MATH 120, MATH 135A, STAT 160C, STAT 161, STAT 170A, STAT 170B

   (2) Genomics, Macromolecules, and Molecular Biology: BIOL 107B, BIOL 108, BIOL 109 or BCH 153/BIOL 153/BPSC 153 or BCH 162, BPSC 148/BIOL 148, CBNS 150/ENTX 150

   Note: Independent study or research in the field of bioinformatics or genomics is recommended.
(2) BIOL 102 or BIOL 115
(3) BIOL 107A or BCH 110C, CBNS 101 or BIOL 113 or BIOL 114, BIOL 119, BIOL 128/CBNS 128, BPSC 155/BIOL 155

b) Functional Biology of Organisms
   (minimum of two courses with lecture component)

c) Ecology/Evolution/Systematics/Behavior
   (minimum of two courses with lecture component)

d) Additional Elective Courses
   BIOL 107B, BIOL 109* or BCH 153/ BIOL 153/BPSC 153*, BIOL 110, BIOL 120/MCBL 120/ PLPA 120, BIOL 120L/MCBL 120L/ PLPA 120L*, BIOL 122/MCBL 122, BIOL 123/MCBL 123/PLPA 123, BIOL 148/BPSC 148, BIOL 158, BIOL 165/BPSC 165*, BIOL 166*, BIOL 168, BIOL 171, BIOL 171L*, BIOL 185 (E-Z), BIOL 191, CBNS 150/ENTX 150

2. Statistics/Computer Science requirement
   (two courses)
   CS 010, CS 011/MATH 011, CS 012, CS 014, CS 021, CS 061, CS 120A/ EE 120A, CS 143/EE 143, STAT 100A, STAT 100B

3. Additional courses in biological sciences
   (upper division) and related areas from the approved list to bring total units to 52. Eight of these units may be from a declared minor in one of the science colleges, or additional lower-division science requirements for the teaching credential (advisor's approval required).

Cell, Molecular, and Developmental Biology Track

Cell, Molecular, and Developmental Biology are important subdisciplines in the Biological Sciences. Students take a series of gateway courses and at least one upper-division laboratory course which acquaints them with the basic techniques used in this field, introduces them to experimental design in the laboratory, and teaches them how to interpret laboratory data. Students build depth in Cell, Molecular, and Developmental Biology by taking additional upper-division lecture courses from a diverse menu that may be tailored to suit each student's interests. Students add breadth to their science training by completing courses from the list of "additional courses." Students interested in the medical or health science field should choose appropriate medically related courses from this list.

Training in this field will prepare students for numerous educational opportunities upon graduation, including medical, dental, optometry, veterinary, and graduate school. In addition, numerous positions are available in teaching (for secondary level see Biology track), business, biotechnology, forensics, law, biomedical and basic research, agriculture, and government.

1. Upper-division requirements (must include at least one laboratory course (indicated by *) from either category 1.b) or 2.)
   a) Required courses (20–24 units)
      (1) BCH 110A and BCH 110B (recommended) or BCH 100
      (2) BIOL 102, BIOL 107A, CBNS 101, CBNS 169
   b) Additional requirements (a minimum of 20 units from the following list)
      Note Credit is awarded for only one of BIOL 109 or BCH 153/BIOL 153/ BPSC 153.
      (1) Cell Biology: BIOL 109*, BIOL 113, BIOL 114, BPSC 135, CBNS 116, CBNS 120/PSYC 120
      (3) Developmental Biology: BIOL 168, CBNS 169

2. Additional courses from the following to bring total units to 52.

Conservation Biology Track

Conservation biology seeks to understand the consequences of the rapid loss of Earth's diversity of life and to preserve biodiversity. Conservation Biology is a multidisciplinary science that applies principles of ecology, population genetics, evolutionary biology, and other sciences to solve problems related to the loss of biodiversity.

The emergence of conservation biology stems from the recognition that Earth's ecological systems face critical problems from rapid growth of human populations and per capita resource consumption. A major focus of the discipline is the study of human impacts on biodiversity, with special emphasis on management processes that prevent species extinctions and ameliorate anthropogenic damage to ecosystems. People rely on a healthy biosphere for most of their basic requirements for food, medicines, chemicals, fibers, and building materials. Ecosystem processes are dependent on biodiversity and are critical for nutrient recycling, degradation of human wastes and pollutants, and maintenance of the chemical composition of the atmosphere. Biodiversity also provides important aesthetic benefits, as well as a vast genetic library that provides vital resources for the developing enterprise of biotechnology.

Students earning a bachelor's degree in Biological Sciences with the Conservation Biology track are trained to help society understand the extent and consequences of biodiversity loss, and to provide objective scientific data to resource managers and social planners. Students who are broadly trained in fields relevant to Conservation Biology, such as ecology, population genetics, evolutionary biology, and earth or environmental sciences, will be prepared for graduate study and a variety of careers in research, education or environmental consulting and management.

Suggested areas of specialization include ecology, evolution and systematics, and earth or environmental sciences. Because Conservation Biology is broadly interdisciplinary, students are advised to select lower-division courses in humanities and social sciences with an eye to the prerequisite structure of upper-division courses in Geology, Environmental Sciences, Anthropology, or Economics that might form their upper-division specialization.

1. Additional lower-division requirements
   a) ECON 006/ENSC 006. This course also satisfies a portion of the breadth requirements in Social Sciences.
   b) GEO 002

2. Upper-division requirements (at least 36 units from the following, including two courses with laboratory or field component (indicated by *))
   a) BIOL 102
   b) BCH 100 or BCH 110A
   c) STAT 100A
   d) Breadth Electives (a minimum of one course from each of the following areas)
      (1) Evolution and Systematics: BIOL 105, BIOL 108, BIOL 112/BPSC 112/ ENTM 112, GEO 151*
      (2) Ecology: BIOL 116, BIOL 116L*, BIOL 117, BIOL 127/ENTM 127, BPSC 146*
Environmental Toxicology Track

The effect of environmental pollutants on human health and other biological systems, and the impact of human activity on the environment is a growing source of public concern. Consequently, there is an increasing demand on government, industry and academia for scientists trained in a variety of environmental disciplines.

The Environmental Toxicology curriculum fills this need and provides students with a strong foundation in biology and biochemistry, as well as training in environmental toxicology. All Environmental Toxicology track students must complete a series of courses designed to provide a broad, fundamental understanding of environmental toxicology. Graduates will be positioned to pursue careers in environmental toxicology and other environmental life sciences and have the required background for entry into graduate, medical, dental, or veterinary programs.

1. Upper-division required courses (40–44 units)
   a) BCH 100 or both BCH 110A and BCH 110B
   b) BIOL 102, BIOL 107A or BCH 110C, CBNS 101 or BIOL 113 or BIOL 114, BIOL 116
   c) CHEM 136/ENSC 136/ENTX 136 or ENSC 101, ENSC 102
   d) CBNS 150/ENTX 150, ENTX 101, ENTX 154

2. Additional upper-division requirements (four courses from the following, with at least one from Chemical Fate and one from Health/Ecology)
   a) Chemical Fate: CHEM 005, CHEM 109, CHEM 125, CHEM 135/ENSC 135/ENTX 135, CHEM 150A, CHEM 150B, ENVE 144/ENSC 144, ENSC 100/WSHC 100, ENSC 104/WSHC 104, ENSC 107/WSHC 107, ENSC 127/WSHC 127, ENSC 140/WSHC 140, ENSC 141/MCB 141/WSHC 141, ENSC 142, ENSC 155, ENSC 163, ENSC 172, ENSC 174, ENSC 176/WSHC 176

3. Additional courses in biological sciences (upper division) and related areas from the approved list to bring total units to 52.

Evolution and Ecology Track

Evolution is the central unifying concept linking all areas of the Biological Sciences. Ecology is the study of the interrelationships and interactions between organisms and their environment that drive adaptation and dictate the distribution and abundance of organisms.

An area of specialization in Evolution and Ecology primarily serves students who are interested in entering graduate school in one of these fields or in directly entering a career in a related area, such as in an environmental consulting firm or local, state, or federal agency that deals with ecological issues.

Students can focus their training to prepare themselves for further graduate study in numerous areas of the Biological Sciences, further study in a number of health related professions (medicine, dentistry, veterinary medicine, optometry), and a biological sciences career within private industry, local, state, or federal government.

1. Upper-division requirements [at least 36 units from the following, including one course with laboratory or field component (indicated by *)]
   a) Required courses
      (1) BCH 100
      (2) BIOL 102
   b) Additional requirements (at least one course from each of the following areas)
      (1) Biological Diversity: BIOL 100/ENSC 100*, BIOL 134/PLPA 134, BIOL 151*, BIOL 157*, ENMT 114*

2. Statistics requirement (minimum of one course) STAT 100A, STAT 100B

3. Additional courses in biological sciences (upper division) and related areas from the approved list to bring total units to 52.

Medical Biology Track

The Medical Biology track provides a solid foundation in science and mathematics for students who plan a career in medicine, health sciences or veterinary medicine. The track is also excellent preparation for graduate research in modern cell and molecular biology and physiology. Although clinical courses are not part of the curriculum, the track prepares students for specific training for clinical applications in the health sciences, including medicine, veterinary medicine, osteopathic medicine, chiropractic medicine, dentistry, podiatry, optometry, pharmacy, laboratory technology, public health, nursing, physical therapy, nutrition, epidemiology, forensics, hospital administration, and physician's assistant.

Additional information and Web sites are provided below (see Suggestions for Elective Units for Medical/Health Professions, Admission Requirements for Medical and Health Professional Schools).

As can be seen from the breadth of courses included in the curriculum of the track, health sciences is a complex and diverse field with much research, new technology and opportunity. It is a major part of the economy of this country, and there is a continuing need for motivated and well-trained workers, teachers, practitioners and researchers in all aspects of the field.

1. Upper-division requirements [at least 52 units from the following, including two courses with laboratory or field component (indicated by *)]
   a) Cell/Molecular
      (1) Required courses (15–20 units)
         BCH 100 or both BCH 110A and BCH 110B
         BIOL 102 or BIOL 115
         CBNS 101 or BIOL 113 or BIOL 114
         BIOL 107A or BCH 110C
teaching credentials, or enter professional schools in medicine, dentistry, or veterinary medicine.

1. Upper-division core requirements (31–32 units)
   a) BCH 110A, BCH 110B; BCH 110C or BIOL 107A
   b) BIOL 102 or BIOL 115, BIOL 121/MCBL 121, BIOL 121/MCBL 121L, BIOL 157
   c) BIOL 123/MCBL 123/PLPA 123

2. Additional upper-division requirements (at least three courses from the following) BIOL 107B, BIOL 109, BIOL 113, BIOL 114, BIOL 120/MCBL 120/PLPA 120, BIOL 122/MCBL 122, BIOL 124/MCBL 124, BIOL 128/PLPA 128, BIOL 134/PLPA 134, BIOL 134L, BIOL 159/NEM 159, CBNS 101, ENSC 141/MECB 141/ SWSC 141, ENSC 155

3. Additional courses in biological sciences (upper division) and related areas from the approved list to bring total units to 52.

Plant Biology Track

The track in Plant Biology is built on the premise that students with training in plant biology fill unique and diverse niches in academia, industry, medicine, business, law, biotechnology, government and agriculture. The track is a flexible one that can be tailored to an individual's interests and career goals. Students should consult with a faculty advisor to clarify educational goals and to plan an appropriate program of study.

The Plant Biology track can prepare students for a wide array of graduate or professional training programs or employment positions in the fields of agronomy, biochemistry, biotechnology, botany, cell biology, conservation biology, developmental biology, ecology, ethnobotany, evolution, dentistry, genetics, horticulture, medicine, molecular biology, plant breeding, plant pathology, plant physiology, systematics, and veterinary medicine. While Plant Biology is not considered a traditional track for students who plan careers in medicine, veterinary medicine, or dentistry, professional schools may view the individuality of training in plant biology as an asset.

Notes

BCH 110A is strongly recommended.

1. Upper-division core requirements (28–32 units)
   a) BIOL 102
   b) BPSC 104/BIOL 104 (may be waived with consent of the faculty advisor)
   c) BIOL 132/BPSC 132, BIOL 143/ BPSC 143, BPSC 133
   d) At least 8 units from the following:
      BIOL 100/ENTM 100, BIOL 120/ MCBL 120/PLPA 120, BIOL 120L/ MCBL 120/PLPA 120, BIOL 121/ MCBL 121, BIOL 121L/MCBL 121L, BIOL 123/MCBL 123/PLPA 123, BIOL 124/MCBL 124, BIOL 134/ PLPA 134, BIOL 134L, BIOL 159/NEM 159, BPSC 134/ ENSC 134/SWSC 134, ENSC 120/ NEM 120/SWSC 120, ENTM 124
   e) Two (2) units of BPSC 195H, BPSC 197, BPSC 198-I, or BPSC 199

2. Additional upper-division requirements (20 units must come from one of the following four areas of specialization)
   a) Plant Cellular, Molecular, and Developmental Biology
      (1) BPSC 135
   b) Plant Genetics, Breeding, and Biotechnology
      (1) BPSC 150
   c) Ecology, Evolution, and Systematics
      (1) BPSC 146
   d) Plant Pathology, Nematology, and Pest Management
      (1) BIOL 120/MCBL 120/PLPA 120
   e) Additional units from the following to meet the B.S. requirement:
      BCH 102, BCH 110B, BCH 110C or BIOL 107A, BCH 153/BPSC 153, BCH 162, BCH 183, BIOL 107B, BIOL 113, BIOL 114, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 123/MCBL 123/PLPA 123, BIOL 124/MCBL 124, BIOL 134/PLPA 134, BIOL 134L/ PLPA 134L, BIOL 159/NEM 159, CBNS 101, ENSC 141/MECB 141/ SWSC 141, ENSC 155

Microbiology Track

Microorganisms are ubiquitous from the stratosphere to the depths of the ocean. They encompass the greatest metabolic diversity of all life forms. Many are important in conversion of food products, and more yet, in their spoilage. Some produce important medicinal products, while others, the most potent toxins known. Many are beneficial as symbionts to animals and plants, yet others effect their demise. Students earning a B.S. degree in Biological Sciences with the Microbiology track will be trained for technical careers in a broad spectrum of the medicinal, agricultural, biotechnology, and environmental fields as consultants and technicians. Students specializing in the Microbiology track will also be prepared to continue studies at the graduate level, earn
PLSC 134, BIOL 134L/PLPA 134L, BIOL 159/NEM 159, BPSC 133, BPSC 146, BPSC 150, BPSC 158, BPSC 166, ENSC 104/SSWC 104, ENTM 109, ENTM 124, ENTM 129, ENTM 129L, ENSC 100/SSWC 100, ENSC 120/NEM 120/SSWC 120

3. Additional upper-division courses in biological sciences and related areas from any of the above lists, and students may apply a maximum of six units of BPSC 190 and/or BPSC 197 and/or BPSC 198-I and/or BPSC 199 to bring total units to 52.

**Honors Program**

The Honors Program in the Biological Sciences interdepartmental major is designed to provide qualified upper-division students with opportunities to engage in the theory and practice of original research, and to learn the art of written and oral scientific communication.

Prerequisites for the Honors Program

1. Submission of an application to the University Honors Program during the spring quarter of the sophomore year or during fall quarter of the junior year
2. Junior standing (completion of a minimum of 90 units)
3. Minimum GPA requirements or consent of director
   a) Cumulative GPA of 3.50
   b) A GPA of 3.50 in upper-division major courses

Students who meet the requirements of the University Honors Program for academic excellence are invited at the end of their sophomore year to participate in the Biological Sciences Undergraduate Honors Program during their junior and/or senior years. Students in the program are required to complete BLSC 192H and BLSC 193H, seminar/thesis courses for a total of 4 units. The students are also required to enroll in BLSC 198H and BLSC 195H to work on and complete an honors thesis under the supervision of a faculty member, for a total of 12 units distributed over three to six quarters in their junior and senior years.

**Selecting a Track**

The requirements of the Life Sciences core curriculum occupy most of the first two years of study; therefore, Biological Sciences majors need not select their area of specialization (track) until the beginning of the junior year. However, if a student desires, a track can be selected earlier. For assistance in selecting a track, a student should consult with a faculty advisor in the area of interest. Consultations of this kind are conducted in the CNAS Academic Advising Center (1223 Pierce Hall). To declare a track or transfer from one track to another, students inform the Advising Center staff.

**Comparison of Tracks in Biological Sciences Major with Departmental Majors**

Also available at UCR are some departmental majors similar to certain tracks within the Biological Sciences major. The upper-division requirements for the departmental majors in Biology and Plant Biology (see those sections in this catalog) are similar to the requirements in the Biology and Plant Biology tracks, respectively. The Life Sciences core curriculum is required for those departmental majors as with all the tracks in the Biological Sciences major, so students in good standing can easily transfer from one major to another simply by filing the Change of Major form.

A choice of a B.A or B.S. degree is available for the departmental Biology major, whereas only the B.S. degree is offered for the Biology track and all other tracks in the Biological Sciences major. In comparison with the departmental Biology major, the Biology track has a more prescribed selection for the upper-division courses. The Biology major requires genetics (BIOL 102) and an additional 32 upper-division units to be selected from courses on the approved list. The Biology track is intended to ensure a breadth of course work in life sciences in contrast to the other more specialized tracks in the Biological Sciences major. As described below, the 36 units of upper-division courses for the Biology track must include at least two laboratory or field courses, three courses in the cell/molecular area (including genetics), two courses in the functional biology of organisms, and two courses in the integrated fields of ecology/evolution/systematics/behavior.

The departmental Plant Biology major differs from the Plant Biology track primarily in offering a B.A. option in addition to the B.S. option. The upper-division course requirements are identical for the departmental major and the Plant Biology track.

**Enrollment Options and Advising**

The CNAS Academic Advising Center (1223 Pierce Hall, [951] 827-3579) is the advising office for all students majoring in Biology, Biological Sciences, Plant Biology, and Neuroscience. The CNAS Academic Advising Center is open Monday through Friday, 9 a.m. to noon and 1 to 4 p.m. Faculty advisors are usually available for advising Tuesday through Friday, 10 a.m. to noon and 1 to 3 p.m.

Advising is on a walk-in basis. Students sign in at the counter indicating what is needed. A quarterly schedule, available at the counter, lists faculty advisors, their advising hours, and areas of specialization.

Prospective, new, and continuing students considering enrollment in the above majors are welcome to visit or phone the CNAS Academic Advising Center. Information is provided about the majors, policies and procedures, and course enrollment. Petitions and other related business requiring a signature or approval are routed through the CNAS Academic Advising Center. Students visit the CNAS Academic Advising Center as needed, but those in academic difficulty are especially urged to meet with a faculty advisor to review study procedures and plan a program of study to correct deficiencies and achieve academic success. With informational handouts and advising, all students are urged to create a long-range academic plan so that course prerequisites are met and courses are taken in the best possible sequence for the individual’s interests, aptitude, and career goals. Note that a course load of approximately 16 units per quarter is required for normative progress toward the degree.

**Grading Basis: Letter Grade or Satisfactory (S)/No Credit (NC)**

Students must enroll for letter grade credit in science and mathematics courses used to satisfy major requirements. This includes all courses in the Life Sciences core curriculum, the 36 upper-division units for the major, and the 16 units of substantive course work related to the field of the major. After completion of the core requirements and upper-division requirements for the major, science and mathematics courses counted as electives may be taken on a Satisfactory (S)/No Credit (NC) basis.

Basic Writing and English Composition (ENGL 001A, ENGL 001B, ENGL 001C) may be taken on an S/NC basis, but this is strongly not recommended. English composition is essential and so important that students should aim for excellence rather than a satisfactory level of achievement. Foreign language courses may be completed on an S/NC basis, but this is also not recommended. Since language courses are often taken in series, progress is cumulative, and students may fall behind if only a satisfactory level is attempted in early courses in the sequence.

For policies on S/NC grading, see the Academic Regulations section of this catalog.

**Full- or Part-time Study**

Students ordinarily enroll full-time in 12 to 18 units of course work each quarter. Advisor approval is required for exceptions. The dean’s approval is required for any change in the academic program that reduces enrollment below 12 units for the quarter. Students who are unable to enroll full-time because of health, family responsibilities, or outside employment may apply to the CNAS Academic Advising Center (1223 Pierce Hall) for permission to enroll part-time. Documentation of hours of employment is required. Part-time students may take no more than 12 units in one quarter, and they receive a 50 percent reduction in the Educational Fee for that quarter.

**Minor**

The Biological Sciences major does not offer a minor in Biological Sciences, but seven discipli-
nary minors (Applied Statistics, Botany and Plant Sciences, Chemistry, Entomology, Environmental Sciences, Mathematics, Neuroscience, Physics) are offered by departments within the College of Natural and Agricultural Sciences. Interested students are referred to those sections of this catalog. Other available minors include Computer Science in the College of Engineering, and more than 40 minors in the College of Humanities, Arts and Social Sciences.

For students enrolled as a Biological Sciences major, a minor added to the program must be in an area that is distinctive and different from the chosen track (e.g., a minor in Botany and Plant Sciences is not permitted with the track in the same field).

**Double Major**
A double major can be completed with a track in Biological Sciences and another major, as long as the chosen majors are in distinct and different fields. Biological Sciences can be either the first (primary) or second major, depending on which one is chosen for matriculation and emphasis. The Life Sciences core curriculum and requirements for one of the tracks in Biological Sciences must be completed. Completion of two tracks within Biological Sciences does not count as a double major since both tracks are within the same major.

Double majors are not allowed between certain tracks in Biological Sciences (Biology, Plant Biology) and the similar departmental major in the same field (Biology and Plant Biology). Some or all of the requirements may be completed for more than one track, but only one track will be approved for inclusion on the transcript.

**Transfer Students**
Students planning to transfer to UCR with a major in Biological Sciences, Biology, or Plant Biology must have “C” or higher grades in general chemistry (item 1, below) and at least two of the remaining sequences in the recommended priority 2, 3, 4, 5. This is a minimal course requirement for transfer to the above majors from community colleges and four-year colleges and universities, but all five sequences are necessary for graduation in these majors at UCR. Transfer students will usually find it advantageous to complete most or all sequences before starting at UCR. All prospective transfers should try to complete the sequences they begin rather than divide a sequence between two campuses.

1. General chemistry, equivalent to CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
2. First-year calculus, equivalent to MATH 009A, MATH 009B
3. Introductory biology (for science majors), equivalent to BIOL 005A, BIOL 05LA, and BIOL 005B (and BIOL 005C, if available)
4. Organic chemistry, equivalent to CHEM 112A, CHEM 112B, CHEM 112C
5. General physics with laboratory equivalent to PHYS 002A, PHYS 002B, PHYS 002C (and PHYS 02LA, PHYS 02LB, PHYS 02LC) or PHYS 040A, PHYS 040B, PHYS 040C. Calculus is a prerequisite for both the PHYS 002 and PHYS 040 sequences.

To be eligible to transfer into one of the above majors, students must also have a minimum GPA of 2.70 in transferable college courses.

If the equivalents of BIOL 005A, BIOL 05LA, and BIOL 005B are not accessible prior to transfer, students are strongly recommended to complete organic chemistry and take the BIOL 005 sequence at UCR rather than the equivalent of BIOL 002 and BIOL 003 (introduction biology for nonscience majors) before transfer.

Completion of calculus is strongly recommended before transfer. If sequences 1-3 are completed, students are also encouraged to complete one year of organic chemistry with laboratory (for which a one-year general chemistry series is a prerequisite). Partial satisfaction of the breadth requirements (e.g., English, humanities, arts, social sciences, and ethnic studies) also accelerates the student’s progress, but priority should be given to the above mathematics and science sequences.

UCR has articulation agreements with most of the California community colleges. These agreements list specific community college courses that have been designated as comparable to UCR courses (see the statewide articulation Web site at www.assist.org).

To integrate transfer credits with a program of study at UCR, it is important that all new transfer students consult with an advisor before or early in their first quarter on campus. Prospective UCR students are welcome to discuss their past and future academic program with an advisor. Phone the CNAS Academic Advising Center, (951) 827-3579, to arrange an appointment.

**Independent Study and Research**
The various departments and programs in the College of Natural and Agricultural Sciences offer courses in which students can enroll to do independent laboratory or field research or an in-depth library study of a topic of special interest. These courses are numbered 194-199 and usually have variable unit credit allowing for differences in emphasis and time available for research in the student’s academic program.

The departments have different names and policies for the 190-series courses: Independent Reading, Introduction to Research, Research for Undergraduates, Junior/Senior Research, Senior Research, Senior Honors Research. Interested students should consult with a professor who is willing to supervise the project. The student may suggest a specific question or formulate a project after consultation with the instructor. Information about the research fields of the professors is available from the CNAS Academic Advising Center (1223 Pierce Hall) or at cnas-uqresearch.ucr.edu.

The procedure for enrolling in these courses depends on the policies of the department or academic unit sponsoring the research. For BIOL 194, BIOL 197 and BIOL 199, the student must obtain an application form from the CNAS Academic Advising Center. Instructions for writing a brief description of the proposed project are provided with the form. The completed application, signed by the professor in charge of the project, is submitted to the CNAS Academic Advising Center preferably before the first day of the quarter but no later than the end of the second week of the quarter. Applicants for independent research should ordinarily be sophomores, juniors or seniors in good standing and achieving well in their academic program.

Courses numbered 194, 197, 199 and 199H may be taken for a letter grade or “S/NC” depending on the department or program offering the course. Up to 9 units of credit in the 190 series may be counted as part of the 16 substantive units related to the major for the B.S. degree.

**Internships**
Internships provide students with practical, part-time work experiences in conjunction with their academic studies. The internships are designed to relate a student’s academic preparation in the major with professional work at the entry level in community businesses and organizations. They can be one or more quarters in duration. For more information or to arrange an internship, see the Internship Coordinator in Career Services (Veitch Student Center).

As much as possible, the internships are arranged to accommodate the student’s specific interests. Students majoring in Biological Sciences (or Biology, Plant Biology, Neuroscience) commonly work in local hospitals, clinics, museums and medical research laboratories. Some students do internships in health administration, environmental planning and natural resource management. Those considering high school teaching as a possible career can work as tutors or teacher’s aides in local high schools (e.g., EDUC 100).

Students majoring in Biological Sciences are welcome to participate in the internship program, but they are not paid for this work. Academic credit is not awarded unless a faculty advisor approves, and the student is enrolled in a 198 course in the College of Natural and Agricultural Sciences. Students frequently find internships helpful in investigating a possible career, and some experience in the work environment is helpful or required for admission to professional and technical training schools.

**Teaching Credential**
Teachers in the public schools of California must be certified by the California Commission on Teacher Credentialing (CCTC). The credential requires an undergraduate major, baccalaureate degree, and completion of a graduate credential program such as that offered by the
Graduate School of Education at UCR (see Education section, Credential Programs, in this catalog). The latter usually requires three quarters and includes education courses and supervised teaching.

Before admission and student teaching in a graduate credential program, candidates must pass the California Basic Education Skills Test (CBEST) and demonstrate subject-matter proficiency in the fields in which they will teach. Candidates can demonstrate proficiency either by passing the commission’s subject-matter assessment examination (CSET), or by completing an undergraduate program that is CCTC approved for teacher preparation.

For students in Biological Sciences and all other majors at UCR, this campus has a CCTC-approved undergraduate program leading to a Multiple Subjects Credential and teaching in the elementary (K-6) grades. A breadth of course work is necessary in addition to the specified requirements for the major. Students are urged to start early, preferably as freshmen, selecting courses most helpful for this career. Students who want a Multiple Subjects Credential must pass the subject-matter proficiency examination (CSET, Multiple Subjects).

UCR does not have a CCTC-approved undergraduate program for Biological Sciences or other science majors who wish to teach at the secondary level. The single-subject, Teaching Credential in Science, biology emphasis, is required for biology teachers, grades 7-12, and adults. Students who plan to get this credential must take the CSET and should make certain that their academic program includes preparatory course work. This is most easily achieved with the breadth of courses required in the Biology track of the Biological Sciences major, but other tracks or majors may be used, provided there is sufficient breadth to pass the CSET exam.

For the Teaching Credential in Science with emphasis in biology, the subject-matter examination (CSET) includes 1) biology/life science in depth and 2) general science with introductory, college-level biology, chemistry, physics, and geoscience (geology, meteorology, oceanography, astronomy). Introductory biology, chemistry, and physics are included in the Life Sciences core curriculum, but some additional course work in geoscience should be taken to strengthen preparation in this area. The intent is that candidates for the Teaching Credential in Science are prepared to teach unifying themes and principles in general and specialized science courses.

There are other credential options (e.g., BCLAD) and requirements that may be completed during the undergraduate years. Requirements include knowledge of the U.S. Constitution and courses in health (EDUC 044), cardiopulmonary resuscitation, and mainstreaming (EDUC 116).

Additional information is provided in orientation meetings and the Graduate School of Education (1124 Sproul Hall; www.education.ucr.edu/teach).

California Teach-Science/Mathematics Initiative (CaTEACH-SMI) California Teach-Science Mathematics Initiative (CaTEACH-SMI) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SMI at UCR offers undergraduate students paid/unpaid opportunities to explore STEM teaching as a career option. Through CaTEACH-SMI, students receive advising and mentoring to prepare for entrance into an intern teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SMI Resource Center provides future STEM teachers with material and financial resources to promote planning and professional development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit http://smi.ucr.edu or at the Resource Center at 1104 Pierce Hall.

Preparation for Graduate School

All the tracks in the Biological Sciences major and the departmental majors in life science (Biology, Plant Biology, Entomology, Neuroscience) are appropriate as preparation for those planning to attend graduate school for advanced degrees (Master’s, Ph.D.). The faculty advisor assists in selecting combinations of courses appropriate for advanced study in the various fields of biology. Students considering graduate study are encouraged to do undergraduate research and include courses in computer science and statistics in their program.

The campuses and departments of the UC set their own requirements for admission to graduate school, but students should expect that at least a “B” average is required to be eligible for consideration. Higher levels are usually necessary for applicants to be competitive for admission as well as financial assistance (e.g., graduate fellowship, teaching assistantship). Letters of recommendation, undergraduate research, and results on the nationwide Graduate Record Examination are also considered. A minimum GPA of 2.50 in the last 60 units of undergraduate course work is necessary to be eligible for admission to master’s degree programs in the California State University system, but campuses and departments usually have additional or higher requirements.

Preparation for Medical/Health Professions or Veterinary Medicine

Suggestions for Elective Units Students must complete a minimum of 180 units for a bachelor’s degree at UCR, and each of the nine tracks in the Biological Sciences major and the departmental majors in life science have some unit space for elective courses. Depending on the courses chosen to meet other requirements, about 30 elective units remain among the 180 units required for graduation, after completion of English composition, humanities and social sciences breadth courses, the Life Sciences core curriculum, and the 52 upper-division and substantive units in the field of the major. Students planning a career in medicine or health science or other areas should give careful consideration to the use of their elective units to add breadth, perspective, and practical experience as part of the preparation for the professional schools and careers they have chosen. The following suggested activities were prepared after consultation with some medical school representatives.

Communication Skills, Internships, Volunteer Work Interaction with co-workers and patients is an integral part of health care professions. Students planning a career in this area need excellent social and communication skills and leadership experience. Patients must have confidence in the competence and judgment of medical professionals and know that recommendations and decisions are being made for the patient’s benefit. Experiences that broaden understanding of the human condition and/or increase sensitivity towards the medically underserved will increase an applicant’s chances for admission to medical school or other health professional programs.

As interest, time, and units permit, students should take more than the minimum required courses in English, humanities, arts, and social sciences. Volunteer work in health care facilities and community service agencies provides valuable experience and helps students clarify career interests and goals. EDUC 100 (2 units) can be taken for tutoring in the public schools, and coordinators in Career Services (Veitch Student Center) arrange for internships in local clinics, hospitals, laboratories, and community centers.

Foreign Language, Study Abroad There is much ethnic diversity in California and the United States, so proficiency in a foreign language (e.g., Spanish) is highly desirable for health care workers. Participation in the Education Abroad Program (EAP) is encouraged (see the EAP section of this catalog). Students interested in the language, literature, science, art, culture, history, government, or social institutions of the EAP countries have the opportunity to learn from first-hand experiences. Opportunities are available at each level, but the traditional year abroad is generally taken in the junior year. Short-term (one quarter or less) options are available in selected countries in numerous academic fields. Search for programs by specific areas at eap.ucop.edu/programwizard.

Minor, Second Major Students succeeding in their primary major may wish to add a minor or second major to the academic program. More than 40 minors are offered in the College of
In the College of Natural and Agricultural Sciences, and one (Computer Science) in the College of Engineering. Additional lower- or upper-division course work, a minor or second major in a field distinct from the primary major adds breadth and individuality to the academic program and shows that the student has interest and proficiency beyond the field of the major. Information about minors and second majors is provided in other sections of this catalog.

Expected Level of Computer Proficiency

Rapid changes and improvements in the health science field are occurring as a result of new technology and discoveries. Computers and complex instrumentation are routinely used in clinics and laboratories, so it is necessary to have computer skills and experience with lab equipment as provided in laboratory or field science courses. Undergraduates planning a career in medicine or other areas of science must have a knowledge of computer operating systems, word processing, spreadsheets, databases, E-mail, and the Internet. For those who have not reached this level of proficiency, CS 008 (Introduction to Computing, 4 units) is available as an elective.

Genomics and Bioinformatics

These new research fields, along with clinical applications of proteomics, are having an increasing impact on all aspects of medical practice, including diagnosis, treatment and delivery of services. Information derived from these fields is included in the Life Sciences core and upper-division science courses, and students may wish to include more than the minimum requirement as part of their undergraduate and postgraduate studies.

Independent Study and Research

Independent study is encouraged for future workers in medicine and other science research areas, and the various departments and programs on campus offer courses (numbered 194, 197, 199, 199H) in which students can enroll to do independent laboratory and/or field research or an in-depth study of a topic of special interest. Students desiring to do such independent work should consult with a professor who is willing to supervise the project.

Admission Requirements for Medical and Health Professional Schools

Most of the course work required for admission to professional schools is met by 1) the UCR requirements in English composition, humanities, arts, and social science and 2) the core curriculum for the various life science majors and tracks. Professional schools commonly require biochemistry, differential and integral calculus (MATH 008B or MATH 009A, MATH 009B), statistics (e.g., STAT 100A), some computer proficiency (e.g., CS 008), and one year of each of the following (with lab): introductory biology, inorganic chemistry, organic chemistry and physics.

Most schools require one or two years of college-level biology or zoology classes without specifying certain courses. Some schools, however, do require or highly recommend specific courses. Because of the amount and complexity of information in medical science, undergraduate students are urged to acquire strong preparation in major areas (e.g., biochemistry, genetics, microbiology, vertebrate anatomy and physiology, cell and molecular biology) so that they will not be overwhelmed with new information in the premedical school.

Information about required course work and admission tests (DAT, MCAT, VCAT, PCAT, GRE), can be obtained from Career Services (Veitch Student Center) and the Medical and Health Careers Program (visit 1114 Pierce Hall or mhcp.ucr.edu). Students must attend one orientation meeting prior to making an individual appointment at the Medical and Health Careers Program office. Several meetings are available each quarter (the schedule is available on the Web site or from 1114 Pierce Hall or 1223 Pierce Hall).

Joint UCR/UCLA Medical School

Each year, 24 students at UCR are selected for admission to the UCR/UCLA medical school (Thomas Haider Program in Biomedical Sciences). For the classes starting medical school Fall 2006 and later, eligible students in Medical Biology and other tracks and majors at UCR can complete the admission requirements and apply for the 24 positions reserved for UCR students. The first two years of medical school are taken at UCR, while the next two (clinical) years are completed at medical facilities at or associated with UCLA (Geffen School of Medicine). Information about course work and other admission requirements for the UCR/UCLA medical program are provided at www.biomed.ucr.edu, under Biomedical Sciences in this catalog, at the Student Affairs Office for the program (B600 Statistics-Computer) and in orientation meetings held at UCR.

Other Medical Schools, Osteopathic Medicine, Pharmacy, Dentistry, Optometry, Podiatry

A national organization for each medical profession publishes admission requirements, enrollment data and the curriculum for each school in that profession. The Medical School Admission Requirements book is usually available in the UCR Bookstore. Publications that outline requirements for other professional schools may be ordered from the bookstore, and they are available in Career Services (Veitch Student Center).

The most commonly required or recommended courses for professional schools in the above areas are biochemistry, genetics, cell and molecular biology, embryology or development, and (for pharmacy, optometry) human anatomy and physiology. Most professional schools require that physics, chemistry and other science courses be taken with laboratory if possible. Some dental and optometry schools require one or two courses in psychology (e.g., PSYC 001, PSYC 002). Some dental schools require principles of management (e.g., BUS 010). Helpful electives for dental school include economics, social science, nutrition, and basic accounting.

Some medical schools recommend physical chemistry (e.g., CHEM 109) and one year of college-level mathematics (e.g., MATH 005, MATH 008B or MATH 009A, and MATH 009B or the MATH 009A, MATH 009B, MATH 009C sequence). Medical schools usually do not offer substantive instruction in parasitology, so students can gain lecture and laboratory strength in this area by including BIOL 157 in the undergraduate program.

The Medical College Admission Test (MCAT), Dental Admissions Test (DAT), and tests for other health professions are commonly taken in the spring or summer of the junior year, so chemistry, physics, mathematics and some upper-division courses (e.g., biochemistry, genetics, cell and molecular biology, vertebrate anatomy and physiology) should be completed as much as possible before the exam is taken. The medical schools strongly urge applicants to complete the MCAT by April of the year in which they are applying so that evaluation of the application will not be delayed.

Veterinary Medicine

The UC Davis School of Veterinary Medicine requires a course in statistics (e.g., STAT 100A), genetics (e.g., BIOL 102), physiology (e.g., BIOL 171 and BIOL 171L) and embryology or development (e.g., BIOL 168, CBNS 169). The Western University of Health Sciences (Pomona, CA) requires the following for admission to its School of Veterinary Medicine: microbiology (BIOL 121/MCBL 121, BIOL 121L/MCBL 121L), nutrition (e.g., BCH 010), genetics (BIOL 102), computer skills (e.g., CS 008), technical writing (e.g., ENGL 015C), public speaking (THEA 050) and macroeconomics (e.g., ECON 002).

Physical Therapy, Physician’s Assistant, Public Health, Nutrition, Occupational Therapy, Dental Hygiene

In most of the schools that have specializations in these areas, the clinical/ professional training is at the graduate level. Preparatory coursework and a baccalaureate degree can be obtained at UCR, with application to the desired graduate program. Each professional school may have specific requirements that must be met in the undergraduate years, in addition to the courses required for all UCR biology students (e.g., English composition, humanities and social sciences, science and mathematics core curriculum). In their second or third year at UCR, students interested in the above professional schools and careers should attend one of the orientation meetings held by the Medical and Health Careers Program Advisor. Practical volunteer or paid work experience is required or helpful for admission to these programs, especially physical therapy and physician’s assistant. Visit the internship coordinator (Career Services, Veitch Student Center) to arrange volunteer work at local institutions. For some of the above specializations, clinical training is provided as part of an undergraduate
curriculum. For a certificate or baccalaureate degree in nursing, nutrition, dental hygiene, or physician’s assistant, students are well-advised to enroll initially in a school with the specific undergraduate program they want. Students can take some of the preparatory course work (e.g., English composition, introductory biology, chemistry) at UCR for such programs and then transfer, but this may increase the overall time to get the certificate or degree. Students wishing to obtain their degree at UCR before transferring should select additional upper-division course work in biology and related fields appropriate for the desired professional school and career objective.

Laboratory Technology Students who plan to apply to a laboratory technology school must obtain a Clinical Laboratory Scientist Trainee license, which certifies that they have completed the required courses for admission to a training program. In addition to the courses required in the core curriculum, the following courses are required by the California State Department of Health for a trainee license in Clinical Laboratory Science:

- Biochemistry: BCH 100 or BCH 110A
- Microbiology: BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 124/MCBL 124
- Immunology: BIOL 128/CBNS 128
- Human anatomy/physiology: BIOL 171, BIOL 171L
- Quantitative analysis: CHEM 005

Hematology

Students should inquire at the CNAS Academic Advising Center (1223 Pierce Hall) concerning hematology, since a separate course is not available at UCR.

For admission to training laboratories approved by the American Medical Association, students must have one year of organic chemistry. This is completed as part of the core curriculum for the life science majors and tracks. Statistics (e.g., STAT 100A, STAT 100B) and parasitology (BIOL 157) are strongly recommended.

Preparation is further strengthened with courses in cell and molecular biology (e.g., BIOL 107A, CBNS 101).

The Medical and Health Careers Program Advisor and Career Services staff can provide information about laboratory technology schools. For current information regarding requirements for clinical training and applications for the Clinical Laboratory Scientist Trainee License (required for admission to any laboratory technology program), students should call (510) 873-6327, or write State of California Department of Health, Laboratory Field Services, 2151 Berkeley Way, Annex 12, Berkeley, CA 94704.

Education and Research Centers, Institutes, and Resources

Undergraduate students benefit greatly from the rich variety of centers, institutes, natural reserves and other research facilities that are part of UCR. Each center or institute has research and teaching focused on a specific area of science or engineering or a specific aspect of culture, behavior, or society. Faculty associated with these resources provide courses, field trips and opportunities for undergraduate research and part-time employment. Research opportunities for undergraduate students can be explored at cnas-ugresearch.ucr.edu. The Research Opportunities section of this catalog has information and Web sites for the examples below and other centers and institutes at UCR.

Center for Ideas and Society:
IdeasAndSociety.ucr.edu

UC Institute for Mexico and the United States:
ucmexus.ucr.edu

Center for Conservation Biology:
cceb.ucr.edu

UCR Institute for Integrative Genome Biology:
genomics.ucr.edu

Center for Plant Cell Biology:
cepceb.ucr.edu

UCR Botanic Gardens:
gardens.ucr.edu

UCR Natural Reserve System:
biology.ucr.edu/about_us/nrs.html

Upper-Division Courses

BLSC 192H. Junior Honors Seminar (2) Seminar, 2 hours. Prerequisite(s): junior standing in the Biological Sciences major; admission to the upper-division University Honors Program or consent of instructor. Discussion of senior thesis writing procedures, including data analysis and presentation, and written and oral scientific communication methods by faculty who are sponsoring honors thesis research. Satisfactory (S) or No Credit (NC) grading is not available.

BLSC 193H. Senior Honors Seminar (2) Seminar, 2 hours. Prerequisite(s): senior standing in the Biological Sciences major; admission to the upper-division University Honors Program or consent of instructor. Satisfactory (S) or No Credit (NC) grading is not available.

BLSC 195H. Senior Honors Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): BLSC 198H; senior standing in the Biological Sciences major, admission to the upper-division University Honors Program or consent of instructor. Students complete research in the biological sciences and write a senior honors thesis under the guidance of a faculty member of the Biological Sciences interdepartmental major. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 9 units.

BLSC 198H. Junior Honors Research (1-4) Laboratory, 3-12 hours. Prerequisite(s): junior standing in the Biological Sciences major; admission to the upper-division University Honors Program or consent of instructor. Students investigate special problems and conduct research in the biological sciences under the guidance of a faculty member of the Biological Sciences interdepartmental major. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 9 units.

Biology

Subject abbreviation: BIOL
College of Natural and Agricultural Sciences

Richard A. Cardullo, Ph.D., Chair
Department Office, 1208 Sipli Hall
(951) 827-3579; biology.ucr.edu

Professors
Michael F. Allen, Ph.D. (Biology/Plant Pathology)
Richard A. Cardullo, Ph.D.
Mark A. Chappell, Ph.D.
Daphne Fairbairn, Ph.D.
Theodore Garland, Jr., Ph.D.
Leah T. Haimo, Ph.D.
Bradley C. Hyman, Ph.D.
Dmitri Maslov, Ph.D.
Leonard P. Nurney, Ph.D.
Edward G. Platzer, Ph.D. (Biology/Nematology)
David N. Reznick, Ph.D.
Derek A. Roff, Ph.D.
John T. Rotenberry, Ph.D.
Clay A. Sassaman, Ph.D.
Mark S. Springer, Ph.D.
Daniel S. Straus, Ph.D.
(Biology/Biomedical Sciences)
Marlene Zuk, Ph.D.

Professors Emeriti
Carlton R. Bovell, Ph.D.
Kenneth W. Cooper, Ph.D.
Roger D. Farley, Ph.D.
Wilbur W. Mayhew, Ph.D.
Mary V. Price, Ph.D.
Rodolfo Ruibal, Ph.D.
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Associate Professors
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Kimberly A. Hammond, Ph.D.
Cheryl Y. Hayashi, Ph.D.
Morris F. Maduro, Ph.D.

Assistant Professors
Douglas Altshuler, Ph.D.
Helen M. Regan, Ph.D.
Joel L. Sachs, Ph.D.
Wendy G. Saltzman, Ph.D.

Adjunct Assistant Professors
William I. Boarman, Ph.D.
Michael P. Hamilton, Ph.D.
Francis A. Muth, Ph.D.

Lecturer
Tracy L. Kahn, Ph.D.

Cooperating Faculty
Edith B. Allen, Ph.D. (Botany and Plant Sciences)
James G. Baldwin, Ph.D. (Nematology)
Rene T. Carde, Ph.D (Entomology)
Paul DeLey, Ph.D. (Nematology)
Mary L. Droser, Ph.D. (Earth Sciences)
J. Daniel Hare, Ph.D (Entomology)
John M. Heraty, Ph.D (Entomology)
Nigel C. Hughes, Ph.D (Earth Sciences)
Robert F. Luck, Ph.D. (Entomology)
Timothy D. Paine, Ph.D (Entomology)
Major

The Department of Biology offers B.A. and B.S. degrees in Biology. Both programs are based on the conviction that broad undergraduate training in biology, mathematics and the physical sciences, together with study in the humanities and social sciences, are fundamental to the education of a biologist. In addition to English composition, humanities, social sciences and the Life Sciences core curriculum (see below, Major Requirements), both degrees require 36 units of upper-division (numbered 100-199) biology courses. The degrees differ in the humanities and social sciences requirements; also 16 units of a foreign language are required for the B.A., whereas the B.S. requires 16 additional units in substantive courses in biology or related fields.

The research and teaching of the Department of Biology includes different levels (e.g., molecules, cells, organisms, populations, communities) and processes (e.g., development, evolution) of biological organization. An overview is presented in the introductory courses (BIOL 05LA, BIOL 05LB, BIOL 05LC, BIOL 005B, and BIOL 005C), and emphasis is placed on the unifying principles of the discipline.

Because of the diversity within biology and the wide range of career options, much latitude is allowed in selecting upper-division biology courses for the 36 units required for the major. Each student can select courses and plan a program of study to meet her/his specific interests and career goals. For assistance with this, faculty advisors are available in the CNAS Academic Advising Center (1223 Pierce Hall, (951) 827-7294). The section below, Programs of Specialization, is provided as a guide for course selection for graduate schools, medical and health science professional schools and the broad range of careers that are possible with the Biology major.

The 36 upper-division units are selected from a list which includes courses offered by the Department of Biology (BIOL 100-199) and a limited number of courses in Biochemistry (BCH), and Cell Biology and Neuroscience (CBNS). Qualified undergraduates (GPA 3.0 or above) may participate in graduate-level biology seminar courses with consent of the instructor, and up to 4 units (with letter grade) may be included in the major.

Those who choose to obtain a B.S. degree have as a college requirement an additional 16 units in upper-division biology courses and/or substantive courses in a field or fields related to the major. The purpose of this related area is to add strength and breadth to the major and to meet specific requirements for postgraduate study or a chosen career. The substantive courses in fields related to the major may be lower or upper division, but they usually have science or mathematics prerequisites (e.g., CBNS 120/PSYC 120, CHEM 005, STAT 100A, STAT 100B, MATH 009C).

UCR/UCLA Thomas Haider Program in Biomedical Sciences

Students in this major and all others at UCR are eligible to complete admission requirements and apply for the 24 positions reserved for UCR students in the joint UCR/UCLA Thomas Haider Program in Biomedical Sciences. The first two years of medical school are taken at UCR, while the next two (clinical) years are completed at medical facilities at or associated with UCLA (Geffen School of Medicine). Information is provided at www.biomed.ucr.edu, in the program’s section of this catalog, in the Student Affairs Office for the program (B600 Stat-Comp, (951) 827-4334), and at orientation meetings held at UCR.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Natural and Agricultural Sciences, Colleges and Programs section.

Major Requirements

Some of the following requirements for the major in Biology may also fulfill the College’s breadth requirements. Consult with a department advisor for course planning.

1. Life Sciences core curriculum (68-72 units)
   a) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
   c) CHEM 112A, CHEM 112B, CHEM 112C
   d) MATH 008B or MATH 009A, MATH 009B
   e) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC
   f) STAT 100A
   g) BCH 100 or BCH 110A

The core curriculum must be completed with a grade point average of 2.0 or better and no grade lower than “C-.” If a grade of D or F is received in two core curriculum courses, either in separate courses or repetitions of the same course, the student will not be permitted to continue in the major.

2. Upper-division requirements (36 units)
   a) BIOL 102
   b) Thirty-two (32) additional Biology units to be taken in consultation with a faculty advisor

3. Other requirements
   a) For the Bachelor of Arts only (0-16 units):
      The foreign language requirement may be fulfilled by completing level four or the demonstration of equivalent proficiency in one foreign language.
   b) For the Bachelor of Science only (16 units):
      An additional 16 units in upper-division biology courses and/or substantive courses in a field or fields related to the major. A list of acceptable courses is available in the CNAS Academic Advising Center.

Programs of Specialization

The Life Sciences core curriculum (item 1 above) fulfills many of the requirements for admission to graduate schools in biology or professional schools in the medical and health science fields. In addition to Introductory Genetics (BIOL 102, 4 units), a wide choice is available for the remaining 32 upper-division units required for the Biology major (item 2.b) above and the 16 additional units related to the field of the major (B.S. degree, item 3 above). Each student selects upper-division and related courses depending on the type of school and career chosen (e.g., education, medicine, pharmacy, dentistry, optometry, veterinary medicine, nursing, physical therapy, public health, graduate school in one of the fields below).

In planning an academic program to prepare for teaching or one of the medical fields, present and prospective Biology majors are referred to relevant topics in the Biological Sciences section of this catalog. That section has information for those planning to attend graduate school in education to obtain a teaching credential (subsection, Teaching Credential) and/or a master’s or Ph.D. degree in education (subsection, Preparation for Graduate School). Also included are guidelines to help students select courses to prepare for admission to professional schools in the medical field (subsections, Medical Biology, Suggestions for Elective Units for Medical/Health Professions, Admission Requirements for Medical and Health Professional Schools). Additional information about required course work and admission tests (MCAT, OAT, VCAT, PCAT, GRE) can be obtained from Career Services (Velch Student Center) and the Medical and Health Careers Program (visit 1114 Pierce Hall or mhcp.ucr.edu).

Suggested courses of study are provided below for those interested in various biological fields. These programs meet most of the requirements for admission to corresponding graduate schools for those students who wish to pursue a master’s and/or Ph.D. degree. The faculty advisor assists in selecting combinations of courses appropriate for advanced study in the fields below and others. Students considering graduate study are encouraged to do undergraduate research and take courses in computer science and statistics.

The Biological Sciences section of this catalog (subsection, Preparation for Graduate School) has additional information for those planning graduate study in a life science field. In some cases, a course of study differing substantially from the examples given below will best meet the needs of the student. In consultation with a faculty advisor, a student may prepare a
program in some other biological specialization such as animal behavior, evolution/development or developmental biology.

Cell and Molecular Biology BIOL 102, BIOL 105, BIOL 107A, BIOL 107B, BIOL 109 or BIOL 153/BCH 153/ BPS 153, CBNS 101 or BIOL 113 and BIOL 114, BIOL 119, BIOL 121/MCB 121, BIOL 1211/MCB 1211, BIOL 122, MCB 123/MCB 123/ PLPA 123, BIOL 124/MCB 124, BIOL 128/CBNS 128, BIOL 155/BPS 155, BIOL 168, BCH 100 or the BCH 110A, BCH 110B, and BCH 110C sequence, BCH 102, CBNS 108, CBNS 150/ENTX 150, CHEM 005, CHEM 109, STAT 100A and STAT 100B

Ecology and Population Biology BIOL 102, BIOL 104/BPS 104, BIOL 105, BIOL 108, BIOL 116, BIOL 116L, BIOL 117, BIOL 160, BIOL 160L, BIOL 174, either BIOL 175 or BIOL 143/BPS 143, the MATH 008B or MATH 009A, MATH 009B, and MATH 009C sequence, STAT 100A and STAT 100B. Also recommended: BIOL 151, BIOL 161A, BIOL 163, BPS 146, MATH 046, BIOL 165/BPS 165, BIOL 166


Organismal Genetics BIOL 102, BIOL 105, BIOL 107A, BIOL 107B, BIOL 108, BIOL 115, BIOL 155/BPS 155, CBNS 150/ENTX 150, CBNS 169

Zoology and Physiology BIOL 100/ ENTM 100, BIOL 102, BIOL 105, CBNS 101 or BIOL 113 and BIOL 114, BIOL 151, BIOL 152/GE 152, BIOL 157, BIOL 159, BIOL 160, BIOL 160L, BIOL 161A, BIOL 161B, BIOL 162/ENTM 162, BIOL 168, BIOL 171, BIOL 171L, BIOL 173/ENTM 173, BIOL 174, BIOL 175, BIOL 178, BCH 100, CBNS 106, CBNS 108, CBNS 116, CBNS 169. Students are also encouraged to take laboratory courses (e.g., BIOL 102). Also recommended: a course in ecology (e.g., BIOL 116, BIOL 116L), STAT 100A and STAT 100B

California Teach-Science/Mathematics Initiative (CaTEACH-SMI) California Teach-Science Mathematics Initiative (CaTEACH-SMI) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SMI at UCR offers undergraduate students paid/unpaid opportunities to explore STEM teaching as a career option. Through CaTEACH-SMI, students receive advising and mentoring to prepare for entrance into an intern teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SMI Resource Center provides future STEM teachers with material and financial resources to promote planning and professional development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit http://smi.ucr.edu or at the Resource Center at 1104 Pierce Hall.

Additional Curricular and Advising Information

This catalog has sections applicable for all students at UCR (Finances and Registration, Academic Regulations), and a specific section for students in this college (College of Natural and Agricultural Sciences). Present and prospective students are referred to those sections for enrollment policies and procedures and curricular and advising information for the campus and college.

As described above, the Biological Sciences section has topics especially relevant and helpful for students in that major and the departmental majors in Biology, Plant Biology, and Neuroscience. Present and prospective students are referred to the following subheadings in the Biological Sciences section:

Student Academic Advising
Grading Basis: Letter Grade or S/NC
Full or Part-time Study
Transfer Students
Minor
Double Major
Internships
Teaching Credential
Preparation for Graduate School
Suggestions for Elective Units for Medical/Health Professionals
Admission Requirements for Medical and Health Professional Schools
Education and Research Centers, Institutes and Resources

Independent Study and Research

The Department of Biology offers courses in which students can enroll to do independent laboratory research or an in-depth library study of a topic of special interest.

Students desiring to do Independent Reading (BIOL 194), Introduction to Research (BIOL 197) or Junior/Senior Research (BIOL 199) should consult with a professor who is willing to supervise the project. The student may suggest a specific question or formulate a project after consultation with the instructor. Information about the research fields of the professors is available at the CNAS Academic Advising Center (1223 Pierce Hall).

To enroll in these courses, the student must obtain an application form from the Biological Sciences Undergraduate Advising Center. Instructions for writing a brief description of the proposed project are provided with the form. The completed application, signed by the professor in charge of the project, is submitted to the advising center preferably before the first day of the quarter but no later than the end of the second week of the quarter.

Applicants for BIOL 194 and BIOL 199 should ordinarily be juniors or seniors with a GPA of 3.00 or higher. Sophomore students with a GPA of 3.00 or higher may apply to enroll in BIOL 197 (Introduction to Research), since the purpose of this course is to enable the student to do preliminary reading and laboratory research to explore with the professor the feasibility of undertaking a project for later enrollment in BIOL 199. Enrollment in BIOL 197 is not required before enrollment in BIOL 199, but the former course is available for those situations where preliminary work will be helpful.

For BIOL 194 and BIOL 199, the student writes a report of the library study or laboratory results for the quarter, which is reviewed by the sponsoring professor and submitted to the CNAS Academic Advising Center by the last day of instruction of the quarter.

BIOL 194, BIOL 197, and BIOL 199 are graded “S/NC”, and up to 9 units of credit may be counted as part of the 16 substantive units related to the major for the B.S. degree.

Natural Reserve System

This system was formed by the UC in 1965 to preserve for study a series of undisturbed natural areas representing the state's vast ecological diversity. Since then the system has grown to include twenty-seven reserves, eight of them administered by the UCR campus. See Research Opportunities in this catalog.

Most of the reserves are undeveloped except for fencing, roads and trails, but laboratory facilities, housing and campgrounds for class use are available at some sites. The reserves are used as outdoor classrooms and laboratories by students, teachers and researchers from educational institutions, public and private, throughout the state, across the nation and around the world. Some of the courses offered by the UCR Department of Biology include field trips and overnight camping trips to the reserves. In the field, students are introduced to the great diversity of plant and animal organisms in Southern California, and to the effect of environmental factors on this diversity.

Undergraduate and graduate students who wish to use the reserves in their individual research projects should contact Dr. John T. Rotenberry, Department of Biology, 3372 Spieht Hall, (951) 827-3953, to obtain an application, map and list of rules and regulations.
Graduate Program

The Department of Biology administers programs leading to the M.S. and Ph.D. degrees in Evolution, Ecology, and Organismal Biology, with specializations in Evolutionary Biology, Ecology, and Physiology and Biophysics.

Admission: Applicants must submit GRE scores for the General Test (verbal, quantitative, and analytical). In addition, submission of the Subject Test score may improve chances of admission and is recommended.

All graduate students entering the department meet with a guidance committee during the first quarter of enrollment so that their educational background can be addressed. Considering the requirements of the student’s specialization, the committee recommends a program of study to be followed in pursuit of graduate work. Because of the diversity among the specializations, course requirements for advanced degrees are specified by the student’s guidance committee in accordance with the specific requirements of each track.

Doctoral Degree

The Department of Biology offers the Ph.D. degree in Evolution, Ecology, and Organismal Biology, with specializations in Evolutionary Biology, Ecology, and Physiology & Biophysics. In addition to the general requirements of the Graduate Division, students intending to become candidates for the Ph.D. degree in Evolution, Ecology, and Organismal Biology must complete the following.

Course Work: Course requirements are determined in consideration of the requirements of the student’s area of specialization. Selection of specific courses is done by the guidance committee in consultation with the student.

Each track requires EEOB 400, two 200-level disciplinary courses, a core course (or core course series) and the colloquium series seminar (BIOL 252).

A. Evolutionary Biology

1. Disciplinary core course in Evolutionary Theory (EEOB 216 or the equivalent)

2. At least two disciplinary courses (EEOB 211, BIOL 212, EEOB 213, EEOB 214 EEOB 217, BIOL 219)

3. Current research topics course during each quarter of residence (BIOL 252 or another disciplinary colloquium and EEOB 265)

B. Ecology

1. Disciplinary core course in Ecology (EEOB 211)

2. At least two disciplinary courses (BIOL 212, EEOB 213, EEOB 217, BPSC 246, BPSC 247, BPSC 243, ENSC 232, SWSC 211/MCBL 211)

3. Current research topics course during each quarter of residence (BIOL 252 or another disciplinary colloquium and EEOB 265)

C. Physiology and Biophysics

1. Disciplinary core course in Physiology (EEOB 297; two units each in the first four quarters of residence for a total of 8 quarters)

2. At least two disciplinary courses (CMDB 200 or CBNS 200A, CMDB 201, CBNS 200B, CMDB 202, CBNS 200C, BIOL 203, EEOB 216, ENMT 201, ENMT 243)

3. Current research topics course during each quarter of residence (BIOL 252 or another disciplinary colloquium and EEOB 265)

Written and Oral Qualifying Examinations: Students must pass a written examination in their specialized field of interest not later than the end of the second year of residence. Written Qualifying Examinations must be completed by the eighth week of the sixth quarter in residence for each track. Upon successful completion of the Written Qualifying Examination, an Oral Qualifying Examination is administered wherein students defend a proposal detailing the rationale, specific aims, and approaches to be undertaken for their proposed dissertation research.

Dissertation: Candidates may be required to successfully defend their dissertation research in a public oral presentation.

Teaching Requirement: Students must have at least one year of approved teaching experience.

Normative Time to Degree: 18 quarters

Master’s Degree

The Department of Biology offers the M.S. degree in Evolution, Ecology, and Organismal Biology, with specializations in Evolutionary Biology, Ecology, and Physiology & Biophysics. To qualify for the M.S. degree in Evolution, Ecology, and Organismal Biology, candidates must meet the requirements of the Department of Biology.

These requirements are as follows:

Plan I (Thesis): Thirty-six (36) quarter units of approved courses in the 100 or 200 series, of which at least 24 units must be in the 200 series courses in the biological sciences. Not more than 12 units of EEOB 299 may be applied to the degree. A minimum of 12 units of course work other than courses in the 290 series must be completed in fulfillment of the requirement for 24 units of graduate courses. Students must present an acceptable thesis and undergo a final oral examination in defense of the thesis.

Lower-Division Courses

BIOL 002. Cellular Basis of Life (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): none. An introduction to the fundamentals of life processes at the cellular level. Topics include cell structure, chemical composition, metabolism, reproduction, genetics, and development with emphasis on humans. Not recommended for natural science majors. Either BIOL 002 or BIOL 003 may be taken as a breadth requirement in biology; together they provide a general introduction to the field of biology. Credit is not awarded for BIOL 002 if it has already been awarded for BIOL 005A or BIOL 05LA.

BIOL 003. Organisms in Their Environment (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): none. An introduction to the physiology, ecology, and evolution of living organisms with emphasis on humans. Not recommended for natural science majors. Either BIOL 002 or BIOL 003 may be taken as a breadth requirement in biology; together they provide a general introduction to the field of biology. Credit is not allowed for both BIOL 003 and BIOL 005B.

BIOL 005A. Introduction to Cell and Molecular Biology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 05LA (may be taken concurrently); CHEM 001A and CHEM 001LA with grades of “C-” or better; CHEM 01HA and CHEM 1LA with grades of “C-” or better; consent of instructor is required for students repeating the course. An intensive course designed to prepare students for upper-division courses in cell and molecular biology. Covers biochemical, structural, metabolic, and genetic aspects of cells. (Required for Biology majors; recommended for science majors desiring an introduction to biology.) Credit is not awarded for BIOL 005A if it has already been awarded for BIOL 002.

BIOL 005B. Introduction to Organismal Biology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 05LA with grades of “C-” or better; CHEM 001A or CHEM 01HA; CHEM 001B or CHEM 01HB; consent of instructor is required for students repeating the course. An intensive course designed to prepare students for upper-division courses in organismal biology. Covers developmental biology, physiology, and regulation at the level of the organism. (Required for Biology majors; recommended for science majors desiring an introduction to biology.) Credit is awarded for only one of BIOL 003 or BIOL 005B.

BIOL 005C. Introductory Evolution and Ecology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A and BIOL 005B (or BIOL 002 and BIOL 003 for non-Biology majors) with grades of “C-” or better; MATH 009A or equivalent (may be taken concurrently); consent of instructor is required for students repeating the course. An intensive course designed to introduce the student to the subjects of evolution and ecology. Covers population dynamics, community ecology, population genetics, and evolutionary theory. (Required for Biology majors; recommended for science majors desiring an introduction to biology.) Students who take BIOL 002 and BIOL 003 as part of another major, or those who take equivalent first-year biology at another institution, may enter directly into BIOL 005C without critical handicap.

BIOL 010. Headlines in the History of Life (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A and BIOL 005B or (BIOL 002 and BIOL 003 for non-Biology majors) with grades of “C-” or better; MATH 009A or equivalent (may be taken concurrently); consent of instructor is required for students repeating the course. An intensive course designed to introduce the student to the subjects of evolution and ecology. Covers population dynamics, community ecology, population genetics, and evolutionary theory. (Required for Biology majors; recommended for science majors desiring an introduction to biology.) Students who take BIOL 002 and BIOL 003 as part of another major, or those who take equivalent first-year biology at another institution, may enter directly into BIOL 005C without critical handicap.

BIOL 030. Human Reproduction and Sexual Behavior (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A consideration of human
Focuses on insect identification. Cross-listed with biology, behavior, and diversity of insects. Laboratory covers the anatomy, physiology, ecological, and evolutionary aspects of the topics covered in BIOL 005A. Credit is awarded for only one of BCH 153/BIOL 107A. Molecular Biology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, CHEM 010C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A. The study of the structure and function of the genetic material, including DNA structure, DNA replication and recombination, regulation of gene expression, and protein synthesis. Both prokaryotic and eukaryotic systems are examined, including contemporary recombinant DNA technology and applications of molecular cloning procedures.

BIOL 107B. Advanced Molecular Biology (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BIOL 107A or BCH 110C or equivalents. An advanced treatment of the functional architecture of genetic material. Topics include genome structure and chromosome organization, DNA replication and gene expression, cloning organisms, molecular medicine, protein engineering, and application of modern molecular biology to agricultural problems. Coverage of each topic includes discussion of the impact of the emergent molecular technology on society.

BIOL 108. Introductory Population Genetics (4) Lecture, 3 hours; discussion and demonstration, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, or equivalents; or consent of instructor. Introductory study of insects. Earth’s most diverse group of animals (75 percent of animal species are insects). Lecture covers the anatomy, physiology, ecology, behavior, and diversity of insects. Laboratory focuses on insect identification. Cross-listed with ENMT 100.

Upper-Division Courses

BIOL 102. Introductory Genetics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A and BIOL 005B with grades of "C-" or better. An introductory course, including classical Mendelian genetics, linkage and recombination, sex-linked traits, cytotyping, developmental genetics, and molecular genetics. Also includes some probability theory and statistics.

BIOL 104. Foundations of Plant Biology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005C. A study of the plant world from cells to ecosystems. Examines the structure and function of organisms from the major plant groups and their role in the biosphere. The laboratory explores the unique properties of plants. Cross-listed with BPSC 104.

BIOL 105. Evolution (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005C with a grade of "C-" or better, BIOL 102, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. Covers the causal interpretation of organic diversity and adaptation. Topics include inference of evolutionary change from the fossil record and from genomic and molecular patterns; microevolution and macroevolution; systematics and the species problem; and natural selection, drift, and other forces of evolution.
BIOL 117. Population and Community Ecology (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C, BIOL 116, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics. Introduces models of population growth, interaction-specific, interaction, and biotic communities and their implications for applied fields such as pest control, epidemiology, and conservation of biodiversity. Topics include population growth and regulation, life history evolution, metapopulation dynamics, extinction, competition, predation, and the role of ecological interactions in adaptation and evolutionary change.

BIOL 118. Laboratory in Molecular Phylogenetics and Evolution (4) Discussion, 1 hour; laboratory, 3 hours; lecture, 2 hours. Prerequisite(s): BIOL 105 or consent of instructor. Covers theory, techniques, and analytical methods for interpreting patterns of molecular evolution and phylogeny. Explores the comparative analysis of DNA and tests of evolutionary hypotheses using modern computational tools. Includes polymerase chain reaction (PCR), cloning, gel electrophoresis, and restriction site analysis.

BIOL 119. Introduction to Genomics and Bioinformatics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics. Introduction to the science of genomics and bioinformatics, including genome- and gene-related sequencing, database techniques, comparative and evolutionary genomics, and microarray analysis.

BIOL 120. Introduction to Plant Pathology (3) Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics, or consent of instructor. An introduction to the biology of plant diseases. Topics include diseases and disease-causing agents, host-pathogen interaction during disease development, and strategies for disease management. An optional, separate laboratory is offered. Cross-listed with MCBL 120 and PLPA 120.

BIOL 120L. Introduction to Plant Pathology Laboratory (1) Laboratory, 4 hours. Prerequisite(s): BIOL 005A, BIOL 005B; concurrent enrollment in BIOL 120/MCBL 120/PLPA 120 or consent of instructor; BIOL 121/MCBL 121 and BIOL 124/MCBL 124 recommended. Covers fundamentals in the use of laboratory instruments and techniques for the detection, isolation, and identification of representative infectious agents that cause disease in plants. Cross-listed with MCBL 120L and PLPA 120L.

BIOL 121. Introductory Microbiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently); or consent of instructor. An intensive introduction to the fundamental physiology and molecular biology of bacteria and viruses. Covers covers strategies for examining microbial pathogenic mechanisms. Cross-listed with MCBL 124.

BIOL 122. Food Microbiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 121/MCBL 121 with a grade of "C-" or better; BIOL 121/MCBL 121L. Covers spoilage and preparation of food; food quality and indicator organisms; the role of microorganisms in the production of dairy goods and fermented beverages; food-borne pathogens and microbiological production of toxins and modern molecular methods for detection of food microorganisms. Cross-listed with MCBL 122.

BIOL 123. Introduction to Comparative Virology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics, or consent of instructor. Considers viruses as infectious agents of bacteria, plants, and animals (vertebrates and invertebrates). Compares the major groups of viruses to each other with respect to their biological and biochemical properties, molecular and genetic characteristics, and modes of replication. Cross-listed with MCBL 123 and PLPA 123.

BIOL 124. Pathogenic Microbiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 121/MCBL 121 with a grade of "C-" or better or consent of instructor. An intensive introduction to the fundamental physiology and molecular biology of bacteria and viruses. Covers covers strategies for examining microbial pathogenic mechanisms. Cross-listed with MCBL 124.

BIOL 127. Insect Ecology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics, or consent of instructor. Introduces principles of insect ecology with examples emphasizing the Arthropoda. Topics include factors governing population growth; ecological and evolutionary interactions with hosts, competitors, and natural enemies; structure of ecological communities; and adaptations to different environments. Cross-listed with ENTM 127.

BIOL 128. Immunology (3) Lecture, 3 hours. Prerequisite(s): BIOL 005C, PHYS 002C, PHYS 02LC; BCH 100 or BCH 110A. A study of humoral and cellular immunity. Topics include lymphoid systems, cells, antigens, antibodies, antibody formation, cellular immunity, and tumor transplantation immunity. Diseases and altered immune states associated with each topic are discussed in detail. Cross-listed with CBNS 128.

BIOL 132. Plant Anatomy (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): BIOL 005A and BIOL 005B, or consent of instructor. Functional and developmental aspects of plant cell, tissue, and organ structure. All aspects of the flowering plant life cycle are covered from germination to pollination and fruit and seed development. Cross-listed with BPSC 132.

BIOL 134. Introduction to Mycology (3) Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005L, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics, or consent of instructor. Introduces the comparative morphology and evolution of vascular plants with use of fossil and living representatives, focusing on the Angiosperms. Cross-listed with BPSC 138.

BIOL 137. Morphology of Vascular Plants (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 005A, BIOL 005L, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently); or consent of instructor. Examines the fundamental principles of plant physiology, including photosynthesis, respiration, water relations, mineral nutrition, growth, morphogenesis, plant hormones, differentiation, and senescence. Cross-listed with BPSC 143.

BIOL 148. Quantitative Genetics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005L, BIOL 005B, BIOL 005C, BIOL 012, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently), BIOL 104/BPSC 104; or consent of instructor. A survey of the fundamental principles of general genetics, including classical genetic concepts, and the application of modern laboratory methods. Cross-listed with BIOL 148.

BIOL 151. Invertebrate Zoology (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, PHYS 002A with grades of "C-" or better. Structure, classification, and biology of the invertebrates.

BIOL 152. Principles of Invertebrate Paleobiology and Paleoecology (4) Lecture, 2 hours; laboratory, 3 hours; three 1-day field trips. Prerequisite(s): BIOL 005C with a grade of "C-" or better or BIOL 010/GEO 003 with a grade of "C-" or better. Topics include evolutionary and the fossil record, paleoecology, classification, and the nature of adaptive radiations, and extinctions. Cross-listed with GEO 152.

BIOL 153. Plant Genomics and Biotechnology Laboratory (4) F, Even Years Lecture, 1 hour; discussion, 1 hour; laboratory, 6 hours. Prerequisite(s): BCH 110C or BIOL 107A; upper-division standing; consent of instructor. A study of modern techniques in plant genome modification. Includes topics include nucleic acid cloning and sequencing; plant tissue culture and genetic transformation; controlled-environment plant growth; gene mapping; and germplasm collections. Also explores the history of plant biotechnology, economic, agricultural, nutritional, medicinal, and societal relevance, and regulatory issues. Cross-listed with BCH 153 and BPSC 153.
BIOL 155. Chromosomes (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently); or consent of instructor. An examination of the structure, function, and behavior of eukaryotic chromosomes. Cross-listed with BPCS 155.

BIOL 157. Parasitology (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, BCH 100 or BCH 110A, one course in statistics. The nature and principles of parasitism with a survey of various types of animal parasites.

BIOL 158. Medical Molecular Parasitology (4) Lecture, 3 hours; seminar, 1.5 hours. Prerequisite(s): BCH 100 or BIOL 107A. An overview of genome organization and gene expression, with aspects of biochemistry, evolution, natural history, and clinical manifestations of human parasites. Trypanosoma, Leishmania, Plasmodium, and others. Emphasizes the molecular and biochemical adaptations to parasitism. Prior knowledge of classical parasitology is not assumed. Students present original research papers during the seminar.

BIOL 159. Biology of Nematodes (3) Lecture, 2 hours; discussion and demonstration, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics. An introduction to the biology of nematodes. Topics include the morphology, physiology, development, genetics, behavior, and ecology of nematodes from parasitic and free-living habitats. In the discussion and demonstration section, students observe the comparative morphology and biology of nematodes and give oral presentations on selected nematode life histories. Cross-listed with NEM 159.

BIOL 160. Animal Behavior (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, and BIOL 102 with grades of "C-" or better, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics. An examination of behavior from an evolutionary and ecological perspective. Topics include the inheritance of behavior, evolution of communication and displays, migration and habitat selection, foraging ecology, mating systems, and the evolution of social behavior.

BIOL 160L. Laboratory in Animal Behavior (1) Laboratory, 4 hours. Prerequisite(s): BIOL 160 (may be taken concurrently). Laboratory and field exercises in animal behavior. Covers topics such as foraging behavior, aggression, and territoriality.

BIOL 161A. Functional Anatomy of the Vertebrates (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, MATH 009B or MATH 09HB, CHEM 112A, MATH 009B or MATH 09HB, PHYS 002A, and one course in statistics with grades of "C-" or better. A study of the functional anatomy of vertebrates, including humans. Examines each organ system from a developmental and evolutionary perspective. Topics include phylogeny, the skeleton, muscles, and the nervous system. BIOL 161A, BIOL 161B, BIOL 171, and BIOL 171L provide a one-year sequence in vertebrate and human anatomy and physiology. Recommended for sophomores and juniors.

BIOL 161B. Functional Anatomy of the Vertebrates (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): BIOL 161A, CHEM 112B, and PHYS 002B with grades of "C-" or better. A study of the functional anatomy and regulation of organ systems. Survey of the cardiovascular, endocrine, and nervous systems; glands and hormones; body fluids and the kidney; digestion and absorption; and pharmacology and hematology. BIOL 161A, BIOL 161B, BIOL 171, and BIOL 171L provide a one-year sequence in vertebrate and human anatomy and physiology.

BIOL 171L. Human Anatomy and Physiology Laboratory (1) Laboratory, 3 hours. Prerequisite(s): BIOL 161A (may be taken concurrently), CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics; BIOL 161B is recommended; concurrent enrollment in BIOL 171L involves laboratory experiments in physiology and study of human anatomy and histology (normal and diseased). Covers experimentation, data collection and analysis, incorporating hema- tology and BIOL 171B. Topics include nutrition and control, cardiac excitation and pharmacology, blood pressure, electrocardiography, and electrophysiology. BIOL 161A, BIOL 161B, BIOL 171, and BIOL 171L provide a one-year sequence in vertebrate and human anatomy and physiology.

BIOL 173. Insect Physiology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A and BIOL 005B or equivalents; CHEM 112A, CHEM 112B, and one course in statistics; or consent of instructor. Introduction to principles of insect physiology. Subjects include growth, development and hormones, cuticle, nervous system, circulation, respiration, digestion, nutrition, excretion, reproduction, water balance, and temperature relations. Prior knowledge of insects is not assumed. Cross-listed with ENTM 173.

BIOL 174. Ecological and Evolutionary Physiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics. Examines the interactions between organisms and their environments, emphasizing coadaptation of physiological, morphological, and behavioral ontogenies. Includes allometry and scaling, metabolism and locomotion, heat and water exchange, evolution of endothermy, artificial selection experiments, and phylogenetically based statistical methods.

BIOL 175. Comparative Animal Physiology (3) Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics; recommendations: BIOL 151 or both BIOL 151A and BIOL 151B. Topics include respiration, control of body temperature, and energy metabolism, gas exchange, circulation, and regulation of body fluid composition.

BIOL 176. Comparative Biomechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005C; PHYS 002C or PHYS 040C; BCH 100 or BCH 110A. Applies principles from physics and engineering to the study of the relationship between organism form and function. Covers examples from diverse plant and animal systems. Includes functions of solids and fluids, viscoelasticity, drag, biological pumps, locomotion, and muscle mechanics.

BIOL 178. Hormones and Behavior (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics; concurrent enrollment in BIOL 171L is recommended. An analysis of cell, tissue, and organ structure and function in normal and diseased conditions. Topics include the musculoskeletal, circulatory, and autonomic nervous systems; and endocrine systems; body fluids and the kidney; digestion and absorption; and pharmacology and hematology. BIOL 161A, BIOL 161B, BIOL 171, and BIOL 171L provide a one-year sequence in vertebrate and human anatomy and physiology.
course in statistics. An examination of the interactions between hormones and behavior in animals, including humans. Provides an overview of endocrine physiolo-
gy, and examines the roles of hormones in sexual differ-
entiation, sex differences in behavior, sexual behav-
ior, parental behavior, affiliation, aggression, stress, and mood.

BIOL 185 (E-2). Advanced Undergraduate Seminar in Biology (2-4) Seminar, 2-4 hours. Prerequisite(s): upper-division standing with a major in biology or related field. A seminar course offered to provide biol-
ogy majors and others that can meet the prerequisite of the course, an opportunity for an in-depth consider-
ation of special topics in biology and related areas. Topics are selected as faculty interest, student interest, and opportunity permit. (Limited enrollment) G. Biology of Development (2); N. Biology of Food (3); P. Psychobiology (2).

BIOL 190. Special Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): consent of instructor and departmental chairperson. To be taken as a means of meeting special curricular needs. Grading basis to be selected in consultation with the instructor and departmental chairperson. Course is repeatable.

BIOL 191. Seminar in Biology (2-4) Seminar, 2-4 hours. Prerequisite(s): upper-division standing, consent of instructor. A critical study of selected topics in biology. Course is repeatable.

BIOL 194. Independent Reading (1-4) Consultation, 1-4 hours. Prerequisite(s): junior or senior standing and consent of instructor and departmental chairperson. Independent study under faculty supervision. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 4 units.

BIOL 197. Introduction to Research (1-2) Consultation, 1-2 hours. Prerequisite(s): sophomore, junior or senior standing and consent of instructor and departmental chairperson. Reading, planning and preliminary labo-
atory work to develop a research project suitable for BIOL 199, Junior/Senior Research. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BIOL 199. Junior/Senior Research (1-4) Laboratory, 1-4 hours. Prerequisite(s): junior or senior standing, a minimum GPA of 3.0 and consent of instructor and departmental chairperson. Special problems and research in biology performed under the supervision of members of the faculty of the Department of Biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Graduate Courses

BIOL 200. Cell Biology (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): BCH 110A or BCH 110B or equivalent (may be taken concurrently); BIOL 102 or equivalent; BIOL 113 or BIOL 114 or CBNS 101 or equivalent. An examination of the structure and func-
tion of eukaryotic cells and their components with emphasis on the key experiments that provide the foundation for our current knowledge. Covers topics such as cell membranes, intracellular trafficking, cell-
to-cell interactions, motility, and the cytoskeleton. Cross-listed with CMDB 200.

BIOL 201. Molecular Biology (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): BCH 110A or BCH 110B or equivalent (may be taken concurrently); BIOL 102 or equivalent; BIOL 107A or equivalent. Covers the structure and inheritance of genetic material, the regulation of gene expression at the cellular and molecular level including molecular mechanisms for regulation of gene transcription, posttranscriptional regulation at the level of messenger RNA stability, pro-
cessing, editing and translation, methods for gene mapping, and positional cloning. Cross-listed with CMDB 201.

BIOL 203. Cellular Biophysics (3) Lecture, 3 hours. Prerequisite(s): BIOL 200/CMDB 200; BIOL 201/CMDB 201; CHEM 109 or equivalent; or consent of instructor. Biophysical principles that determine cellular structure and function including diffusion, electrochemical gradients, transport, macromolecular interactions, and genetic recombination. Illustrative examples are used to highlight the importance of these principles in modern cell biology and physiology.

BIOL 208. Host-Parasite Relationships (3) Lecture, 3 hours. Prerequisite(s): BIOL 100/ENTM 100 or BIOL 157 or consent of instructor. Explores the fundamental biochemical and developmental requirements for “successful” host-parasite relationships in insects. Emphasizes wasp and nematode parasites of insects and vector-parasite interactions involved in transmission of parasites in malaria, trypansomia, and Lyme disease. Cross-listed with ENTM 208.

EEOB 211. Ecology: Genes to Ecosystems (4) Lecture, 4 hours. Prerequisite(s): BIOL 116 or consent of instructor. Examination of the history, theory, and interrelationships of fundamental ecological principles through readings and discussions of classic and recent literature. Topics include quantitative, popu-
lation, community, ecosystem, landscape, restoration, conservation, and human or social ecology.

BIOL 212. Ecological Systems in Space and Time (4) Lecture, 3 hours; field, 30 hours per quarter. Prerequisite(s): BIOL 117 or BIOL 152/GEOL 152 or equivalent or consent of instructor. Focuses on how ecological systems are interpreted and reconciled at the community, landscape, and paleoecological scales. Addresses the role of extrinsic factors operating at each of these scales. Also examines the historical development of our understanding of ecological sys-
tems at various scales. Cross-listed with ENTM 212 and GEO 212.

EEOB 213. Behavioral Ecology (4) Lecture, 4 hours. Prerequisite(s): BIOL 160 or consent of instructor. Examines animal behavior in an evolutionary context. Traces the historical development of the study of behavior, drawing from ethology, comparative psychol-
ogy, and sociobiology. Topics include evolution of sociality, sexual selection, predator-prey behavior, and parental care.

EEOB 214. Evolutionary Genetics (4) Lecture, 4 hours. Prerequisite(s): BIOL 108 or consent of instructor. Traces the historical development of modern ideas in evolutionary genetics. Focuses on the influence of Fisher, Haldane, and Wright on current views of genetic variation in natural populations, by examining recent research in the context of their classic works.

EEOB 215. Advanced Methods of Data Analysis in Evolution, Ecology, and Behavior (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): PSYC 212 or STAT 231B or equivalent. Introduces students to new meth-
ods of data analysis in the fields of evolution, ecology, and behavior. Covers theory and practical application using relevant examples. Topics include maximum likelihood, randomization, the jackknife, bootstrapping, Monte Carlo approaches, and meta-analysis.

EEOB 216. The Theory of Evolution (4) Lecture, 4 hours. Prerequisite(s): BIOL 105 or consent of instructor. Traces the historical development of modern ideas in evolutionary theory. Focuses on the influ-
ence of Darwin and of the various authors of the modern syntheses on current views of macroevolution, by

examining recent research in the context of their classic works.

EEOB 217. Advanced Population and Community Ecology (4) Lecture, 4 hours. Prerequisite(s): BIOL 117 or consent of instructor. Traces the development of the major concepts in ecology. Focuses on the influence of pioneers in the field, historical roots of key concepts, and key controversies. Evaluates cur-
rent research with reference to these historical origins. Redak, Rotenberry

BIOL 219. Theory of Systemsatics (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): BIOL 112/BPSC 112/ENTM 112 or equivalent or consent of instructor. Examines topics developed around a series of classi-
cal and recent papers on the principles, philosophy, and methodology of modern systematics and phyloge-
netic methods. Cross-listed with ENTM 219 and GEO 219.

EEOB 220. Evolutionary Physiology (4) S, Even Years Lecture, 4 hours. Prerequisite(s): an upper-division course in evolution and animal physiology or behavior, an upper-division course in statistics that covers analysis of covariance, or consent of instructor. Covers evolutionary approaches to the study of animal physi-
ology. Includes organmal and organ-system physiolo-
y, biomechanics and locomotor mechanisms, cell and molecular biology, the development of physiological systems; and behavioral neuroscience. Altshuler, Garland, Jr.

BIOL 221. Microbial Genetics (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110C or BIOL 107A; BIOL 102. In-depth coverage of the genetics of microbes with emphasis on the primary data and the foundation of modern techniques using Escherichia coli and other prokaryotic systems. Includes genome organization, plasmids, restriction-modification systems, mutation, transposable ele-
ments, regulation of gene expression, viruses, recom-
bination, repair, and responses to stress. Cross-listed with MCBL 221 and PLPA 226. Borkovich

EEOB 230. Analysis of Ecological Communities (5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): PSYC 212 or STAT 231B or equivalent; consent of instructor. Covers principles of multivariate analysis and its application to the interpretation of ecological community data. Topics include multiple and partial correlation and regression, canonical correlation, detrended and canonical correspondence analysis, multidimensional scaling, similarity indices and cluster analysis, and discriminant analysis.

BIOL 250. Special Topics in Biology (1-2) Seminar, 1-2 hours. Prerequisite(s): graduate standing and consent of instructor. Oral presentations and intensive small-
group discussion of selected topics in the area of spe-
cial competence of each staff member. Course con-
tent will emphasize recent advances in the special topic area and will vary accordingly. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

BIOL 252. General Colloquium in Biology (1 Seminar, 1 hour; discussion, 1 hour. Prerequisite(s): graduate standing. Oral reports by visiting scholars on current biological research. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

BIOL 261. Seminar in Genetics, Genomics, and Bioinformatics (1 Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Oral reports by visiting scholars, faculty, and students on current research topics in Genetics, Genomics, and Bioinformatics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with BCH 261, BPSC 261, ENTM 261, GEN 261, and PLPA 261.
EEOB 265. Advances in Population and Evolutionary Biology (1 or 2) Seminar, 1 hour; outside research, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Presentations by visiting scholars, faculty, and students on current research topics in population and evolutionary biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BIOL 281 (E-Z). Seminar in Cell Development, Structure, and Function (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Lectures, discussions, and demonstrations by students, faculty, and invited scholars on selected topics concerned with the principles of cell development, structure, and function. E. Cell Biology F. Molecular Biology G. Developmental Biology. Segments are repeatable. Cross-listed with CMDB 281 (E-Z).

EEOB 282. Seminar in Genetics and Evolution (2-4) Seminar, 2-4 hours. Prerequisite(s): graduate standing; consent of instructor. Presentations by students, faculty, and invited scholars on selected topics concerned with the principles of genetics and evolution. Course is repeatable.

EEOB 283. Seminar in Organismal Physiology and Physiological Ecology (2-4) Seminar, 2-4 hours. Prerequisite(s): graduate standing; consent of instructor. Presentations by students, faculty, and invited scholars on selected topics concerned with the principles of organismal physiology and physiological ecology. Course is repeatable.

BIOL 284. Seminar in Biology (2-4) Seminar, 2-4 hours. Prerequisite(s): graduate standing; consent of instructor. Consists of lectures, discussions, and demonstrations by students, faculty, and invited scholars on selected topics concerned with the principles of biology. Course is repeatable.

EEOB 289. Special Topics in Neuroscience (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. An interdisciplinary seminar consisting of student presentations and discussion of selected topics in neuroscience. Content and instructor(s) vary each time course is offered. Students who present a seminar receive a letter grade; others receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BCH 289, CHEM 289, ENTM 289, NRSC 289, and PSYC 289.

EEOB 290. Directed Studies (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Individual studies on specially selected topics in evolution, ecology, and organismal biology under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

EEOB 291. Individual Study in Coordinated Areas (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing. Provides a program of study designed to advise and assist candidates who are preparing for examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

EEOB 292. Concurrent Analytical Studies in Evolution, Ecology, and Organismal Biology (2-4) Outside research, 6-12 hours. Prerequisite(s): consent of instructor. Elected concurrently with an appropriate undergraduate course but on an individual basis. Devoted to one or more graduate papers based on research or criticism related to the course. Faculty guidance and evaluation provided throughout the quarter. Course is repeatable.

EEOB 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Directed research in evolution, ecology, and organismal biology. Experimental studies on specially selected topics under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

EEOB 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Original research in an area selected for the advanced degree. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

BIOL 301. Teaching of Biology at the College Level (1) Seminar, 1 hour. Prerequisite(s): graduate standing. A program of weekly meetings and individual formative evaluations required of new Biology Teaching Assistants. Covers instructional methods and classroom/section activities most suitable for teaching Biology. Conducted by the TA Development Program. Graded Satisfactory (S) or No Credit (NC).

EEOB 400. Introduction to Graduate Study in Biology (2) Lecture, 1 hour; discussion, 1 hour. Prerequisite(s): graduate standing; consent of instructor. Introduces opportunities and requirements for successful graduate study. Emphasis is placed on effective strategies for developing and implementing a program of professional development and graduate research. Graded Satisfactory (S) or No Credit (NC).

Biomedical Sciences

Subject abbreviation: BMSC
Division of Biomedical Sciences

Craig V. Byus, Ph.D., Dean and Program Director
Neal L. Schiller, Ph.D., Associate Dean
Ameae M. Walker, Ph.D., Chair of the Faculty
Stewart W. Shankel, M.D., Director of Clinical Instruction
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Paul M. Quinton, Ph.D. Physiology
Neal L. Schiller, Ph.D. Microbiology/Immunology
John Y.-J. Shyy, Ph.D. Pharmacology/Physiology
Daniel S. Straus, Ph.D. Human Genetics (Biomedical Sciences/Biology)
Ameae M. Walker, Ph.D. Microanatomy

Professors Emeriti
Mary Ann Baker, Ph.D. Neurosciences
Richard A. Luben, Ph.D. Endocrinology
Anthony W. Norman, Ph.D. Endocrinology (Biomedical Sciences/Biochemistry)
Michael B. Stemerman, M.D. Biomedical Sciences

Associate Professors
Monica J. Carson, Ph.D. Gliat Biology/Neuroimmunology
Iryna M. Ethell, Ph.D. Biology/Biochemistry
Emma Wilson, Ph.D., Parasite Immunologist
Christian Y. Lytle, Ph.D. Physiology

Assistant Professors
Kathryn DeFea, Ph.D. Cell Biology/Biochemistry
Douglas W. Ethell, Ph.D. Neurobiology

Lecturer
James Colgan, Ph.D.

Clinical Professors
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Roscoe D. Atkinson, M.D.
Ann F. Bolger, M.D.
Neal S. Bricker, M.D.
Lawrence A. Cone, M.D.
William P. Hunt, M.D.
Asma B. Jafri, M.D.
William E. Junkert, M.D.
Rajagopal Krishnan, M.D.
Steven E. Larson, M.D., M.P.H.
Lawrence K. Loo, M.D.
Walter M. Marcus, M.D.
Elizabeth M. Richards, M.D.
Stewart W. Shankel, M.D.
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Graham A. Scott, M.D.
Jeffrey R. Simons, M.D.
Catherine Steel, Ph.D.
Robert B. Summerour, M.D.
Ravi Thiruvengadam, M.D.
Samuel G. Wilchik, M.D.
Joanne T. Wilkowski, M.D.

Assistant Clinical Professors
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Raja Bhupathy, M.D.
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Antonious Brandon, Ph.D.
H. Mark Carter, M.D.
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Andrey P. Corr, M.D.
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Steven Wilson, M.D.  
Babak Zamiri, M.D.

**UCR/UCLA Thomas Haider Program in Biomedical Sciences**

The mission of the prestigious UCR/UCLA Thomas Haider Program in Biomedical Sciences is to train physicians for distinguished medical careers in service to the people of California, with an emphasis on the needs of the underserved, inland, and rural populations.

UCR provides a unique path of entrance to one of the country’s leading medical schools. Undergraduate students at UCR have exclusive access to 24 seats in medical school each year through the university’s joint program with the David Geffen School of Medicine at UCLA. UCR students admitted to the program complete years 1 and 2 of their medical education at UCR. They follow a state-of-the-art disease-based integrated curriculum taught by basic-science research faculty who work closely with a special cadre of highly qualified, community-based, physician faculty. This curriculum focuses on developing the process of life-long learning, employs problem-based learning, and requires extensive computer use. Years 3 and 4 of medical school are completed at UCLA, after which students receive their M.D. degrees from UCLA.

Only undergraduates who entered UCR as freshmen or as transfer students may apply to the UCR/UCLA Program. Students must be enrolled at UCR for at least two years (six continuous full-time quarters) in the pursuit of a bachelor’s degree before entering the program. Only under truly exceptional circumstances will the program matriculate a student without a UCR baccalaureate degree.

Applicants apply through the American Medical College Application Service, at [www.amcas.org](http://www.amcas.org), following its guidelines and deadlines. Students may submit their applications at any time during the application period, as early as June (14 months before medical school classes begin in August at UCR) or as late as November 1 (9 months before classes begin). Applications without recent MCAT scores are considered incomplete. Review the application guidelines at [www.biomed.ucr.edu](http://www.biomed.ucr.edu) and the application process at [www.amcas.org](http://www.amcas.org).

Unique aspects of the program include the following:

- The 24 annual seats in the program are open to UCR undergraduate students and alumni only.
- Students from any major may apply for one of the 24 seats as long as they will have completed the prerequisite course work and fulfilled other application requirements before entering the program.
- Students accepted into the UCR/UCLA Program complete their first two years of medical school on the UCR campus and then move to UCLA to complete their medical education and graduate with an M.D. from UCLA.

**Prerequisite Courses**

Students preparing to apply to the UCR/UCLA Program should excel in their undergraduate academic program and complete specific course work before admission to the UCR/UCLA Program. Students who plan to transfer to UCR from another college or university for their undergraduate studies and then apply to the UCR/UCLA Program should complete, where possible, courses that have been designated as being equivalent to UCR courses. Transfer students from community colleges are encouraged to view the UCR/UCLA Program as an attractive and viable avenue to medical school.

The UCR/UCLA Program prerequisite course curriculum is identical to the admissions requirements of the David Geffen School of Medicine at UCLA. Shown as UCR course work, it is as follows:

**English** — one year of college English to include the study of English composition (ENGL 001A, ENGL 001B, ENGL 001C or equivalent)

**Physics** — one year of college physics with laboratory (PHYS 002A, PHYS 02LA, PHYS 002B, PHYS 02LB, PHYS 002C, PHYS 002LC or equivalent)

**Chemistry** — two years of college chemistry to include the study of inorganic chemistry and organic chemistry with laboratory (CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C, and CHEM 112A, CHEM 112B, CHEM 112C or equivalent)

**Biology** — one year of general biology with laboratory (BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C or equivalent)

**Mathematics** — one year of college math - ematics to include introductory calculus and statistics (MATH 009A, MATH 009B, STAT 100A or equivalent)

A one-quarter course in biochemical to cover structure, function, and metabolism of biological molecules (BCH 100 or BCH 110A, BCH 110B or equivalent), while not required for admission, is highly recommended. Courses in Spanish language and the humanities are also highly recommended.

AP results are not accepted as substitutes for the required science courses.

**Related Literature and References** UCR currently has articulation agreements with most of the California community colleges. These agreements list specific community college courses that have been designated as comparable to UCR courses. See the statewide articulation Web site, at [www.assist.org](http://www.assist.org), or California community college Web sites.

**Academic Advising** UCR undergraduates receive academic advising from professional staff and faculty of the department or program of their chosen major.

**Admission** Students from any UCR major are eligible to apply for one of the 24 seats in the medical school each year. The admission requirements for the UCR/UCLA Program are identical to those for UCLA’s Geffen School of Medicine, but UCR students have a distinct advantage when applying to the UCR/UCLA Program. They compete only with other UCR students for those 24 seats in the program and the opportunity to earn an M.D. degree from UCLA’s Geffen School of Medicine.

**Admission considerations** A strong candidate for admission to the UCR/UCLA Program has:

- Completed the UCR/UCLA Program prerequisite course curriculum
- An excellent undergraduate academic record
- An excellent score on the Medical College Admission Test (MCAT)

The strong candidate also shows a commitment to a career in medicine as demonstrated by volunteerism in medicine, clinical experience, or research.

A solid record of community service is highly desired. It is important that applicants have made a difference to those around them. Examples of community service pursuits include volunteer work, leadership in campus organizations, mentor service for a peer or youth group, and commitment to and participation in religious or service organizations.

**Letters of Reference** Applicants must submit letters from individuals such as professors and those who can speak about the applicant’s educational talents, character, work ethic, motivation, special traits, and positive influence on others.

**Admission Interview** Qualified applicants will be invited to interview and have the opportunity to talk about themselves, their special qualities, and demonstrate their ability to interact with others.

**A Four-Year Medical Program**

**Years 1 and 2** Students admitted to the UCR/UCLA Program are jointly enrolled at UCR and UCLA’s Geffen School of Medicine and take their first two years of medical school at UCR. Unlike other medical schools where students are taught in classes of 100 or more, the classes in the UCR/UCLA Program are small and comprised of 24 students during each of the first two years. This allows students to get to know their professors and receive the individual help and guidance they need to suc-
ceed. Classes in years 1 and 2 are taught by the UCR/UCLA Program faculty who are at the forefront of teaching and research and by community-based physician faculty with real-world understanding of medicine.

**Years 3 and 4** Students move to UCLA's Geffen School of Medicine for the third and fourth years, where they participate in required and elective clinical rotations. UCLM Medical Center and the network of affiliated hospitals provide diverse settings for students to receive exemplary clinical experiences and utilize cutting-edge technology. In the fourth year, most graduating students are matched with one of their three top choices for a residency program.

Students also have the opportunity to spend up to 12 weeks away at other universities to explore a particular area of interest. Externships in foreign countries exist as well.

For more information
UCR/UCLA Thomas Haider Program in Biomedical Sciences
Office of Student Affairs
1626 Statistics/Computer Building
University of California, Riverside
Riverside, CA 92521
(951) 827-4333 or 4334
dayna.moore@ucr.edu or margie.moren0@ucr.edu

**University Requirements**
See Undergraduate Studies section.

**College Requirements**
See College of Natural and Agricultural Sciences, Colleges and Programs section.

**B.S. Degree Requirements**
The following major requirements apply only to students who, in truly exceptional cases, matriculate into the UCR/UCLA Haider Program without a UCR baccalaureate degree. These students are eligible to receive a B.S. degree in Biomedical Sciences upon satisfactory completion of the first year of the curriculum leading to the M.D. degree granted by the David Geffen School of Medicine at UCLA.

**Major Requirements**
1. Biological Sciences Core Curriculum (65-68 units)
   a) BIOL 005A, BIOL 051A, BIOL 005B, BIOL 005C or equivalent
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C, CHEM 112A, CHEM 112B, CHEM 112C or equivalent
   c) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC or equivalent
   d) MATH 008B or MATH 009A, MATH 009B or equivalent
   e) STAT 100A or equivalent
   f) BCH 100 or BCH 110A or equivalent

2. Courses taken during the first year of medical school (59 units)
   BMSC 231, BMSC 231M, BMSC 232, BMSC 232M, BMSC 233, BMSC 233M, BMSC 234, BMSC 234M, BMSC 235, BMSC 235M

**Lower-Division Courses**

| BMSC 091 | Freshman Advising Seminar for Medical Scholars Program Students (1 Seminar) | 1 hour | Prerequisite(s): freshman standing in the Medical Scholars Program. Introduction to UCR for students in the Medical Scholars Program. Focuses on learning the necessary survival skills to succeed in college and prepare for a career in the allied health sciences. Graded Satisfactory (S) or No Credit (NC). |
| BMSC 092 | First-Year Seminar for Medical Scholars Program Students: Topics in Health Careers (1 Seminar) | 1 hour | Prerequisite(s): freshman standing in the Medical Scholars Program or consent of instructor. A discussion of health careers in biomedical sciences and allied health sciences for students in the Medical Scholars Program. Graded Satisfactory (S) or No Credit (NC). |
| BMSC 093 | Seminar for Medical Scholars Program Students | 1 Seminar, 1 hour | Prerequisite(s): permission from the instructor. A discussion of special topics in biomedical sciences and allied health sciences as they pertain to students in the Medical Scholars Program. Graded Satisfactory (S) or No Credit (NC). |
| BMSC 094 | Independent Reading (1-2) Consultation | 1-2 hours | Prerequisite(s): consent of instructor. Independent study under faculty supervision. Possible topics include modern approaches to the pathophysiology of disease, delivery of medical care to the community, or current medical education. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 4 units. |
| BMSC 097 | Research Tutorial in Biomedical Sciences (1-2) Laboratory | 3-6 hours | Prerequisite(s): grade of 3.0 and consent of instructor. Laboratory tutorial in research related to biomedical sciences. To provide laboratory experience in the areas of physiology, microbiology, molecular biology, pharmacology, cell biology, immunology, biochemistry for exceptional lower-division students. A written report is required at the end of each quarter. Graded Satisfactory (S) or No Credit (NC). May be repeated for up to 6 units. |

**Upper-Division Courses**

| BMSC 191 | Seminar in Biomedical Sciences (2) Seminar, 20 hours per quarter. Prerequisite(s): upper-division standing in the Medical Scholars Program or consent of instructor. Special topics in biomedical sciences, healthcare delivery, cultural competency, biomedical research, and related areas. Course is repeatable to a maximum of 6 units. |
| BMSC 194 | Independent Reading (1-2) Discussion | 1 hour | outside research, 2-3 hours. Prerequisite(s): upper-division standing and consent of instructor and Divisional Dean. Independent study involving library projects on topics related to Biomedical Sciences. Independent study will be conducted under faculty supervision. A written report to be graded Satisfactory (S) or No Credit (NC) will be requested. Course is repeatable to a maximum of 4 units. |

| BMSC 197L | Research for Undergraduates (1-3) Laboratory | 3-9 hours | Prerequisite(s): upper-division standing (completion of 90 quarter units) and consent of instructor. An introduction to the methods of research in biomedical sciences. The student will conduct investigation in an area of biomedical sciences under the supervision of a Division of Biomedical Sciences faculty member and submit a written report on his/her work. Course is repeatable. |

**Graduate Courses**

| BMSC 202 | Molecular Basis of Disease (3) S & Lecture | 2 hours | discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Discussion of the molecular basis of disease with special emphasis on new developments and the broad application of approaches and techniques. Course is repeatable with consent of the student’s advisory committee; may be applied only once toward core requirements. |
| BMSC 223 | Themes in Human Biology and Disease (2-4) For hours and prerequisites, see segment descriptions. Graduate students write a paper on current basic research relevant to the course theme. |
| BMSC 223E | Inflammation, Autoimmunity, and Pathogen Defense (3) Lecture | 23 hours per quarter; discussion, 8 hours per quarter; laboratory, 8 hours per quarter. Prerequisite(s): consent of course coordinator. Integrated view of the human immune system and inflammation in health and disease. Credit is awarded for only one of BMSC 223E, BMSC 229, or BMSC 231. Carson |
| BMSC 223F | Cardiovascular Physiology (4) Lecture | 30.5 hours per quarter; discussion, 11.5 hours per quarter; laboratory, 5 hours per quarter. Prerequisite(s): consent of course coordinator. Integrative view of the human cardiovascular system in health and disease. Credit is awarded for only one of BMSC 223F or BMSC 232. Lytle |
| BMSC 236 | Renal Physiology (3) Lecture | 22 hours per quarter; discussion, 8 hours per quarter; laboratory, 2 hours per quarter. Prerequisite(s): consent of course coordinator. Integrative view of the human kidney function and dysfunction. Credit is awarded for only one of BMSC 236 or BMSC 232. Quinton |
| BMSC 223L-I | Respiratory Physiology (3) Seminar | Discussion, 1 hour; outside research, 2 hours per quarter. Prerequisite(s): consent of course coordinator. An introduction to the methods of research in respiratory disease. The student will conduct investigation in an area of respiratory sciences under the supervision of a Division of Biomedical Sciences faculty member and submit a written report on his/her work. Course is repeatable. |

**BMSC 233-I** Respiratory Physiology (3) Seminar | Discussion, 1 hour; outside research, 2 hours per quarter. Prerequisite(s): consent of course coordinator. An introduction to the methods of research in respiratory disease. The student will conduct investigation in an area of respiratory sciences under the supervision of a Division of Biomedical Sciences faculty member and submit a written report on his/her work. Course is repeatable.
BMSC 223. Gastrointestinal Physiology (3) Lecture, 33 hours per quarter; laboratory, 6 hours per quarter. Prerequisite(s): consent of course coordinator. Integrative view of the human gastrointestinal system in health and disease. Credit is awarded for only one of BMSC 223F or BMSC 223. Lyle

BMSC 229. Foundations in Translational Research (8) Summer Lecture, 67 hours per quarter; discussion, 7 hours per quarter; laboratory, 18 hours per quarter. Prerequisite(s): first-year standing in the Biomedical Sciences graduate program or consent of graduate advisor. Covers basic principles of disease processes, genetics, and molecular, cellular, and developmental biology. Case-driven instruction accomplished through lectures and small group discussions and laboratories. Offered in summer only. Credit is awarded for only one of BMSC 223E, BMSC 229, or BMSC 231. DeFea, Strauss

BMSC 231. Foundations of Medicine I (7.5) Lecture, 65.5 hours per quarter; discussion, 6 hours per quarter; laboratory, 20.5 hours per quarter. Prerequisite(s): first-year standing in medical school or consent of instructor. Covers basic principles of disease processes, genetics, and molecular, cellular, and developmental biology. Instruction is driven by cases and accomplished through lectures and discovery in small group discussions, laboratories, and conferences. Students using this course to fulfill requirements for the B.S. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) letter grade. Other students receive a Satisfactory (S) or No Credit (NC) letter grade. Biomedical Sciences receive a letter grade. DeFea, Strauss

BMSC 231M. Foundations of Medicine I: Clinical Aspects (3) Lecture, 2 hours per quarter; discussion, 24 hours per quarter; clinic, 15 hours per quarter. Prerequisite(s): first-year standing in medical school or consent of course coordinator; concurrent enrollment in BMSC 231. Covers aspects of anatomy, biochemistry, pathology, and patient examination. Includes problem-based learning that supports the material covered in BMSC 231. Students using this course to fulfill requirements for the B.S. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. DeFea, Strauss

BMSC 232. Cardiovascular, Renal, and Respiratory Sciences I (12) Discussion, 9 hours per quarter; laboratory, 19 hours per quarter; lecture, 107 hours per quarter. Prerequisite(s): first-year standing in medical school or the graduate program in Biomedical Sciences or consent of instructor; BMSC 229 or BMSC 231. Covers physiology, pathophysiology, physical diagnosis, and imaging in the cardiovascular, renal, and respiratory sciences. Instruction is driven by cases and accomplished through lectures and discovery in small group discussions, laboratories, and conferences. Students using this course to fulfill requirements for the B.S. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. DeFea, Strauss

BMSC 232M. Cardiovascular, Renal, and Respiratory Sciences I: Clinical Aspects (5) Lecture, 6 hours per quarter; discussion, 36 hours per quarter; laboratory, 9 hours per quarter; clinic, 36 hours per quarter. Prerequisite(s): BMSC 231; BMSC 231M; concurrent enrollment in BMSC 232. Covers aspects of anatomy, biochemistry, pathology, and patient examination. Includes problem-based learning that supports the material covered in BMSC 232. Students using this course to fulfill requirements for the B.S. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Lyle, Quinton

BMSC 233. Gastrointestinal, Endocrine, and Reproductive Health I (10) Lecture, 42 hours per quarter; discussion, 44 hours per quarter; laboratory, 34 hours per quarter. Prerequisite(s): BMSC 232; BMSC 232M; concurrent enrollment in BMSC 233. Covers aspects of anatomy, biochemistry, pathology, and patient examination. Includes problem-based learning that supports the material covered in BMSC 233. Students using this course to fulfill requirements for the B.S. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Lyle, Quinton

BMSC 235. Clinical Neurosciences I: Clinical Aspects (4) Lecture, 28 hours per quarter; clinic, 34 hours per quarter; laboratory, 18 hours per quarter. Prerequisite(s): second-year standing in medical school; BMSC 235. Covers advanced clinical perspective of anatomy, biochemistry, pathophysiology, clinical reasoning, and imaging associated with gastroenterological, endocrine, and reproductive health. Instruction involves weekly cases and is presented through lectures and discovery in small group discussions, laboratories, conferences, and patient examination. Offers problem-based learning that supports the material covered in BMSC 235. Students using this course to fulfill requirements for the B.S. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Schiller

BMSC 236. Foundations of Medicine II (10) Lecture, 93 hours per quarter; discussion, 8 hours per quarter; laboratory, 10 hours per quarter. Prerequisite(s): second-year standing in medical school or the graduate program in Biomedical Sciences or consent of instructor; BMSC 235. Covers advanced clinical perspective of anatomy, biochemistry, pathophysiology, clinical reasoning, and imaging associated with gastroenterological, endocrine, and reproductive health. Instruction involves weekly cases and is presented through lectures and discovery in small group discussions, laboratories, conferences, and patient examination. Offers problem-based learning that supports the material covered in BMSC 236. Students using this course to fulfill requirements for the Ph.D. degree in Biomedical Sciences receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Schiller

BMSC 237. Gastrointestinal, Endocrine, and Reproductive Health II (13) Lecture, 80 hours per quarter; clinic, 42 hours per quarter; discussion, 34 hours per quarter; laboratory, 18 hours per quarter. Prerequisite(s): second-year standing in medical school; BMSC 236. Advanced clinical perspective of anatomy, biochemistry, pathophysiology, clinical reasoning, and imaging associated with gastroenterological, endocrine, and reproductive health. Instruction involves weekly cases and is presented through lectures (usually two hours/day) and discovery in small group discussions, laboratories, clinical skills development, and conferences. Graded Satisfactory (S) or No Credit (NC). Schiller

BMSC 238. Clinical Neurosciences II (10) Lecture, 74 hours per quarter; discussion, 22 hours per quarter; laboratory, 6 hours per quarter; clinic, 24 hours per quarter. Prerequisite(s): BMSC 237. Covers advanced clinical perspective of neuropsychology, neuropsychiatry, and neuropharmacology that is coordinated with physical and psychological clinical skills development. Includes weekly cases and is presented through lectures, laboratories, small group discussions, conferences, and clinic visits. Graded Satisfactory (S) or No Credit (NC). Schiller

BMSC 239. Cardiovascular, Renal, and Respiratory Sciences II (12) Lecture, 62 hours per quarter; clinic, 33 hours per quarter; discussion, 44 hours per quarter; laboratory, 36 hours per quarter. Prerequisite(s): second-year standing in medical school; BMSC 238. Advanced clinical perspective of anatomy, physiology, pathophysiology, physical diagnosis, and imaging in the cardiovascular, renal, and respiratory sciences. Instruction involves weekly cases and is presented
through lectures and discovery in small group discussions, laboratories, clinical skills development, and conferences. Graded Satisfactory (S) or No Credit (NC). Carson, Walker

**BMSC 240. Integrative Human Biology and Disease (3)** Discussion, 30 hours per quarter. Prerequisite(s): second-year standing in medical school; BMSC 239. Reviews concepts of human biology and disease covered in BMSC 231, BMSC 231M, BMSC 232, BMSC 232M, BMSC 233, BMSC 233M, BMSC 234, BMSC 234M, BMSC 235, BMSC 235M, BMSC 236, BMSC 236M, BMSC 237, BMSC 238, and BMSC 239. Graded Satisfactory (S) or No Credit (NC). Shankel

**BMSC 251. Colloquium in Biomedical Sciences (1)** Colloquium, 1 hour. Prerequisite(s): graduate standing in Biomedical Sciences or consent of instructor. Specialized discussions by staff and students of current research topics in biomedical sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**BMSC 252. General Seminar in Biomedical Sciences (1)** Seminar, 1 hour. Prerequisite(s): graduate standing. Oral presentations by staff and visiting scholars on current research topics in the field of biomedical sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**BMSC 254. Graduate Seminar in Biomedical Sciences (1)** Seminar, 1 hour. Prerequisite(s): graduate standing. Oral reports by graduate students on current research topics in biomedical sciences. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

**BMSC 260A. Topics in Translational Biomedical Research (2)** Lecture, 2 hours per quarter; discussion, 18 hours per quarter. Prerequisite(s): consent of instructor or graduate advisor; concurrent enrollment in BMSC 232. A survey of the mechanisms of common human diseases at the molecular, cellular and organ system levels and the multidisciplinary approaches used for their investigation. Instructional components include lectures, discovery in problem-based learning sessions, and independent study. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Byus, Lytle

**BMSC 260B. Topics in Translational Biomedical Research (2)** Lecture, 2 hours per quarter; discussion, 18 hours per quarter. Prerequisite(s): consent of instructor or graduate advisor; concurrent enrollment in BMSC 232. A survey of the mechanisms of common human diseases at the molecular, cellular and organ system levels and the multidisciplinary approaches used for their investigation. Instructional components include lectures, discovery in problem-based learning sessions, and independent study. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Shyy, Schiller

**BMSC 260C. Topics in Translational Biomedical Research (2)** Lecture, 2 hours per quarter; discussion, 18 hours per quarter. Prerequisite(s): consent of instructor or graduate advisor; concurrent enrollment in BMSC 234 and BMSC 235. A survey of the mechanisms of common human diseases at the molecular, cellular and organ system levels and the multidisciplinary approaches used for their investigation. Instructional components include lectures, discovery in problem-based learning sessions, and independent study. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Lo, Carson

**BMSC 261. Methods in Biomedical Research (1)** Tutorial, 3 hours. Prerequisite(s): graduate standing in Biomedical Sciences or consent of instructor. Experimental studies on a specific laboratory technique involved in the study of human disease. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 3 units.

**BMSC 290. Directed Studies (1-6)** Outside research, 3-18 hours. Prerequisite(s): graduate standing in Biomedical Sciences or consent of instructor. Experimental or literature studies on specifically selected topics under direction of a staff member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**BMSC 297. Directed Research (1-6)** Outside research, 3-18 hours. Prerequisite(s): graduate standing in Biomedical Sciences or consent of instructor. Directed research in biomedical sciences performed prior to advancement to candidacy in preparation for dissertation projects. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**BMSC 299. Research for Dissertation (1-12)** Outside research, 3-36 hours. Prerequisite(s): graduate standing in Biomedical Sciences or consent of instructor. Original research in the area selected for the advanced degree. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**Professional Course**

**BMSC 302. Directed Teaching (2)** Practicum, 6 hours. Prerequisite(s): graduate standing in Biomedical Sciences. Supervised teaching in medical school courses. Required for all Biomedical Sciences graduate students. Fulfills the teaching portion of the teaching requirement for the Ph.D.; four units are required for the Ph.D. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.

**Biomedical Sciences Graduate Program**

**Subject abbreviation: BMSC**

**Division of Biomedical Sciences**

Craig V. Byus, Ph.D.,
Dean and Program Director
Program Office, 1001 Batchelor Hall North
(800) 735-0717 or (951) 827-5621
biomed.ucr.edu/graduate

**Professors**

- Peter Atkinson, Ph.D. (Entomology)
- Bahman Anvari, Ph.D. (Bioengineering)
- Craig V. Byus, Ph.D. (Biomedical Sciences/Biochemistry)
- David A. Eastmond, Ph.D. (Cell Biology and Neuroscience)
- Ted Garland, Ph.D. (Biology)
- David A. Johnson, Ph.D. (Biomedical Sciences)
- Cindy Larive, Ph.D. (Chemistry)
- Xuan Liu, M.D., Ph.D. (Biochemistry)
- David Lo, M.D., Ph.D. (Biomedical Sciences)
- Manuela M. Martins-Green, Ph.D. (Cell Biology and Neuroscience)
- Dimitris Monikis, Ph.D. (Bioengineering)
- Michael C. Pirrung, Ph.D. (Chemistry)
- Edward G. Platzer, Ph.D. (Biology/Nematology)
- Paul M. Quinton, Ph.D. (Biomedical Sciences)
- Victor Rodgers, Ph.D. (Bioengineering)
- Neal L. Schiller, Ph.D. (Biomedical Sciences)
- Jerome Schultz, Ph.D. (Bioengineering)
- John Y.-J. Shyy, Ph.D. (Biomedical Sciences)
- B. Glenn Stanley, Ph.D. (Cell Biology and Neuroscience/Psychology)
- Daniel S. Straus, Ph.D. (Biomedical Sciences/Biology)
- Amea M. Walker, Ph.D. (Biomedical Sciences)

**Professors Emeriti**

- Helen L. Henny, Ph.D. (Biochemistry)
- Richard A. Luben, Ph.D. (Biomedical Sciences/Biochemistry)
- Anthony W. Norman, Ph.D. (Biomedical Sciences/Biochemistry)
- Michael B. Stemberman, M.D. (Biomedical Sciences)

**Associate Professors**

- Monica J. Carson, Ph.D. (Biomedical Sciences)
- Margarita C. Currás-Collazo, Ph.D. (Cell Biology and Neuroscience)
- Scott N. Currie, Ph.D. (Cell Biology and Neuroscience)
- Kathryn DeFea, Ph.D. (Biomedical Sciences)
- Iryna M. Ethell, Ph.D. (Biomedical Sciences)
- Christian Y. Lyte, Ph.D. (Biomedical Sciences)
- Morris Maduro, Ph.D. (Biology)

**Assistant Professors**

- Douglas Altshuler, Ph.D. (Biology)
- Douglas W. Ethell, Ph.D. (Biomedical Sciences)
- Kelly Huffman, Ph.D. (Psychology)
- Edward Korzus, Ph.D. (Psychology)
- Karine Le Roch, Ph.D. (Cell Biology and Neuroscience)
- Jiayu Liao, Ph.D. (Psychology)
- Ernest Martinez, Ph.D. (Biochemistry)
- Khaled Razak, Ph.D. (Psychology)
- Wendy Saltzman, Ph.D. (Biology)
- Noboru Sato, Ph.D. (Cell Biology and Neuroscience)
- Emma Wilson, Ph.D. (Biomedical Sciences)
- Laura Zanello, Ph.D. (Biochemistry)

**Graduate Program**

The interdisciplinary interdepartmental graduate program in Biomedical Sciences offers graduate instruction leading to a Ph.D. degree or a combined M.D.–Ph.D degree.

The aim of the graduate program is to provide students with training that crosses traditional boundaries between scientific disciplines and allows them to address modern biomedical research questions. The objective is to train scientists who have a broad knowledge of basic medical sciences, a high degree of expertise in an area of specialization, and effective teaching skills for a medical school or university environment.

The need for scientists who understand the interrelationships of various areas of medical science is readily apparent. For example, it is clearly advantageous for a scientist studying diabetes to understand the disease in depth. This requires a fundamental understanding of endocrinology (hormone secretion and action), cell biology (cell types that produce insulin and upon which insulin acts), biochemistry (insulin-receptor interactions, biochemical pathways regulated by insulin), genetics (hereditary factors in the development of diabetes), immunology (autoimmune mechanisms in diabetes),
and anatomy (microvascular pathology). There is a growing need for scientists who can communicate among disciplines so that very effective research collaborations can be developed.

**Cell Biology/Physiology** research areas include function of transcription factors in development, disease, and in the promotion of regeneration; fluid and electrolyte pathophysiology in cystic fibrosis; molecular genetics of human cell response to environmental carcinogens; tumor suppressor genes in malignant melanoma; molecular basis of Down syndrome; factors controlling lymphocyte differentiation; mechanisms of action of cytotoxic lymphokines; physiological aspects of host–parasite interaction; and host defense mechanisms in infectious disease; and mucosal immunity and molecular approaches to vaccine development.

**Endocrinology/Pharmacology** research areas include regulation and actions of the vitamin D endocrine system; mechanism of action of insulin and insulin-like growth factors; prolactin as a growth factor in health and disease; hormonal and electric field regulation of bone development and growth; and molecular mechanisms for carcinogenesis (glioblastoma, breast and prostate cancer).

**Neurosciences** research areas include studies of the hypothalamic control of homeostatic and sexual function; molecular mechanisms of neurodevelopment, neuronal death and neurodegeneration with emphasis on the following diseases: Alzheimer’s disease, Parkinson’s disease, Autism, Fragile X/mental retardation, multiple sclerosis, Huntington’s disease, stroke and pathogen-inducedencephalitis.

**Admission** Applicants should have completed an undergraduate degree in one of the physical or biological sciences and must submit scores from the GRE General Test (verbal and quantitative). (GRE requirement not applicable to UCR Biomedical Sciences students applying for the M.D.–Ph.D.) Courses required for admission include one year each of general chemistry, organic chemistry, physics, and calculus and at least two years of biological sciences. Preferred upper-division courses in biology include vertebrate or human anatomy and physiology, embryology, genetics, cell biology, microbiology, immunology, and neurosciences.

**Doctoral Degree**

The aim of the graduate program in Biomedical Sciences is to train Ph.D. scientists in a specific area of research specialization who also have enough general knowledge in the basic medical sciences to apply their research expertise to unraveling the basis of disease. This approach includes understanding not only pathogenic manifestations of disease but also the normal physiologic state. To accomplish this, the student completes a core and elective curriculum, the latter tailored to the student’s research interests.

Core requirements include:

1. BMSC 229: Foundations of Translational Research
2. BMSC 232, 233, 234 and 235: Foundations of Medicine Series
3. BMSC 260A, BMSC 260B, BMSC 260C: Topics in Biomedical Research. The entire 3 quarter series is required in the first year of graduate education.
4. BMSC 261: Methods in Biomedical Research. Enrollment required all 3 quarters of the first year of graduate education.
5. BMSC 252: General seminar in Biomedical Sciences (enrollment required each quarter)
6. BMSC 254: Graduate seminar in Biomedical Sciences (enrollment required each quarter)
7. BMSC 302: (one-quarter requirement, not required of M.D.–Ph.D. students)

Under normal circumstances, each student should complete course work requirements during the first year of studies.

At the end of the student’s first full year of residence, the advisory committee for each student evaluates the progress of the student and recommends to the faculty whether the student should continue in the program. In addition, prior to advancement to candidacy and at the beginning of each academic year, the student presents a written summary of the research progress and plans to the advisory committee. Continuation in the program depends on the advisory committee’s positive evaluation of the student’s research progress.

**Written and Oral Qualifying Examinations**

Prior to advancement to candidacy, students must complete both parts of a qualifying examination. Part I consists of the preparation of a research proposal, to be written in the form of a grant proposal, including literature review, description of methods and experimental plans for the dissertation. This proposal should outline the research progress of the student to date and delineate the planned dissertation research aims and objectives. Part I is usually completed in the spring quarter of year 2 and no later than the fall quarter of year 3 of a student’s graduate training. Part II consists of an oral comprehensive examination administered by a committee of five faculty members, at least one of whom is from outside the program. The student’s research advisor does not serve on the oral qualifying committee. The oral comprehensive examination includes examination of the student’s knowledge and understanding of material covered in the core courses and in the student’s area of specialization. Part II must be completed no later than the end of year 3 of the student’s graduate training.

**Research Project, Dissertation and Final Oral Examination**

After successful completion of the qualifying exam and advancement to candidacy, the student completes the research project, submits a written dissertation, and defends the dissertation in a final oral examination.

**Normative Time to Degree** 15 quarters

**M.D.–Ph.D. Combined Degree**

**Admission** The combined degree is offered to students admitted to the medical school phase of the Biomedical Sciences Program and to exceptional students from other four-year LCME-accredited medical schools. Normally, a student completes the first two years of medical school, and then spends approximately three years in the Ph.D. part of the program before completing the M.D. degree. However, the track is also offered to students who have completed the M.D. degree. UCR Biomedical Sciences students may apply for admission concurrently with their applications to the medical school phase or any time after acceptance to the medical phase. For these students only, the MCAT is accepted in lieu of the GRE.

Students from other medical schools should apply in the fall of their sophomore or senior year. Applications from sophomores must be accompanied by official permission for an appropriate leave of absence. The GRE requirement is the same as for regular Ph.D. students.

**Master’s Degree**

The Biomedical Sciences Graduate Group offers an M.S. degree. No students are admitted directly into the program for work toward the master’s degree. However, a Plan I (Thesis) or Plan II (Comprehensive Examination) M.S. degree is available in special circumstances when work leading to the Ph.D. degree cannot be completed. The student’s advisory committee decides whether the master’s degree is an appropriate alternative to the Ph.D. degree. This decision may be made at the end of the student’s first year of residence or at other times in the student’s career, particularly at the time of the qualifying examination.

**Course Descriptions**

All Biomedical Sciences courses are listed and described under Biomedical Sciences.

Further information regarding graduate studies in Biomedical Sciences may be obtained from the Division of Biomedical Sciences.

**Botany and Plant Sciences**

Subject abbreviation: BPSC

**College of Natural and Agricultural Sciences**

Jodie S. Holt, Ph.D., Chair
Department Office, 2132 Batchelor Hall
Graduate Student Affairs (800) 735-0717 or (951) 827-5688
Undergraduate Advising Center (951) 827-3579; plantbiology.ucr.edu

**Professors**

Edith B. Allen, Ph.D. Community/Restoration Ecology
Julia N. Bailey-Seres, Ph.D. Genetics
Timothy J. Close, Ph.D. Genetics
The Departments of Botany and Plant Sciences, Plant Pathology and Microbiology, and Entomology participate in an interdisciplinary program leading to either a B.A. or B.S. degree in Plant Biology. In addition, these departments and others participate in the Plant Biology Track within the interdisciplinatory Biological Sciences major. In this program, students earn a B.S. degree in Biological Sciences. Course requirements for the Plant Biology Track are listed under the Biological Sciences major in this catalog. Both majors are designed to provide students with basic knowledge in the natural sciences and in their chosen field of specialization.

Courses prerequisite to the major, courses used to satisfy major requirements, and the 16 units (for B.S. degree) related to the major must be taken for letter grades. Students may elect to take other courses on a Satisfactory (S)/No Credit (NC) basis. Refer to the Academic Regulations section of this catalog for additional information on “SNC” grading.

Information about this program is available from the CNAS Academic Advising Center (1223 Pierce Hall, Monday through Friday, 9 a.m. to noon and 1 to 4 p.m., (951) 827-4186).

Transfer Students

Students planning to transfer to UCR with a major in Plant Biology must have a minimum GPA of 2.7 in transferable college courses and “C” or higher grades in a year sequence of general chemistry and in courses equivalent to our BIOL 005A, BIOL 005B. We also recommend that transfer students complete a year of college calculus before admission. Exceptions may be granted by the faculty advisor.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college’s breadth requirements. Consult with a department advisor for course planning.

Major Requirements

The major requirements for the B.S. and B.A. degrees in Plant Biology are as follows:

1. Life Sciences core requirements (68-72 units)

   Students must complete all required courses with a grade of “C-” or better and with a cumulative GPA in the core courses of at least 2.0. Grades of “D” or “F” in two core courses, either separate courses or repetitions of the same courses, are grounds for discontinuation from the major.

   a) BIOL 005A, BIOL 005B, BIOL 005C, BIOL 005D
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 001L, CHEM 001B, CHEM 001L, CHEM 112A, CHEM 112B, CHEM 112C
   c) MATH 008B or MATH 009A, MATH 009B (MATH 009C recommended)
   d) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 021A, PHYS 021B, PHYS 021C
   e) STAT 100A
   f) BCH 100 or BCH 110A (BCH 110A is strongly recommended)

   Note for the B.S. degree, courses in Statistics and Biochemistry taken as part of the core may count toward the 24 units from an area of specialization. For the B.A. degree, courses in Statistics and Biochemistry taken as part of the core may not count toward the 16 units required from an area of specialization.

2. Upper-division requirements (40-52 units)

   A GPA of at least 2.0 in upper-division courses taken in the field of the major is a graduation requirement. A student is subject to discontinuation from the major whenever the GPA in upper-division course work is below 2.0. Students finding themselves in this circumstance must meet with an advisor.
   a) BIOL 102
   b) BPS 104/BIO 104 (may be waived with consent of the faculty advisor)
   c) BIOL 132/BPS 132, BIOL 143/BPS 143, BPS 133
   d) At least 8 units from the following: BIOL 100/ENTM 100, BIOL 120/MCB 120/PLPA 120, BIOL 120/MCB 120/PLPA 120, BIOL 121/MCB 121, BIOL 121/MCB 121, BIOL 123/MCB 123, BIOL 123/MCB 123, BIOL 124/MCB 124, BIOL 134/PLPA 134, BIOL 134/PLPA 134, BIOL 159/NEM 159, BPS 134/ENSC 134/WSHC 134, ENSC 120/NEM 120/WSHC 120, ENMT 124
   e) Two (2) units of BPS 195H, BPS 197, BPS 198-I, or BPS 199
   f) For the B.S. 20 additional units from one of the four areas of specialization (consult with a faculty advisor) and additional upper-division courses in biological sciences and related areas from any of the areas of specialization lists, and students may apply a maximum of 6 units of BPS 190 and/or BPS 195H and/or BPS 197 and/or BPS 198-I and/or BPS 199. Requirements a) through f) must be at least 52 units in total.
   f) For the B.A. 12 additional units from one of the four areas of specialization (consult with a faculty advisor).

   Note Students planning a B.A. degree should schedule the required language courses in place of a series of electives.

Areas of Specialization

Individual student career goals may be achieved by selecting an area of specialization within the diverse disciplines of botany and plant sciences. Adjustments within these programs can be made to accommodate students’ interests. Students must consult with a faculty advisor to clarify educational goals and to plan a program of study.

1. Plant Cellular, Molecular, and Developmental Biology
a) BPSC 135

b) Additional units from the following to meet either the B.S. or B.A. requirement: 
BCH 102, BCH 110B, BCH 110C or BIOL 107A, BCH 153/BIOL 153/BPSC 153, BCH 162, BCH 183, BIOL 107B, BIOL 113, BIOL 114, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 123/MCBL 123/PPLA 123, BIOL 155/BPSC 155, BIOL 168, CBNS 101, CBNS 108

2. Plant Genetics, Breeding, and Biotechnology
a) BPSC 150
b) Additional units from the following to meet either the B.S. or B.A. requirement:

3. Ecology, Evolution, and Systematics
a) BPSC 146
b) Additional units from the following to meet either the B.S. or B.A. requirement:

4. Plant Pathology, Nematology, and Pest Management
a) BIOL 120/MCBL 120/PPLA 120
b) Additional units from the following to meet either the B.S. or B.A. requirement:
BCH 183, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 124/MCBL 124, BPSC 133, BPSC 146, BPSC 150, BPSC 158, BPSC 166, ENTM 100/BIOL 100, ENTM 109, ENTM 124, ENTM 127/BIOL 127, ENTM 129, ENTM 129L, ENSC 100/SWSC 100, ENSC 120/ENS 120/SWSC 120, NEM 159/BIOL 159, PPLA 120/BIOL 120/MCBL 120, PPLA 120L/BIOL 120L/MCBL 120L, PPLA 123/BIOL 123/MCBL 123, PPLA 134/BIOL 134, PPLA 134L/BIOL 134L, SWSC 104/ENS 104

Minor
The minor in Plant Biology allows students majoring in other departments to obtain in-depth training in Plant Biology.

Requirements for the minor in Plant Biology are as follows:
1. BIOL 104/BPSC 104 (4 units)
2. One course (4–5 units) from the following: BIOL 132/BPSC 132, BIOL 138/BPSC 138, BIOL 143/BPSC 143, BPSC 133
3. Twelve (12) to 20 units from the following:

   Note: No more than 4 units of BPSC 190–199 may be used to fulfill this requirement. The course used to fulfill the requirement in 2. cannot also be used to fulfill the requirement in 3.

   See Minors under the College of Natural and Agricultural Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Graduate Program
The Department of Botany and Plant Sciences offers programs leading to the M.S. degree in Plant Biology with two tracks, Botany or Plant Science, and a program leading to the Ph.D. degree in Plant Biology or Plant Biology (Plant Genetics). Research in these programs can focus on basic and/or applied questions.

Admission
Applicants who have a baccalaureate degree and who satisfy the general requirements of the university listed in the Graduate Studies section of this catalog are considered for admission to graduate status. Students applying to the Ph.D. program and domestic applicants to the M.S. program must submit GRE General Test scores (verbal, quantitative, and analytical).

Regardless of the area of their major for the baccalaureate degree, students must have had, or complete soon after entering graduate school the following:
1. A year of course work in general biology and general chemistry
2. A course in genetics, biochemistry, and calculus
3. Two courses in physics and/or statistics.

Credit from these courses does not count toward the graduate degree.

Immediately after being admitted, each student should identify a faculty advisor and consult with that advisor or the graduate advisor regarding educational goals; scheduling initial course work and possible lab rotations; and forming a guidance committee. Further guidance on these matters is provided in the Botany and Plant Sciences Graduate Student Handbook.

Master’s Degree
The Department of Botany and Plant Sciences offers programs leading to the M.S. degree in Plant Biology with tracks in Botany or Plant Science.

The master’s degree may be earned under Plan I (Thesis) or Plan II (Comprehensive Examination). Students must meet all general requirements of the Graduate Division. The detailed course program is determined by the guidance committee after considering the specific interests of the student. Department requirements are as follows:

Plan I (Thesis)
1. Three courses from Section I of either the Botany track or the Plant Science track M.S. list
2. Two courses from Section II. In fulfilling the Section II requirement, students may use no more than one course cross-listed by Botany and Plant Sciences and another program. If such a cross-listed course is used toward fulfilling the Section II requirement, the same course may not be used toward fulfilling the Section I or III requirements.
3. At least 6 units from Section III of either the Botany track or Plant Science track M.S. list
4. Preparation of a thesis (not more than 12 units from Section V may apply toward the degree)

If the student takes research courses from Section IV, not more than 6 units may be applied toward the degree. Students who have taken courses comparable to those in Section I during their baccalaureate training may have a portion or all of this section waived. In such instances, however, it is expected that their programs include increased units in courses from Sections II, III, and/or IV. Recommendations for waivers should specify alternative courses and should be sent to the department educational advisory committee for approval.

Plan II (Comprehensive Examination)
1. Three courses from Section I of either the Botany track or Plant Science track M.S. list
2. Two courses from Section II. In fulfilling the Section II requirement, students may use no more than one course cross-listed by Botany and Plant Sciences and another program. If such a cross-listed course is used toward fulfilling the Section II requirement, the same course may not be used toward fulfilling the Section I or III requirements.
3. At least 6 units from Section III of either the Botany track or Plant Science track M.S. list
4. At least 6 units from Section IV for a research project or literature review, which should be described in a report to be submitted for evaluation by the comprehensive examination committee

5. Comprehensive written and oral examinations

Students who have taken courses comparable to those in Section I during their baccalaureate training may have a portion or all of this section waived. In such instances, however, it is expected that their programs include increased units in courses from Section II and/or III. Recommendations for waivers should specify alternative courses and should be sent to the educational advisory committee for approval.

Seminar Requirement
All full-time students
must enroll in the BPSC 250 and BPSC 260 seminars during each quarter in which they are offered. Part-time students must take one BPSC 250 and one BPSC 260 seminar for every 12 units of courses. Students may enroll in an equivalent seminar course as a replacement for the BPSC 260 seminar. All students must present at least one BPSC 250 seminar and complete at least two quarters of BPSC 240 (or equivalent).

Courses available for fulfilling the requirement for the M.S. degree:

Section I — Upper-division undergraduate courses:


Section II — Graduate and upper-division undergraduate courses in related departments or programs: applicable courses are determined by the educational advisory committee and require approval of the graduate advisor.

Section III —

**Botany track** BCH 205/BPSC 205/CMDB 205/GEN 205/MCBL 205/PLPA 205, BCH 231/BPSC 231, BPSC 201 (E-Z) (for a maximum of 2 units), BPSC 210, BPSC 223, BPSC 232, BPSC 233, BPSC 234, BPSC 237, BPSC 239, BPSC 240 (only if taken in addition to the required seminar units; see seminar requirement), BPSC 243, BPSC 245, BPSC 247, BPSC 280

**Plant Science track** BCH 205/BPSC 205/CMDB 205/GEN 205/MCBL 205/PLPA 205, BCH 231/BPSC 231, BPSC 201 (E-Z) (for a maximum of 2 units), BPSC 220, BPSC 221, BPSC 222, BPSC 223, BPSC 232, BPSC 233, BPSC 234, BPSC 237, BPSC 239, BPSC 240 (only if taken in addition to the required seminar units; see seminar requirement), BPSC 243, BPSC 245, BPSC 247, BPSC 280

Section IV — Research courses: BPSC 290 and BPSC 297

**Section V** — Thesis research: BPSC 299, Thesis for Plan I

**Normative Time to Degree** 7 quarters

**Doctoral Degree**

The Department of Botany and Plant Sciences offers programs leading to the Ph.D. degree in Plant Biology or Plant Biology (Plant Genetics). The student must meet the general requirements of the Graduate Division.

**Admission** Either prior to entering the graduate program or before advancement to candidacy, students must have completed the equivalent of BPSC 104 and one other course from the core plant biology courses (BIOL 107A, BPSC 132, BPSC 133, BPSC 138, BPSC 143, BPSC 146). Course requirements for each student are determined by individual guidance committees and by the educational advisory committee. No later than the second quarter in residence, students meet with a guidance committee to (1) determine a course program to be submitted to the educational advisory committee, and (2) choose an area of specialization in Plant Biology or Plant Biology (Plant Genetics) and two minor areas.

**Course Work** Guidance committees and students should design individual course programs that meet the specific needs of the student and the requirements of the Ph.D. program. Course programs should prepare students for the qualifying examination and dissertation research. Students must take a minimum of three graduate-level courses relevant to the specialization. Graduate courses taken previously may be considered towards fulfilling this requirement. Students’ course programs must be approved by the educational advisory committee. At the time of submission of course programs to the educational advisory committee, the area of specialization and two minor areas to be covered on the qualifying examination should be specified. Students may petition to change the course program, area of specialization, or minor areas at any time.

**Ph.D. in Plant Biology (Concentration in Plant Cell, Molecular, and Developmental Biology)**

To earn the concentration in Plant Cell, Molecular, and Developmental Biology (appears on the transcript only), students must complete BPSC 231, BPSC 232, and BPSC 237. In addition, one of the two required BPSC 240 courses must be on a topic related to the concentration.

**Ph.D. in Plant Biology (Plant Genetics)**

Requires three graduate courses relating to the specialization. Required courses must include two courses from the following: BPSC 221, BPSC 222, BPSC 234, EEOB 214, /MCBL 221/PLPA 226, GEN 240A.

The third graduate course can be chosen in an area that supports the specialization.

One BPSC 240 course should be in a topic related to Genetics.

**Written and Oral Qualifying Examinations**

Advancement to candidacy depends on the student passing written and oral qualifying examinations. The qualifying examination covers the student’s area of specialization and two minor areas. Granting of the degree is contingent upon acceptance of the dissertation by the candidate’s dissertation committee and satisfactory oral defense of the dissertation.

**Seminar Requirement** All candidates must enroll in the BPSC 250 and BPSC 260 seminars during each quarter in which they are offered. Students may enroll in an equivalent seminar course as a replacement for BPSC 260. Also, students must present at least one BPSC 250 seminar in addition to the defense of the dissertation. The dissertation defense is normally presented in the BPSC 250 seminar series; however, if necessary, a special seminar may be scheduled for the defense. All students must complete at least two quarters of BPSC 240 (or approved similar equivalent that involves substantial student presentations) during the Ph.D. program.

**Foreign Language Requirement** None

**Teaching Requirement** Students must obtain at least one quarter of teaching experience.

**Normative Time to Degree** 15 quarters

**Lower-Division Courses**

BPSC 011. Plants and Human Affairs (4) W, F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction for nonscience and non-Botany majors to the importance of plants and plant products in the shaping of human affairs and civilization. Covers the origin and practice of agriculture; the utilization of plant products; the latest agricultural advances, including genetic engineering; and the current agricultural and social issues. Plants and plant products are examined during class demonstrations and exercises. Close, Huang

BPSC 021. California’s Cornucopia: Food from the Field to Your Table (5) S Lecture, 3 hours; discussion, 1 hour; outside activities, 30 hours per quarter. Prerequisite(s): none. Examines California’s diverse agricultural products. Addresses related contemporary issues such as crop improvement by biotechnology, climate change, pollution, resource use, and nutrition. Also examines how the interplay of geography, history, and culture shapes the cuisine of a region. Ellstrand

BPSC 031. Spring Wildflowers (4) S Lecture, 3 hours; laboratory, 3 hours; one Saturday field trip. Prerequisite(s): none. General approach to the study of vegetative and floral features of plants as a means of identification and botanical classification of major plant families in Southern California. Secondary emphasis on the field biology of flowering plants. Kim

BPSC 097. Lower-Division Research (1-4) Individual study, 3-12 hours. Prerequisite(s): consent of instructor. Involves special research projects in plant biology performed under faculty supervision. Requires a final written report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.
Upper-Division Courses

BPSC 104. Foundations of Plant Biology (4) F, S
Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005C. A study of the plant world from cells to ecosystems. Examines the structure and function of organisms from the major plant groups and their role in the biosphere. The laboratory explores the unique properties of plants. Cross-listed with BIOL 104.

Nothnagel, Holt

BPSC 112. Systematics (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005C or equivalent. Principles and philosophy of classification. Topics include phylogenetic and phenetic methods, species concepts, taxonomic characters, evolution, hierarchy of categories, and nomenclature. Cross-listed with BIOL 112 and ENMT 112.

BPSC 132. Plant Anatomy (5) F Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): BIOL 005A and BIOL 005B, or consent of instructor. Functional and developmental aspects of plant cell, tissue, and organ structure. All of the aspects of the flowering plant life cycle are covered from germination to pollination and fruit and seed development. Cross-listed with BIOL 132.

DeMason

BPSC 133. Taxonomy of Flowering Plants (5) Lecture, 3 hours; laboratory, 3 hours; three 1-day Saturday field trips. Prerequisite(s): BIOL 005C. Introduces the principles and methods of identifying, naming, and classifying flowering plants. Surveys selected flowering plant families in California and shows their interrelationships. Kim

BPSC 134. Soil Conditions and Plant Growth (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 104/BPSC 104, ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H; consent of instructor. A study of the chemical, physical, and biological properties of soils and their influence on plant growth and development. Topics include soil-plant water relations; fundamental of plant mineral nutrition; soil nutrient pools and dynamics; soil acidity, alkalinity, salinity, and sodicity; root symbioses and rhizosphere processes. Cross-listed with ENSC 134 and SWSC 134.

BPSC 135. Plant Cell Biology (4) Lecture, 3 hours; discussion 1 hour. Prerequisite(s): BIOL 005C, BIOL 104 or consent of instructor. Explores concepts of dynamic plant cell structures and functions as revealed by modern technologies such as genetic manipulation and live-imaging of cellular structures and molecules. Smith

BPSC 138. Morphology of Vascular Plants (4) W, Even Years Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 090B or MATH 09IB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently); or consent of instructor. Examines the comparative morphology and evolution of vascular plants with use of fossil and living representatives, focusing on the Angiosperms. Cross-listed with BIOL 138.

Springer

BPSC 143. Plant Physiology (4) W Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 090B or MATH 09IB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently), BIOL 104/BPSC 104; or consent of instructor. A survey of the fundamental principles of plant physiology, including photosynthesis, respiration, water relations, mineral nutrition, growth, morphogenesis, plant hormones, dormancy, and senescence. Cross-listed with BIOL 143.

Lovatt

BPSC 146. Plant Ecology (4) Lecture, 3 hours; laboratory, 18 hours per quarter; field trip, 12 hours per quarter. Prerequisite(s): BIOL 104/BPSC 104 or BIOL 116 or consent of instructor. A study of the fundamental principles of plant ecology emphasizing community ecology, environment, life histories, population dynamics, species interactions, succession, ecosystem and landscape ecology, and plant conservation ecology.

Allen

BPSC 148. Quantitative Genetics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C, BIOL 102, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 090B or MATH 09IB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, STAT 100B; or consent of instructor. Examines approaches to studying the genetic basis of polygenic, metric traits. Includes types of gene action, partitioning of variance, response to selection, and inferring the number and location of quantitative trait loci. Cross-listed with BIOL 148.

Xu

BPSC 150. Principles of Plant Breeding (4) W, Even Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 102, STAT 100A is recommended. Applies the principles of classical, quantitative, and molecular genetics to the development of improved cultivars of crop plants. Waines, Roose

BPSC 153. Plant Genomics and Biotechnology Laboratory (4) F.S, Even Years Lecture, 1 hour; discussion, 1 hour; laboratory, 6 hours. Prerequisite(s): BCH 110C or BIOL 107A; upper-division standing; consent of instructor. A study of modern techniques in plant genome modification. Topics include nucleic acid cloning and sequencing; plant tissue culture and genetic transformation; controlled-environment plant growth; gene mapping; and germplasm collections. Also explores the history of plant biotechnology; economic, agricultural, nutritional, medicinal, and societal relevance; and regulatory issues. Cross-listed with BCH 153 and BIOL 153.

Close, Eulgem

BPSC 155. Chromosomes (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 090B or MATH 09IB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently); or consent of instructor. An examination of the structure, function, and behavior of eukaryotic chromosomes. Cross-listed with BIOL 155.

Lukaszewski

BPSC 158. Subtropical and Tropical Horticulture (4) F, Even Years Lecture, 4 hours; occasional field trips. Prerequisite(s): BIOL 005C or BIOL 104/BPSC 104 or consent of instructor. Studies the important subtropical and tropical crops of the world, emphasizing fruits, including citrus and avocado, with special reference to their botany, germplasm resources, climatic adaptation, and culture. Waines

BPSC 165. Restoration Ecology (4) Lecture, 3 hours; two 1-day field trips; three half-day field trips. Prerequisite(s): BIOL 104/BPSC 104 or BIOL 116 or ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H; CHEM 112A; STAT 100A (STAT 100A may be taken concurrently); or consent of instructor. BIOL 102 and CHEM 112C are recommended. An examination of the basic ecological principles related to land restoration. Topics include enhanced succession, plant establishment, plant adaptations, ecotypes, weed colonization and competition, nutrient cycling, functions and reintroduction of soil microorganisms, restoration for wildlife, and the determination of successful restoration. Includes field trips to restored sites. Cross-listed with BIOL 165.

Allen

BPSC 166. Plant Physiological Ecology (4) W, Odd Years Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005C or consent of instructor; university-level courses in mathematics, physics, and chemistry are recommended. Topics include plant responses to light, temperature, evaporative demand, and limiting soil conditions. Explores photosynthesis, plant-water relations, and plant-temperature relations. Gives attention to plant adaptation to climates with varying aridity and temperature extremes. Santiago

BPSC 170. Ethnobotany (4) F Lecture, 2 hours; seminar, 1 hour; discussion, 1 hour. Prerequisite(s): BIOL 104/BPSC 104 or consent of instructor. Introduces students to ethnobotanical research by reviewing selected ethnobotanical studies. Topics covered by lectures include fundamental principles of ethnobotany, the search for new medicines and other products made from plants, the role of humans in plant evolution, and the impact of plants on human cultures. Discussions focus on the past and present role of humans in plant conservation and the search for sustainable management practices in agriculture and forestry. Seminars by invited guests and enrolled students present selected topics in ethnobotany. Cross-listed with ANTH 170.

BPSC 185. Molecular Evolution (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 105 or BIOL 107A or consent of instructor; BIOL 108 is recommended. Explores the evolution of genes, proteins, and genomes at the molecular level. Focuses on the processes that drive molecular evolutionary change. Covers basic methodological tools for comparative and phylogenetic analyses of molecular data from an evolutionary perspective.

Liu

BPSC 190. Special Studies (1-5) F, W, S variable hours. Library, laboratory or field work designed to meet special curricular needs. A written proposal signed by the supervising faculty member must be approved by the major advisor and the Department Vice Chair. A written report must be filed. Course is repeatable, but total credit toward graduation may not exceed 6 units.

BPSC 195H. Senior Honors Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): upper-division standing; admission to the University Honors Program or consent of instructor. Directed research and completion of a senior Honors thesis under the supervision of a faculty member. Course is repeatable to a maximum of 12 units.

BPSC 197. Research for Undergraduates (1-4) F, W, S Outside research, 3-12 hours. Prerequisite(s): upper-division standing; consent of instructor. Individual research conducted under the direction of a Botany and Plant Sciences faculty member. A written proposal must be approved by the supervising faculty member and undergraduate advisor. A written report must be filed with the supervising faculty member at the end of the quarter. Course is repeatable.

BPSC 198-I. Individual Internship in Botany and Plant Sciences (1-12) Internship, 2-24 hours; written work, 1-12 hours. Prerequisite(s): upper-division standing; consent of instructor. An off-campus internship related to plant biology. The student conducts the internship in the public or private sector but is jointly supervised by an off-campus sponsor and a faculty member in Botany and Plant Sciences. Requires an initial written proposal and a final written report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

BPSC 199. Senior Research (2-4) F, W, S Laboratory, 6-12 hours. Prerequisite(s): senior status; a GPA of 3.2 or better in upper-division courses in Botany/Plant Science and Biology; or consent of instructor. Individual research on a problem relating to

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Botany/Plant Science. A written proposal signed by the major advisor and the Department Vice Chair. A written proposal signed by the major advisor and the Department Vice Chair. A written proposal signed by the major advisor and the Department Vice Chair. A written proposal signed by the major advisor and the Department Vice Chair.

**Graduate Courses**

BPSC 201 (E-Z). Methods in Plant Biology (1-2) F, S, W Laboratory, 3-6 hours. Prerequisite(s): consent of instructor. Explores the theory and principles of instruments and laboratory techniques applicable to research in the plant sciences. Provides experience in the use of laboratory instruments and techniques including applications and limitations. E. Plant Molecular Biology; F. Plant Ecology; G. Plant Systematics; H. Plant Microscopy; J. Plant Physiology; K. Plant Genetics; M. Plant Cell Biology; N. Plant Cytogenetics. Segments are repeatable as content changes.

BPSC 205. Signal Transduction Pathways in Microbes and Plants (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing in the biological sciences, BIOL 107A or BIOL 113 or BIOL 114 or CBNS 101; or consent of instructor. Advanced topics in signal transduction pathways that regulate growth and development in plants and prokaryotic and eukaryotic microbes. Areas covered include two-component regulatory systems; quorum sensing; signaling via small and heterotrimeric G proteins; mitogen-activated protein kinase cascades; cAMP signaling; photoreceptors; plant hormone signaling; responses to low-oxygen stress; calcium signaling; and plant pathogenesis. Cross-listed with BCH 205, CBMB 205, GEN 205, MCBL 205, and PLPA 205.

BPSC 210. Methods in Arabidopsis Research (4) Lecture, 1 hour; discussion, 1 hour; laboratory, 6 hours. Prerequisite(s): BCH 110C or BIOL 107A; BIOL 102; consent of instructor. A study of modern techniques used in Arabidopsis research. Topics include plant growth conditions, pest control, genetic crosses, chemical and insertional mutagenesis, genetic mapping techniques, nucleic acid isolation and manipulation, transformation, and internet resources. Eulgem and Roose.

BPSC 222. Origins of Agriculture and Crop Evolution (3) W, Odd Years Lecture, 3 hours. Prerequisite(s): BIOL 102, BIOL 104/BPSC 104; or consent of instructor. Analysis of origins of agriculture in the Near East, China, the New World, and Africa. Survey of domestication and evolution of major crop plants and animals. Waines.

BPSC 223. Applied Evolutionary Genetics (4) W, Odd Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 105, BIOL 108; or consent of instructor. An in-depth exploration of evolutionary changes resulting from anthropogenic activities, focusing on genetic changes in populations that affect human well-being. Examines current topics such as conservative genetics, evolution of resistance, and evolutionary implications of biotechnology. Readings in primary literature and popular media interpretations of that literature. Ellstrand and Lennon.

BPSC 230. Molecular Plant-Microbial Interactions (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BCH 100, BIOL 120/MCBL 120/PLPA 120, or equivalents. A study of the physiology of host-pathogen interactions with emphasis on the metabolism of diseased plants, nature of pathogenicity, and defense mechanisms in plants. Cross-listed with CMDB 230, GEN 230, and PLPA 230.

BPSC 231. The Plant Genome (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100, BIOL 107A; or BCH 110A, BCH 110B, BCH 110C; or consent of instructor. Gives students an appreciation for the structure of the plant nuclear, chloroplast, and mitochondrial genomes. Gene structure, regulation of gene expression, transposons, and methods of gene introduction are also emphasized. Cross-listed with BCH 231. Chen, Eulgem, Walling.

BPSC 232. Plant Development (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110C or BIOL 107A; BIOL 102; BIOL 104/BPSC 104; or consent of instructor. An examination of plant development, with emphasis on the genetic mechanisms involved in patterning plant forms. Topics are taken from current literature and focus on molecular and cellular mechanisms. Gohel, Springer.

BPSC 233. Plant Molecular Responses to the Abiotic Environment (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 107A, BIOL 143/BPSC 143; or consent of instructor. Integrates plant physiological and molecular responses to the abiotic environment. Explores molecular responses to environmental factors such as light, nutrients, and abiotic stress. Topics include mechanisms of gene regulation, function of novel gene products, and approaches to improve crop plants for unfavorable environments.

BPSC 234. Statistical Genomics (4) F, Even Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 102, STAT 231B; or consent of instructor. Examines statistical methods of genome analysis. Topics include screening for genetic markers, linkage analysis, linkage disequilibrium, and mapping genes for complex diseases and quantitative traits. Covers statistical techniques, including analysis of least squares and maximum likelihood, Bayesian analysis, and Markov chain Monte Carlo algorithm. Xu.

BPSC 236. Principles of Light Microscopy (4) W Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): graduate standing in the life sciences or consent of instructor. Principles and practice of preparing biological tissues for light microscopy. Topics include bright field and variations on the compound microscope, fluorescence and confocal microscopy, fixation, histochemical methods, immunolocalization, in situ localization, and digital image analysis. Carter, DeMason.

BPSC 237. Plant Cell Biology (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 107A or BIOL 143/BPSC 143 or BCH 100 or CBNS 101 or their equivalents, or consent of instructor. Studies the structure, function, and dynamics of plant cell division, expansion, and specialization. Emphasis on aspects unique to plants including cytoskeletal and cell plate dynamics during cytokinesis; intracellular trafficking and wall-dynamics during expansion; and targeting to chloroplasts and vacuoles during specialization. Raikhel, Yang.

BPSC 239. Advanced Plant Physiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 143/BPSC 143 or consent of instructor. Examines advances in plant physiology, with emphasis on carbon and nitrogen metabolism, mineral nutrition, solute transport and phloem translocation, plant growth regulators, and secondary compounds in relation to growth and development. Lovatt.

BPSC 240. Special Topics in Plant Biology (2) F, W, S Seminar, 2 hours. Prerequisite(s): consent of instructor. Discussion of current literature within special areas of plant science. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BPSC 243. Plant Physiological Ecology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 143/BPSC 143, BPSC 146 or equivalent; or consent of instructor. Analyzes adaptations and responses of plants to their environment, with emphasis on the physical environment, photosynthesis, temperature, and water relations, growth and allocation, and plant interactions. Santiago.

BPSC 245. Advanced Plant Ecology (4) F, Even Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 090C or MATH 09HC, STAT 100B or equivalent; an undergraduate course in ecology, or consent of instructor. Explores the fundamental ecological concepts, theoretical developments, quantitative methods, and experimental results involved in multiscale plant ecological studies. Emphasizes plant strategies, vegetation processes, ecosystem properties, and terrestrial landscapes and their interaction with environmental change and human land use. Li.

BPSC 247. Ecological Theory and Modeling (4) W, Even Years Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): MATH 090C or MATH 09HC, STAT 100B or equivalent; an undergraduate course in ecology, or consent of instructor. Explores the fundamental ecological theory and modeling methodology with emphasis on the ecosystem and landscape scales. Synthesizes current research developments in the context of their classic works. Li.

BPSC 250. Seminar in Plant Biology (1) F, S Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Intensive study of selected topics in plant biology. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

BPSC 252. Special Topics in Botany/Plant Science (1) F, W, S Seminar, 1 hour. Prerequisite(s): graduate standing and consent of instructor. Oral presentations and intensive small-group discussion of selected topics in the area of special competence of each staff member. Course content will emphasize recent advances in the special topic area and vary accordingly. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BPSC 260. Seminar in Plant Physiology, Botany, or Genetics (1) W Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Lectures, discussions, and demonstrations by students, faculty, and invited scholars on selected subjects concerned with the principles of plant physiology, botany, or genetics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BPSC 261. Seminar in Genetics, Genomics, and Bioinformatics (1) W, S Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Oral reports by visiting scholars, faculty, and students on current research topics in Genetics, Genomics, and Bioinformatics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with BCH 261, BIOL 261, ENTM 261, GEN 261, and PLPA 261.

BPSC 290. Directed Studies (1-6) F, S Individual study, 3-18 hours. Prerequisite(s): consent of instructor. Library, laboratory, or field studies conducted under the direction of a faculty member. Designed to
meet special or unexpected curricular needs in areas of plant biology not covered by formal course work. Students who complete assigned extra work receive letter grades; other students receive Satisfactory (S) or No Credit (NC) grades. Course is repeatable.

BPSC 291. Individual Study in Coordinated Areas (1-6) F, W, S Prerequisite(s): graduate standing. A program of study designed to advise and assist candidates who are preparing for examinations. Up to 6 units may be taken prior to the master’s degree. Up to 12 units may be taken prior to advancement to candidacy for the Ph.D. Graded Satisfactory (S) or No Credit (NC). Course is repeatable on recommendation of the instructor.

BPSC 292. Concurrent and Advanced Studies in Botany and Plant Sciences (1-4) F, W, S Outside research, 3-12 hours. Prerequisite(s): consent of instructor. Elected concurrently with an appropriate undergraduate course, but on an individual basis. Devoted to one or more graduate projects based on research and criticism related to the course. Faculty guidance and evaluation is provided throughout the quarter. Course is repeatable.

BPSC 297. Directed Research (1-6) F, W, S Outside research, 3-18 hours. Prerequisite(s): graduate standing or consent of instructor. Individual research conducted under the direction of a Botany and Plant Sciences faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

BPSC 299. Research for Thesis or Dissertation (1-12) F, W, S Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

BPSC 302. Teaching Practicum (1-4) F, W, S Prerequisite(s): graduate standing and appointment as Teaching Assistant. Supervised teaching of Botany/Plant Science courses including laboratory and/or discussion sections. Graded Satisfactory (S) or No Credit (NC). Course is repeatable for credit, but units not applicable toward degree unit requirements.

Business Administration

Subject abbreviation: BSAD, BUS A. Gary Anderson Graduate School of Management

Bajis Dodin, Ph.D., Chair
Committee Office, 10 Anderson Hall
(951) 827-4551; agsm.ucr.edu

Committee in Charge
Shaun Bowler, Ph.D. (Political Science)
Donna Hoffman, Ph.D. (AGSM)
Erik Rowland, Ph.D. (AGSM)
Raymond Russell, Ph.D. (Sociology)
Dean David Stewart, Ph.D. (AGSM)
Aman Ullah, Ph.D. (Economics)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio
Dean David Stewart, Ph.D.
Dean, The A. Gary Anderson Graduate School of Management, ex officio

Faculty
(See Management Faculty)

Majors
The B.S. in Business Administration is a two-year upper-division major offered jointly by The A. Gary Anderson Graduate School of Management (AGSM) and the College of Humanities, Arts, and Social Sciences (CHASS). Students can enroll in a pre-Business status and are advised in CHASS during their freshman and sophomore years. The pre-Business curriculum includes the prerequisites to the major and the college breadth requirements. After admission to the major, students are advised by AGSM. The B.S. degree in Business Administration is conferred by CHASS.

The program is accredited by the AACSB International - The Association to Advance Collegiate Schools of Business.

Admission A limited number of students are accepted into the Business Administration major, chosen according to overall GPA. Students must apply for the major when they have completed fewer than 75 and not more than 100 quarter units of college work. Final acceptance into the major is based on completion of all prerequisites and breadth requirements within a 100-quarter-unit limit, a GPA above 2.00 in prerequisites, and cumulative GPA of at least 2.50. (Students who have not completed the language breadth requirement may be accepted into the program, but they must complete the requirement before graduation.) Exceptions to the 100-quarter-unit maximum must be requested by petition.

Students are encouraged to participate in at least one internship during their junior or senior year. Students interested in international business are encouraged to consider opportunities for study through the Education Abroad Program, which has centers affiliated with more than 150 institutions in 35 countries worldwide. For further details, visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

Outstanding academic achievement is recognized by the awarding of the Delta Sigma Pi Scholarship Key to a graduating senior. Other awards, presented on an annual basis, include the Wall Street Journal’s Student Achievement Award, the Bank of America Business Leaders Scholarship, and the Deloitte and Touche Scholarship.

University Requirements
See Undergraduate Studies section.

College Requirements
Students must fulfill all breadth requirements of the College of Humanities, Arts, and Social Sciences or the Intersegmental General Education Transfer Curriculum prior to transferring to the UC.

Major Requirements
The following are requirements leading to the B.S. degree in Business Administration. At least 50 percent of business course require-
Financial Economics: BUS 135A, BUS 135B, BUS 136, BUS 137, BUS 138 or ECON 171, BUS 139, ECON 102B, ECON 103B, ECON 112, ECON 130, ECON 135, ECON 136

General Management: BUS 111 or BUS 113, BUS 128 or BUS 129, BUS 135A, BUS 143 or BUS 155, BUS 146, BUS 147, BUS 148, BUS 165A, BUS 173, BUS 180A, BUS 180B, BUS 180C

Human Resources Management: At least one of BUS 155 and PSYC 142 and the remainder from the following: ANTH 105/ BUS 158, BUS 144, BUS 156, BUS 157, BUS 176/SOC 176, PSYC 155, SOC 150, SOC 151, SOC 171

Information Systems: At least three of the five courses must be selected from BUS 171–BUS 179, BUS 118, BUS 166, BUS 171, BUS 172, BUS 173, BUS 174, BUS 175, BUS 177, BUS 179, CS 120A/EE 120A, CS 120B/EE 120B, PSYC 134, PSYC 140, PSYC 142

International Management: BUS 114, BUS 138, BUS 154B, BUS 164, BUS 178/ECON 178, BUS 185, ECON 171, ECON 182, ECON 185/LNST 185, HISA 162/LNST 172, POSC 126, POSC 127, POSC 130, POSC 162/LNST 142, SOC 181

Managerial Economics: BUS 152/ECON 152, BUS 153/ECON 153, BUS 160/ECON 160, BUS 178/ECON 178, ECON 102B, ECON 103B, ECON 107, ECON 108, ECON 130, ECON 163, ECON 143A/ENSC 143A

Marketing: At least two of the five courses must be selected from BUS 111–BUS 118, BUS 111, BUS 112, BUS 113, BUS 114, BUS 115, BUS 117, BUS 118, CRWT 130, ECON 102B, ECON 111, ECON 112, PHIL 116, PSYC 134, PSYC 140, STAT 147

Operations and Supply Chain Management: At least three of the five courses must be selected from BUS 122–BUS 129, BUS 118, BUS 122, BUS 128, BUS 129, BUS 173, BUS 127/STAT 127, BUS 162/ECON 162, ECON 112

Public Policy and Management: BUS 111, BUS 152/ECON 152, BUS 155, BUS 156, BUS 159, BUS 160/ECON 160, ECON 132, ECON 135, ECON 163, ECON 143A/ENSC 143A, ECON 187/ENSC 187, PHIL 116, POSC 181, POSC 182, POSC 186, SOC 150, SOC 151

g) An additional 12 units of Business Administration elective courses excluding BUS 190. See department for a list of approved Business Administration elective courses.

 Majors with Administrative Studies Components

B.A. degrees are offered in Art History, Economics, History, Political Science, and Sociology with Administrative Studies. A B.S. degree is offered in Sociology with Administrative Studies. Specified departmental requirements are listed under respective departmental listings.

1. All requirements of the College of Humanities, Arts, and Social Sciences

2. Specified requirements of the relevant department, to include at least 36 upper-division units in that discipline

3. Administrative Studies requirements (37 units)

   a) Four lower-division courses (17 units)

      (1) BUS 010, BSAD 020A

      (2) STAT 048 or equivalent (may be used to satisfy breadth requirements)

      (3) CS 008 (may be used to satisfy breadth requirements)

   b) Two upper-division courses (8 units) from the list below:

      (1) ECON 102A or ECON 130 or ECON 162/BSAD 162

      (2) PSYC 140 or PSYC 142

      (3) SOC 150 or SOC 151 or SOC 171

      (4) POSC 181 or POSC 182 or POSC 183

      (5) ANTH 127 or ANTH 131

   These two courses must be outside the discipline of the relevant major and cannot be courses included as part of the three-course Business Administration track or their cross-listed equivalents.

c) A three-course track (12 units) in Business Administration courses, from one of the following:

      (1) Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151

      (2) Human Resources Management/Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142

      (3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186

      (4) Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114 or BUS 117

      (5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, or BUS 168B


      (7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139

      (8) Management Information Systems: BUS 101, BUS 171, BUS 173

      (9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 122, BUS 127/STAT 127

Minor

Prerequisites for the minor in Business Administration are as follows:

1. Three lower-division courses (13 units) (must be completed with no grade lower than “C”): BSAD 020A, ECON 003, STAT 048

   Requirements for the minor in Business Administration are as follows:

2. Six upper-division courses (24 units):

   a) Four courses from the following:

      BUS 101, BUS 103, BUS 104/STAT 104, BUS 105, BUS 106/ECON 134, BUS 108, PHIL 116

   b) Two additional upper-division Business Administration courses.

Lower-Division Courses

BSAD 020A. Principles of Accounting (4) Lecture, 3 hours; discussion, 1 hour. Study of the concepts and techniques for measurement and communication of financial information. An introduction to accounting theory and practice as related to the single proprietorship, with emphasis on service and merchandising transaction analysis, and recording and summarizing procedures used in preparing various financial statements. Credit is awarded for only one of BSAD 020A or BUS 020.

BSAD 020B. Principles of Accounting (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BSAD 020A or equivalent. Continuation of study of accounting principles with emphasis on partnerships and corporations. Topics include stock and bond issuances, present value concept as related to accounting, introduction to consolidation and intercompany investments, special financial statements and financial statement analysis, and partnership formation and liquidation. Credit is awarded for only one of BSAD 020B or BUS 020 and for only one of BSAD 020B or BUS 021.

BUS 010. Introduction to Business (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Provides an overview of the field of business administration. Areas covered include business goals and strategies, functional areas of business and their integration in policy and decision making, social responsibility, computers in business, and business trends and challenges including the international dimension.

BUS 020. Financial Accounting and Reporting (4) Lecture, 3 hours; discussion, 1 hour. Study of the concepts and techniques for measurement and communication of financial information and interpretation of financial statements. Credit is not awarded for BUS 020 if it has already been awarded for BSAD 020A or BSAD 020B.

BUS 021. Generation of Financial Accounting Information (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BUS 020 with a grade of “C-” or better. Detailed study of the process of measuring, recording, and communicating financial accounting information. Credit is awarded for only one of BSAD 020B or BUS 021.
Upper-Division Courses

BUS 102. Ethics and Law in Business and Society (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the role of marketing in society with emphasis on concepts, marketing methods, and institutions.

BUS 103. Marketing and Distribution Management (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the role of marketing in society with emphasis on concepts, marketing methods, and institutions.

BUS 104. Decision Analysis and Management Science (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing. Topics include linear programming and extensions, networks, dynamic programming, decision trees, queuing models, and simulation. Uses of these models in decision making are discussed. Use of the computer is emphasized. Cross-listed with STAT 104.

BUS 105. Production and Operations Management (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BUS 104/STAT 104 or equivalent. Deals with the issues of design and control of production systems in manufacturing and service organizations. Covers product and process selection, capacity planning, location and layout design, project and job scheduling, inventory control, material planning, and quality control.

BUS 106. Financial Theories and Markets (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 003 or ECON 004; upper-division standing: BSAD 020A and BSAD 020B are recommended. Covers the foundations materials for both corporate financial management, and investment and portfolio analysis. Topics include time value of money, capital budgeting, capital structure, dividend policy, portfolio theory, Capital Asset Pricing Model, and market efficiency. Cross-listed with ECON 134.

BUS 107. Organizational Behavior (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing. Studies organizations from the behavioral science perspective. Topics include motivation, leadership, communication, groups, organization structure and culture, and control in complex organizations.

BUS 108. Financial Evaluation and Managerial Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BUS 020 or equivalent; upper-division standing. Study of accounting data used for manageri- al planning and controlling of business operations. Provides an introduction to manufacturing operations and cost accounting systems, cost-volume-profit analysis, relevant costing, standard costing and variance analysis, as well as budgeting.

BUS 109. Competitive and Strategic Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): senior standing in Business Administration. An integrative course which provides an understanding of strategic decision-making processes in organizations, the interrelationships among functional areas, and how decision making is affected by internal and external environments. Teamwork and case studies are emphasized.

BUS 111. Services Marketing (4) Lecture, 3 hours; outside project, 3 hours. Prerequisite(s): BUS 103. Covers the marketing of services and ideas. Focuses on marketing for service organizations such as hospitals, hotels, and banks. Provides understanding of the role of service provision for both service firms and goods firms.

BUS 112. Consumer Behavior (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 103. Provides a basic understanding of the general models of consumer behavior as it relates to marketing decision making. Emphasis is on motivation, perceptions, learning, and social forces as they impact on the choice process.

BUS 113. Marketing Institutions (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 103. Covers the concepts and strategies relating to the delivery of consumer goods and services, the main topic being the management of marketing activities within the channels of distribution, especially in retail and wholesale institutions.

BUS 114. Marketing in a Global Environment (4) Lecture, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): BUS 103. Covers the theory and practice of marketing across national borders. Provides an understanding of global marketing environments and examines the development of marketing strategies to maximize growth of global companies.

BUS 115. Marketing Research (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): BUS 103. Covers types and sources of marketing information, the marketing research process, and techniques of data collection and analysis, including consumer and customer surveys and test marketing. Examines both quantitative and qualitative research with analysis of the values and limitations of data. Emphasis is placed on evaluation and interpretation of results.

BUS 117. Advertising (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 103. Covers the basic concepts and functions of advertising, with emphasis on media selection, message design, and effectiveness measurement.

BUS 118. Electronic Marketing (4) Lecture, 3 hours; outside project, 3 hours. Prerequisite(s): BUS 103. An introduction to the role of electronic commerce in business-to-consumer and business-to-business marketing. Covers the application of traditional marketing principles to an electronic commerce environment and new marketing techniques made possible by this environment.

BUS 119. Database Marketing (4) Lecture, 3 hours; individual study, 2 hours; extra reading, 1 hour. Prerequisite(s): BUS 115 (may be taken concurrent-ly). Solves marketing cases and develops data analytical skills for managerial decision making. Uses statistical software to manage, display, and analyze market- ing information, including consumer survey data, relation- ship management data, scanner data, and socioeconomic data. Topics include attitude measurement, market segmentation and targeting, competition analysis, market performance analysis, and store loca- tion choice.

BUS 122. Project Planning and Control (4) Lecture, 3 hours; assigned problems and field project, 3 hours. Prerequisite(s): BUS 104/STAT 104 or equivalent. Investigates many real-life decision problems that give rise to linear programs with special structures, network flow problems, integer programs, and large-scale programs. Presents theory and algorithms of these models applied to various decision problems in management with use of computer packages.

BUS 127. Introduction to Quality Improvements (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 048 or STAT 100A or consent of instructor. Explores Deming's 14 points for management, graphi- cal methods, fishbone diagram, Pareto analysis, control charts for attributes and variables, cusum and moving average charts, process-capability, economic design, acceptance sampling, Taguchi method, parameter design, tolerance design, reliability, hazard rate, censoring, and accelerated life testing. Cross-list- ed with STAT 127.

BUS 128. Project Planning and Control (4) Lecture, 3 hours; assigned problems and field project, 3 hours. Prerequisite(s): BUS 104/STAT 104. Covers issues related to planning and control. Topics include differences between projects and production systems, breakdown structures of project organization and work, sequencing and budgeting, resource manage- ment, project evaluation and control, and use of cur- rent project management software. Students apply this methodology to a real-world project.

BUS 129. Supply Chain Management (4) Lecture, 3 hours; assigned problems, 3 hours. Prerequisite(s): BUS 105 or consent of instructor. Focuses on management of the distribution of goods and services from plants, ports, and vendors to customers. Key topics include transportation, inventories, warehousing, materials handling, order processing, packaging, pricing, customer service standards, and warehouse and retail location.

BUS 135A. Corporate Finance: Theory and Cases (4) Lecture, 3 hours; extra reading, 1 hour; term paper, 2 hours. Prerequisite(s): BUS 106/ECON 134. Covers the first part of intermediate corporate financial management. The course uses cases and theory to analyze the optimal corporate financial decisions, including capital budgeting, corporate structure decisions, and dividend policy.

BUS 135B. Corporate Finance: Theory and Cases (4) Lecture, 3 hours; extra reading, 1 hour; term paper, 2 hours. Prerequisite(s): BUS 135A. Covers the second part of intermediate corporate financial management. The course uses cases and theory to analyze the application of option pricing theory in corporate finance, financial planning, working capital manage- ment, and mergers and acquisitions.

BUS 136. Investments: Security Analysis and Portfolio Management (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 106/ECON 134. Examines the determination of investment policies and procedures of security analysis with reference to risk and return. Emphasis on the stock market.

BUS 137A. Real Estate Finance (4) Lecture, 3 hours; extra reading, 2 hours. Prerequisite(s): BUS 135A. Covers the major financial issues associated with the purchase, development, and management of real estate.
BUS 137. Investments: Speculative Markets (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 136. Analysis of advanced topics in finance, including options, commodity futures, financial futures, and mutual fund performance evaluation.

BUS 138. International Finance (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 106/ECON 134 or equivalent; upper-division standing. A survey of international financial institutions and the financial factors that affect the modern multinational corporation. Emphasis on exchange rate and portfolio risk.

BUS 139. Real Estate Investments (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 106/ECON 134. Analysis of real estate development including consideration of site selection, market analysis, upper-division, design and construction, loan contracts, mortgage risks, and investment analysis.

BUS 143. Judgment and Decision Making (4) Lecture, 3 hours; written work and group presentation, 3 hours. Prerequisite(s): senior standing. Covers decision-making, including thinking and judgments; information selection and evaluation; learning and memory; the social side of judgment and decision making; fairness, moral obligations, and social dilemmas; and decision making in organizations.

BUS 144. Negotiation Fundamentals (4) Lecture, 3 hours; outside projects, 3 hours. Prerequisite(s): senior standing. Develops an understanding of the theory and processes underlying a broad spectrum of negotiation problems. Students attain competency in negotiations by applying analytic and interpersonal skills covered in readings and lecture to regular exercises and debriefings.

BUS 146. Introduction to Entrepreneurship (4) Lecture, 30 hours per quarter; outside research, 30 hours per quarter. Prerequisite(s): upper-division standing. Discusses the nature of entrepreneurship and its role in the economy. Topics include identifying and evaluating business opportunities, creating a team, and acquiring financial and other necessary resources.

BUS 147. Entrepreneurial Finance (4) Lecture, 30 hours per quarter; outside research, 30 hours per quarter. Prerequisite(s): BUS 146 or consent of instructor. Focuses on the financing of entrepreneurial ventures. Provides an understanding of opportunity recognition skills, funding techniques, institutions involved in the financing of new ventures, and harvesting.

BUS 148. Business Plan Development (4) Lecture, 30 hours per quarter; outside research, 30 hours per quarter. Prerequisite(s): BUS 146 or consent of instructor. Covers the process of developing a business plan. Provides students with skills necessary to assess new venture opportunities and convert them into businesses.

BUS 152. Economics of Labor Relations (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003, or ECON 004. An analysis of the history of labor and industrial relations in the U.S. with emphasis on problems of collective action, long swings of economic growth, income inequality, and the role of government. Cross-listed with ECON 152.

BUS 153. Labor Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. An analysis of labor demand, labor supply, and the structure of wages. Emphasizes neoclassical, institutional, and radical perspectives. Cross-listed with ECON 153.

BUS 154A. Business Law (4) Lecture, 3 hours; extra reading and project, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Studies law as an integral part of the business environment, a process derived from and changing with the larger society. Areas covered include contracts, torts, agency, partnerships, corporations, and bankruptcy.

BUS 154B. International Business Law (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): BUS 154A. Examines major treaties, conventions, and customary laws which affect business transactions among international businesses. Areas covered include international contracting, transportation, payment, legal systems, intellectual property, tariff computation, business organizations, litigation, and General Agreement on Tariffs and Trade (GATT).

BUS 155. Managing Human Resources (4) Lecture, 3 hours; extra reading and project, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Applies a strategic planning approach to managing relations between an organization and its human resources. Topics include processes of forecasting and job analysis, environmental scanning, recruitment and selection, evaluation and compensation, and dispute resolution.

BUS 156. Leadership Development (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. Analyzes leadership theory and practice through lectures, self-analysis instruments, and discussions of independent field experiences. Surveys areas pertaining to leadership, such as leadership theory, leadership style, oral and written communication, ethical leadership, interpersonal conflict management, and the dynamics of culture, and gender in organization leadership. Credit is awarded for only one of BUS 156 or BUS 180C.

BUS 157. Managing Work Force Diversity (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing. BUS 155 or PSYC 142 is recommended. Covers management issues triggered by the increasing participation of women and minorities in the workforce. Topics include work role stereotyping, workplace representation, culturally based leadership and communication styles, work-family conflicts, and related legislative initiatives.

BUS 158. Organizations as Cultural Systems (4) Lecture, 6 hours; extra reading and written exercises, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the role of culture in the formation and management of complex bureaucratic organizations. Covers types of organizations and organizational cultures, the impact of the cultural environment, and problems posed by rapid cultural change. Offered in summer only. Cross-listed with ANTH 105.

BUS 159. Accounting for Nonprofit Entities (4) Lecture, 3 hours; case problems, 3 hours. Prerequisite(s): BSAD 020B. Introduces basic principles of accounting for nonprofit institutions. Focuses on accounting for state and local governments, hospitals, schools, nonprofit health and welfare organizations, and colleges and universities.

BUS 160. Industrial Organization (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. A study of the organization and structure of the American industrial system with emphasis on its production and pricing behavior and policies, and its market structure and public policies regulating or influencing its market behavior. Cross-listed with ECON 160.

BUS 164. Multinational Accounting (4) Lecture, 3 hours; outside project, 3 hours. Prerequisite(s): BUS 108, BUS 165A. Examines non-U.S. business environments and accounting systems and their relevance to the United States. Identifies and evaluates environmental influences on the development of accounting regulations and practices in selected major countries in Europe, Asia, and Latin America. Focuses on accounting issues of particular relevance to multinational corporations.

BUS 165A. Intermediate Financial Accounting (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): BSAD 020B or equivalent. In-depth study of financial accounting theory and practice. Develops an understanding of accounting concepts and generally accepted accounting principles and the ability to apply this technical knowledge to solve accounting problems. Topics include principal financial statements and accounting and valuation of various assets.

BUS 165B. Intermediate Financial Accounting (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): BUS 165A or equivalent. Continuation of study of financial accounting theory and practice. Topics include current liabilities and contingencies, long-term liabilities, contributed capital, retained earnings, and temporary and long-term investments.

BUS 165C. Intermediate Financial Accounting (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): BUS 165B or equivalent. Continuation of study of financial accounting theory and practice. Covers the conceptual discussion and procedural presentation of financial accounting topics as well as recent developments in account valuation and reporting practices promulgated by practitioners in industry and public accountants.

BUS 166. Accounting Information Systems (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 101, BUS 108, or equivalents. Study of the concepts and techniques in the design and implementation of accounting information systems within companies’ operating environments. Emphasis is on the effects of the computer on these systems.

BUS 167. Advanced Financial Accounting (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): BUS 165C (may be taken concurrently). Covers advanced accounting topics such as consolidated financial statements, accounting for multinational corporations, partnership accounting, and accounting for nonprofit organizations.

BUS 168A. Individual Taxation (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 108 or equivalent. Concentrates primarily on the basic provisions of the federal income taxes imposed on individuals and the accounting for those taxes. While the major emphasis is on current tax provisions and tax planning, consideration is also given to the legislative and judicial development of these provisions.

BUS 168B. Federal Taxation for Corporations, Partnerships, Estates, and Trusts (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): BUS 168A. Covers tax research, corporate taxation, partnership taxation, the wealth transfer taxes, income taxation of estates and trusts, international taxation, and tax administration.

BUS 169A. Auditing (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): BUS 165B. Covers the auditing environment, the auditor’s legal liability, audit responsibilities and objectives, audit evidence, audit
planning and documentation, the auditor's report, and management letters.

BUS 169B. Quality Assurance in Auditing (4) Lecture, 3 hours; case analyses, 3 hours. Prerequisite(s): BUS 169A. Covers the audit process (internal control, compliance tests, sampling, substantive evidence gathering, electronic data processing auditing) and the audit procedures for various types of accounts such as sales, cash, accounts receivable, payroll, inventory, and capital acquisitions.

BUS 171. Systems Analysis and Design (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 101 or equivalent. Involves detailed analysis, specification, design, and implementation of computer-based information systems. Includes economic analyses, evaluation of alternatives, analysis or design tools, and systems project management and planning. Case studies are used.

BUS 172. Information Economics (4) Lecture, 3 hours; assigned and proctored 3 hours. Prerequisite(s): BUS 103; ECON 004 or equivalent. Discusses economic concepts and strategies related to the network economy. Topics include economic issues surrounding information goods, competition in electronic business, pricing strategies, and intellectual property protections. Examines business strategies for the information (software) and infrastructure (hardware) elements of electronic business.

BUS 173. Introduction to Databases for Management (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 101 or equivalent. Covers physical and conceptual aspects of database management systems, including familiarity with the variety of database systems based on different data models. Examines the role of database systems in management information systems (MIS) and issues in database design for effective support of MIS. Requires the use of a database package.

BUS 174. Electronic Commerce (4) Lecture, 3 hours; extra reading, 2 hours; project, 1 hour. Prerequisite(s): BUS 101. Reviews the technological evolution of electronic commerce (EC). Investigates how EC can be used to interact with customers, other organizations, and those within the organization. Studies technical innovations, provides a critical evaluation of strategies, and examines current applications and their impact on the business environment.

BUS 175. Business Data Communications (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): BUS 101. Surveys components of telecommunication systems; examines major design and analysis issues in the development and implementation of computer communication systems. Studies both voice and data communication systems including local area networks, wireless systems, satellite systems, and distributed computer and database systems. Emphasizes evaluation of these systems for business purposes.

BUS 176. The Sociology of Work in Organizations (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. Emphasizes the roles of individuals in organizations. Topics include the effects of jobs on workers, long-term trends in the nature of work, and differences in work among major segments of the labor force. Cross-listed with SOC 176.

BUS 177. Strategies in Information Systems (4) Lecture, 3 hours; project, 3 hours. Prerequisite(s): BUS 101. Reviews techniques and methodologies for strategic planning and management. Explores how corporate or strategic planning must be revised for and adapted to the new global telecommunications environment. Topics include time-based management, forecasting and modeling, and construction of a detailed storage plan. Uses detailed case studies.

BUS 178. International Trade (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. A study of the pure theory of trade, trade policy, and international factor movements including illustrative applications to current issues and problems. Cross-listed with ECON 178.

BUS 179. Business Information Systems Development (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BUS 101. Introduces concepts and programming techniques for building successful interactive business systems. Students use systems development tools to study event-driven programs with graphical user interfaces.

BUS 180A. Seminar in Management: Entrepreneurship (4) Seminar, 30 hours per quarter; individual study, 30 hours per quarter. Prerequisite(s): upper-division standing. Discusses issues and challenges faced by leaders in entrepreneurial organizations. Covers topics such as idea generation, team management, evaluation of core competencies, and ethics. Includes case studies and presentations by guest speakers.

BUS 180B. Seminar in Management: Creating Value (4) Seminar, 30 hours per quarter; outside research, 30 hours per quarter. Prerequisite(s): upper-division standing. Discusses business strategies for creating value in a knowledge-based economy. Focuses on innovative business models in areas such as marketing, finance, information technology, e-commerce, and corporate organization.

BUS 180C. Seminar in Management: Developing Leadership Skills (4) Seminar, 30 hours per quarter; individual study, 30 hours per quarter. Prerequisite(s): upper-division standing. Focuses on approaches to leadership in innovative organizations. Discusses topics such as competencies and characteristics of effective leaders, team building and leadership styles, innovation in functional management practices, and implementing change. Includes exercises, case studies, and invited guest speakers. Credit is awarded for only one of BUS 156 or BUS 180C.

BUS 185. International Strategy and Management (4) Lecture, 3 hours; outside project, 3 hours. Prerequisite(s): senior standing. BUS 109 is recommended. Examines the management and strategic challenges of firms competing in international and global markets. Topics include recent trends in globalizaton of markets and industries, strategic alliances, foreign direct investment, emerging economies, political risk and cross-cultural interaction, and leadership.

BUS 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing; consent of instructor and program chair. A project to be undertaken under faculty supervision. Course is repeatable to a maximum of 12 units.

BUS 198-I. Individual Internship in Business Administration (1-12) Seminar, 1 hour; internship, 3-36 hours; term paper, 1-11 hours. Prerequisite(s): upper-division standing in Business Administration; consent of instructor. Active participation in the work of a business concern or a public or quasi-public agency combining academic instruction and supervised field experience. A maximum of 4 quarter units may be counted toward the degree requirements for Business Administration. Course is repeatable to a maximum of 16 units.

BUS 199H. Senior Honors Research (1-5) Seminar, 1 hour; extra reading, 2-12 hours; term paper, 2-12 hours. Prerequisite(s): senior standing with a major in Business Administration; admission to the University Honors Program or consent of instructor. Involves research in business administration under faculty supervision. Students submit a written report. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is awarded. Course is repeatable to a maximum of 12 units.

Cell Biology and Neuroscience

Subject abbreviation: CBNS
College of Natural and Agricultural Sciences

David A. Eastmond, Ph.D., Chair
Department Office, 1208 Spieh Hall
(951) 827-1763; cbns.ucr.edu

Professors
- Michael E. Adams, Ph.D. (Cell Biology and Neuroscience/Entomology)
- Nancy E. Beckage, Ph.D. (Cell Biology and Neuroscience/Entomology)
- David A. Eastmond, Ph.D.
- Sarjeeet S. Gill, Ph.D.
- Glenn I. Hatton, Ph.D.
- Manuela Martins-Green, Ph.D.
- Frances M. Sladek, Ph.D.
- B. Glenn Stanley, Ph.D. (Cell Biology and Neuroscience/Psychology)
- Prudence Talbot, Ph.D.
- Raphael Zidovetzki, Ph.D.

Professors Emeriti
- Katharine D. Atkinson, Ph.D.
- Paul D. Wilson, Ph.D. (Cell Biology and Neuroscience/Psychology)

Associate Professors
- Margarita C. Currás-Collazo, Ph.D.
- Scott N. Currie, Ph.D.
- Maksim Bazhenov, Ph.D.

Assistant Professors
- Jeffrey B. Bachant, Ph.D.
- Todd Fiacco, Ph.D.
- Nicole Zur Nieden, Ph.D.
- Karine G. Le Roch, Ph.D.
- Constance I. Nugent, Ph.D.

Research in the Department of Cell Biology and Neuroscience uses multidisciplinary approaches to understanding basic cellular processes in various tissues, including the nervous system, as well as more integrative levels of analysis, including behavior. Areas of research represented in the department include the following:

- Biophysical properties of excitable membranes
- DNA repair
- Transcriptional regulation
- Mechanisms of toxicity
- Insect development
- Membrane transport
- Mechanisms of mitotic chromosome transmission
- Telomere maintenance
- Synaptic structure and function
- Changes in nervous system with experience
• Interactions of nervous and endocrine systems
• Reproductive biology and fertilization
• Chemokine function in wound healing and tumor development
• Glia-neuron signaling and sensory and motor integrative processes

Undergraduate Curriculum

Students interested in cell, molecular, and developmental biology can obtain training through the interdepartmental major in Biological Sciences with a specialization in Cell, Molecular, and Developmental Biology leading to the B.S. degree. Students interested in neuroscience can obtain training in behavioral neuroscience, neurobiology, and neurochemistry through the Neuroscience major leading to the B.A. or B.S. degree. The Neuroscience major is an intercollege major offered by the College of Humanities, Arts, and Social Sciences and the College of Natural and Agricultural Sciences. See Biological Sciences section and Neuroscience Undergraduate Major section, respectively.

Graduate Curriculum

Courses and research opportunities are offered by the interdepartmental graduate programs in Cell, Molecular, and Developmental Biology; Environmental Toxicology; and Neuroscience. See the respective graduate program section.

Lower-Division Course

CBNS 004. Concepts in Medical Cell Biology (3) Lecture, 1 hour; workshop, 4 hours. Prerequisite(s): CHEM 001A or CHEM 01HA (may be taken concurrently). Introduces fundamental concepts in molecular cell biology, with emphasis on human health and disease. Modules involve lectures and interactive, problem-oriented discussions with faculty. Through classical and contemporary examples, modules acquaint students with the scientific process and how it leads to insights into human biology. Credit is not awarded for CBNS 004 if it has already been awarded for BIOL 005A.

Upper-Division Courses

CBNS 101. Fundamentals of Cell Biology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 112C; BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently). Introduces the principles of eukaryotic cell biology. Includes an examination of the molecules and systems that mediate cell function and an overview of membrane architecture and function, cell signaling and signal transduction, the cytoskeleton, organelles, protein targeting and secretion, and the nucleus and nuclear transport. Credit is not awarded for CBNS 101 if it has already been awarded for BIOL 113 or BIOL 114.

CBNS 106. Introduction to Neuroscience (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, CHEM 001A, CHEM 001B, CHEM 001C; or consent of instructor. An introduction to cellular, organismal, and behavioral neuroscience for science majors. Topics include structure and functions of the brain, neurons, and synapses; sensory systems and perception; control of movement; neurobiology of hormones and sexual behavior; biorythms, learning, memory, and psychoses.

CBNS 108. Introduction to Developmental Biology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 102, CHEM 112C, or consent of instructor. Emphasizes common principles and key concepts that govern development of multiple eukaryotic systems, and how genes control cell behavior during development.

CBNS 116. Cellular Neuroscience: Structure-Function Relationships (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. Examination of structures comprising nervous systems and the functional principles around which these structures are organized. Topics range from whole brain anatomy to the cellular units (neurons and glia) that constitute nervous systems, and to subcellular elements important in neural functioning.

CBNS 120. Cellular Neuroscience: Membrane and Synaptic Phenomena (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. An examination of cellular and molecular mechanisms of nervous system function using concepts drawn from the study of vertebrates and invertebrates with emphasis on mammalian systems. Cross-listed with PSYC 120.

CBNS 120L. Neuroscience Laboratory (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CBNS 120/PSYC 120 or concurrent enrollment. Laboratory experiments using electrophysiological, chemical, and anatomical research methods fundamental to understanding neurons and neural systems. Cross-listed with PSYC 120L.

CBNS 121. Developmental Neuroscience (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. A study of the development of nervous systems. Examines the cellular and molecular mechanisms of neural development and the determinants of cell birth and death, axonal pathfinding, neuronal connections, and development of neural systems underlying behavior. Cross-listed with PSYC 121.

CBNS 123. Brain Control of Bodily Functions (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or PSYC 110 or consent of instructor. Emphasizes principles of organization and function related to endocrine and other physiological systems. Selected topics include control of breathing, body water, temperature, cardiovascular function, and the stress response.

CBNS 124. Systems Neuroscience (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or PSYC 110 or consent of instructor. Study of the structure and function of motor and sensory systems in vertebrate and invertebrate nervous systems. Cross-listed with PSYC 124.

CBNS 125. Neuropharmacology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 120/PSYC 120; previous or concurrent enrollment in CBNS 120L/PSYC 120L and CBNS 124/PSYC 124 recommended. Examines synaptic neurotransmitter systems, mechanisms, and pharmacological agents and effects, which are fundamental to neural information processing. Cross-listed with PSYC 125.

CBNS 126. Neuroscience of Learning and Memory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or PSYC 110 or consent of instructor. Covers mechanisms of learning and memory across levels of analysis, including genetic, neuronal, systems and theory. Topics include the multiple memory systems, memory consolidation, working memory, emotional memory, recognition memory, spatial memory, and human amnesia. Cross-listed with PSYC 126.

CBNS 127. Behavioral Control Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 120/PSYC 120, CBNS 124/PSYC 124 strongly recommended. An analysis of the principles of nervous system operation from the processing of sensory inputs for object recognition and localization to the organization of central patterns for generation of sequenced motor output. Cross-listed with PSYC 127.

CBNS 128. Immunology (3) Lecture, 3 hours. Prerequisite(s): BIOL 005C; PHYS 002C; PHYS 02LC; BCH 100 or BCH 110A. A study of humoral and cellular immunology. Topics include lymphoid systems, cells, antigens, antibodies, antibody formation, cellular immunity, and tumor and transplantation immunology. Diseases and altered immune states associated with each topic are discussed in detail. Cross-listed with BIOL 128.

CBNS 150. Cancer Biology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110C or BIOL 107A; CBNS 101 is recommended (may be taken concurrently). The origin, development, and treatment of cancer are explored with emphasis on molecular mechanisms. Topics such as oncogenes, tumor suppressors, cell cycle, differentiation, AIDS, and hereditary and environmental factors in the development of cancer are covered. Cross-listed with ENTX 150.

CBNS 169. Human Embryology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C or consent of instructor. An in-depth study of normal human development from conception through the early postnatal period. Demonstrations use microscopic and other materials specifically adapted for the course. Some consideration is given to abnormal development.

CBNS 190. Special Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): upper-division standing; consent of instructor and department chair. Individual study to meet special curricular needs. Grading basis to be determined in consultation with the instructor and department chair. Course is repeatable to a maximum of 12 units.

CBNS 194. Independent Reading (1-2) Individual study, 3-6 hours. Prerequisite(s): consent of instructor. Individual reading under faculty direction. Course is repeatable to a maximum of 4 units.

CBNS 197. Research for Undergraduates (1-4) Outside research, 3-12 hours. Prerequisite(s): either sophomore standing and one course in Cell Biology and Neuroscience or upper-division standing; consent of instructor. An introduction to laboratory research conducted under faculty supervision. Students who submit a written report or give an oral presentation receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CBNS 199. Senior Research (1-4) Outside research, 3-12 hours. Prerequisite(s): senior standing; consent of instructor. Original research undertaken under the direction of a faculty member. Students who submit a written report or give an oral presentation receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.
Cell, Molecular, and Developmental Biology

Subject abbreviation: CMDB
College of Natural and Agricultural Sciences
Peter W. Atkinson, Ph.D., Director
Graduate Program, 1140 Batchelor Hall
(800) 735-0717 or (951) 827-5621
cell.ucr.edu

Professors
Michael Adams, Ph.D. (Cell Biology and Neuroscience/Entomology)
Julia Bailey-Serres, Ph.D. (Botany and Plant Sciences)
James Baldwin, Ph.D. (Nematology)
Nancy Beckage, Ph.D. (Entomology/Cell Biology and Neuroscience)
Katherine Borkovich, Ph.D. (Plant Pathology)
Richard Cardullo, Ph.D. (Biology)
Wilfred Chen, Ph.D. (President’s Chair, Chemical and Environmental Engineering)
Carl Cranor, Ph.D. (Philosophy)
Shou-Wei Ding, Ph.D. (Plant Pathology)
Brian Federici, Ph.D. (Entomology)
Sarjeet S. Gill, Ph.D. (Cell Biology and Neuroscience)
Heimo Haimo, Ph.D. (Biology)
Glenn Hatton, Ph.D. (Cell Biology and Neuroscience)
Robert Heath, Ph.D. (Botany and Plant Sciences)
Helen Henry, Ph.D. (Biochemistry)
Anthony H.C. Huang, Ph.D. (Botany and Plant Sciences)
Bradley Hyman, Ph.D. (Biology)
Howard Judelson, Ph.D. (Plant Pathology)
Xuan Liu, Ph.D. (Biochemistry)
David Lo, Ph.D., M.D. (Biomedical Sciences)
Elizabeth M. Lord, Ph.D. (Botany and Plant Sciences)
Charles F. Louis, Ph.D. (Biochemistry)
Manuela Martins-Green, Ph.D. (Cell Biology and Neuroscience)
Thomas Miller, Ph.D. (Entomology)
Ashok Mulchandani, Ph.D. (Chemistry)
Eugene Nothnagel, Ph.D. (Botany and Plant Sciences)
Michael Pirrung, Ph.D. (President’s Chair in Chemistry)
Alexander Raikhel (Entomology)
Natasha Raikhel (Botany and Plant Sciences)
A.L.N. Rao, Ph.D. (Plant Pathology)
Victor Rodgers, Ph.D. (Bioengineering)
Neal L. Schiller, Ph.D. (Biomedical Sciences)
Jerome S. Schulz, Ph.D. (Bioengineering)
John Y.-J. Shyy, Ph.D. (Biomedical Sciences)
Frances Sladek, Ph.D. (Cell Biology and Neuroscience)
B. Glenn Stanley, Ph.D. (Cell Biology and Neuroscience/Psychology)
Daniel Straus, Ph.D. (Biomedical Sciences)
Prudence Talbot, Ph.D. (Cell Biology and Neurobiology)
Linda L. Walling, Ph.D. (Botany and Plant Sciences)
Shihong Xu, Ph.D. (Botany and Plant Sciences)
Zhenduo Yang, Ph.D. (Plant Biology)
Raphael Zelovetzki, Ph.D. (Cell Biology and Neuroscience)

Jian-Kang Zhu, Ph.D. (President’s Chair (Botany and Plant Sciences)

Professors Emeriti
Anthony W. Norman, Ph.D. (Biochemistry/Biomedical Sciences)

Associate Professors
Monica J. Carson, Ph.D. (Biomedical Sciences)
Xuewei Chen, Ph.D. (Botany and Plant Sciences)
Quan Cheng, Ph.D. (Chemistry)
Margarita Currais-Collazo, Ph.D. (Cell Biology and Neuroscience)
Scott N. Currie, Ph.D. (Cell Biology and Neuroscience)
Isgouhi Kalashian, Ph.D. (Nematology)
Paul Larsen, Ph.D. (Biochemistry)
Stefano Lonardi, Ph.D. (Computer Science and Engineering)
Christian Lytle, Ph.D. (Biomedical Sciences)
Morris F. Maduro, Ph.D. (Biology)
Dmitri Maslov, Ph.D. (Biology)
Cengiz Ozkan, Ph.D. (Mechanical Engineering)
Mihri Ozkan, Ph.D. (Electrical Engineering)
Frank Sauer, Ph.D. (Biochemistry)
Patricia S. Springer, Ph.D. (Botany and Plant Sciences)
Yinzhong Wang, Ph.D. (Chemistry)

Assistant Professors
Jeffrey B. Bachant, Ph.D. (Cell Biology and Neuroscience)
Christopher Bardeen, Ph.D. (Chemistry)
Kathryn DeFea, Ph.D. (Biomedical Sciences)
Douglas W. Ethell, Ph.D. (Biomedical Sciences)
Iryna E. Ethell, Ph.D. (Biomedical Sciences)
Thomas Eulgem, Ph.D. (Botany and Plant Sciences)
Venugopala Gonen, Ph.D. (Botany and Plant Sciences)
Haining Jin, Ph.D. (Plant Pathology)
Jiayu Liao, Ph.D. (Bioengineering)
Karine G. Le Roch, Ph.D. (Cell Biology and Neuroscience)
Wenbo Ma, Ph.D. (Plant Physiology and Microbiology)
Changxuan Mao, Ph.D. (Statistics)
Ernest Martinez, Ph.D. (Biochemistry)
Yingying Ng, Ph.D. (Plant Pathology)
Constance I. Nugent, Ph.D. (Cell Biology and Neuroscience)
Anand Ray, Ph.D. (Entomology)
Harley Smith, Ph.D. (Botany and Plant Sciences)
Laura Zanello, Ph.D. (Biochemistry)

The Cell, Molecular, and Developmental Biology Graduate Program is an interdisciplinary program offering M.S. and Ph.D. degrees to students seeking advanced training in these disciplines. The program focuses on the interface between basic and applied research and on the interface between cell, molecular, and developmental biology. Participating faculty are drawn from numerous biological sciences departments whose research interests in cell, molecular, and developmental biology span biomedical to agricultural problems, and students in the program benefit from unique training opportunities.

Students seeking admission into the program should meet all general requirements of the Graduate Division as printed in the Graduate Studies section of this catalog.

Graduate Program

The Cell, Molecular, and Developmental Biology program offers the M.S. and Ph.D. degrees in Cell, Molecular, and Developmental Biology.

Admission

Applicants should have adequate undergraduate course work in chemistry (two years), physics (one year), calculus (one year), statistics (one course), biochemistry (one course), and biology (two years, including a course in genetics and two courses among cell, molecular, or developmental biology). Applicants with strong academic records but with deficiencies in preparation for graduate training may be admitted and must rectify undergraduate deficiencies early in the first two years of residence. Applicants must submit GRE General Test scores (verbal, quantitative and analytical).

Course Work

All students must complete the following core of course work:

1. One graduate-level course in cell biology (BIOL 200/CMDB 200, BPSC 237, or NRSC 200A/PSYC 200A)
2. One graduate-level course in molecular biology (BIOL 201/CMDB 201, BCH 211, BPSC 231/BCH 231, BMSC 202, or NRSC 200B/PSYC 200B)
3. One graduate-level course in developmental biology (BPSC 232, CMDB 202)

Each student must enroll in the program seminars (CMDB 257, CMDB 258) each time they are offered. Upon entry into the program, each student meets with a guidance committee, which recommends a course of study commensurate with the student’s interests and background.

Master’s Degree

The Cell, Molecular, and Developmental Biology program offers an M.S. degree.

Plan I (Thesis)

Students complete the course work above, enroll in one graduate seminar course in cell, molecular, or developmental biology (BCH 230(EZ), BIOL 281(E-Z)/CMDB 281(E-Z), BPSC 240, BCH 289/BIOL 289/NRSC 289/PSYC 289), and undertake a research project leading to a thesis. Each student must complete 36 units of course work, of which at least 24 units must be in the graduate series (200 level) in the biological sciences. No more than 12 units in courses numbered 290-299 may be taken to fulfill the 24-unit requirement. Candidates for the M.S. degree must defend their thesis at a public oral presentation.

Normative Time to Degree

Two years

Doctoral Degree

The Cell, Molecular, and Developmental Biology program offers a Ph.D. degree.

Degree Requirements

1. Completion of the course work listed above
2. One additional graduate course in cell, molecular, and developmental biology
3. Two graduate seminar courses in cell, molecular, or developmental biology (BCH 230E-Z; BIOL 281E-Z; CMDB 281E-Z; BPCR 240, BCH 289/BIOC 289/CHEM 289/ENTM 289/NRSC 289/PSYC 289)
4. A research project leading to a dissertation
5. Oral public defense of dissertation

Written and Oral Qualifying Examinations
Doctoral students are advanced to candidacy following successful completion of written and oral qualifying examinations. Students write a proposal detailing the rationale, specific aims, and approaches to be undertaken for their proposed dissertation research prior to taking the oral qualifying examination.

Dissertation
Candidates must successfully defend their dissertation research in a public oral presentation.

Teaching Requirement
Students must fulfill a two-quarter teaching requirement.

Career Opportunities
There is a high demand in industry and academia for scientists with training in cell, molecular, and developmental biology. Students matriculating from the program are well trained in this field and successfully obtain positions in biotechnology, including biomedical and agricultural industries, and at colleges and universities nationwide.

Normative Time to Degree
Five years

Graduate Courses

CMDB 200. Cell Biology (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): BCH 110A or BCH 110B or equivalent (may be taken concurrently); BIOL 102 or equivalent; BIOL 113 or BIOL 114 or CBNS 101 or equivalent. An examination of the structure and function of eukaryotic cells and their components with emphasis on the key experiments that provide the foundation for our current knowledge. Covers topics such as cell membranes, intracellular trafficking, cell-to-cell interactions, motility, and the cytoskeleton. Cross-listed with BIOL 200.

CMDB 201. Molecular Biology (4) F Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): BCH 110A or BCH 110B or equivalent (may be taken concurrently); BIOL 102 or equivalent; BIOL 107A or equivalent. Covers the structure and inheritance of genetic material, the regulation of gene expression at the cellular and molecular level including molecular mechanisms for regulation of gene transcription, posttranscriptional regulation at the level of messenger RNA stability, processing, editing and translation, methods for gene mapping, and positional cloning. Cross-listed with BIOL 201.

CMDB 202. Developmental Biology (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 101 or equivalent. An examination of development, beginning with the principles that underlie developmental studies of all multicellular organisms. Focuses on plants, insects, and fungi but introduces other model systems. Topics are taken from the current literature.

CMDB 204. Genome Maintenance and Stability (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110C or BIOL 107A; BIOL 113 or BIOL 114 or CBNS 101; BIOL 102 is strongly recommended. Emphasizes chromosome-based processes that maintain genome integrity and ensure accurate genome transmission during cell division. Topics are drawn from the primary literature and include chromatin structure and composition, DNA repair and recombination, telomere function and chromosome maintenance, mitotic chromosome segregation, and check-point surveillance mechanisms. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with BHC 204 and ENTX 204.

CMDB 205. Signal Transduction Pathways in Microbes and Plants (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing in the biological sciences, BIOL 107A or BIOL 113 or BIOL 114 or CBNS 101; or consent of instructor. Advanced topics in signal transduction pathways that regulate growth and development in plants and prokaryotic and eukaryotic microbes. Areas covered include two-component regulatory systems; quorum sensing; signaling via small and heterotrimERIC G proteins; mitogen-activated protein kinase cascades; cAMP signaling; photoreceptors; plant hormone signaling; responses to low-oxygen stress; calcium signaling; and plant pathogenesis. Cross-listed with BHC 205, BSCP 205, GEN 205, MCB 205, and PLPA 205.

CMDB 206. Gene Silencing (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): graduate standing, BIOL 107A or CBNS 101; or consent of instructor. An in-depth coverage of mechanisms, functions, and applications of RNAi and related gene regulatory pathways guided by small RNAs such as siRNAs and miRNAs in plants and animals. Cross-listed with GEN 206 and MCB 206.

CMDB 207. Stem Cell Biology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 101 or equivalent, graduate standing; or consent of instructor. Introduces animal and human stem cell biology and the application of stem cell biology to medicine.

CMDB 208. Bioethics (1) Discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Introduces bioethics, with an emphasis on the medical and social implications of stem cell biology. Cranor in charge

CMDB 210. Molecular Biology of Human Disease Vectors (3) Lecture, 2 hours; seminar, 1 hour. Prerequisite(s): consent of instructor. Covers the molecular aspects of vectors transmitting most dangerous human diseases. Involves lectures and student presentations about current issues in molecular biology and genomics of vector insects and pathogens they transmit. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with ENTM 210 and MCB 210. Raikher

CMDB 220. Chemical Genomics Design Studio (2) Lecture, 1 hour; practicum, 4 hours. Prerequisite(s): Course work in cell biology, genetics, combinatorial chemistry, or consent of instructor. Investigates applications of chemical genomic research approaches. Emphasizes critical thinking; advanced planning of time-consuming tests of hypotheses and experimental caveats, trade-offs, and options. Taught in a case-study approach, teams consist of students with engineering, biology, computational sciences, and chemical backgrounds. Teams generate an interdisciplinary chemical genomic research project. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with BIEN 220. Schultz

CMDB 230. Molecular Plant-Microbial Interactions (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BCH 100, BIOL 120/MCB 120/PLPA 120, or equivalents. A study of the physiology of host-pathogen interactions with emphasis on the metabolism of diseased plants, nature of pathogenicity, and defense mechanisms in plants. Cross-listed with BSC 230, GEN 230, and PLPA 230. Eulgem, Jin

CMDB 250. Special Topics in Cell, Molecular, and Developmental Biology (1-2) F, W, S Seminar, 1-2 hours. Prerequisite(s): graduate standing. Oral presentations and intensive small-group discussion of selected topics in the area of special competence of each participant. Content emphasizes recent advances in the topic area and varies accordingly. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CMDB 257. Seminar in Cell, Molecular, and Developmental Biology (1) F Seminar, 1 hour. Prerequisite(s): graduate standing. Lectures by visiting scholars on current research in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CMDB 258. Graduate Student Seminar in Cell, Molecular, and Developmental Biology (1) S one 1-day seminar. Prerequisite(s): graduate standing in Cell, Molecular, and Developmental Biology. An interdisciplinary seminar consisting of student presentations of original research and discussion of current research topics in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CMDB 281 (E-Z). Seminar in Cell Development, Structure, and Function (2) F, W, S Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Lectures, discussions, and demonstrations by students, faculty, and invited scholars on selected subjects concerned with the principles of cell development, structure, and function. E. Cell Biology; F. Molecular Biology; G. Developmental Biology. Segments are repeatable. Cross-listed with BIOL 281 (E-Z).

CMDB 290. Directed Studies (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Individual study, directed by a faculty member, of specially selected topics in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CMDB 292. Concurrent Analytical Studies in Cell, Molecular, and Developmental Biology (2-4) Outside research, 6-12 hours. Prerequisite(s): graduate standing. Elect in consultation with an appropriate undergraduate advisor, outside research work, or independent research. Prerequisites: consent of advisor or reading professor. Grade of S, NC, or credit/no credit. Graded Satisfactory (S) or No Credit (NC). Course may be repeated.

CMDB 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing. Research and experimental studies conducted under the supervision of a faculty member on a topic of mutual interest to student and faculty. Graded Satisfactory (S) or No Credit (NC). Course may be repeated.

CMDB 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing. Original research in an area selected for the advanced degree. Graded Satisfactory (S) or No Credit (NC). Course may be repeated.
Professional Course

CMDB 301. Teaching of Cell, Molecular, and Developmental Biology at the College Level (1) Seminar, 1 hour. Prerequisite(s): graduate standing. A program of weekly meetings and individual formative evaluations required of new teaching assistants. Covers instructional methods and classroom/section activities most suitable for teaching Biology. Conducted by the Teaching Assistant Development Program. Graded Satisfactory (S) or No Credit (NC).

CHASS F1RST

Subject abbreviation: CHFY

College of Humanities, Arts, and Social Sciences

Geoff Cohen Ph.D., Academic Coordinator
2417A Humanities
(951) 827-7831; Chassf1rst.ucr.edu

Committee in Charge

Steven Brint, Ph.D. (Sociology)
Tracy Fisher, Ph.D. (Women’s Studies)
Michael Jayme, M.F.A. (Creative Writing)
Vorris Nuniy, Ph.D. (English)
Georgia Warnke, Ph.D. (Philosophy)

CHASS F1RST provides first-year students with courses designed to help with the transition to UCR, a major research university setting, which involves high academic standards and rigorous coursework. The courses offer students the resources and tools necessary to excel in the first year and beyond. They take place within a “learning-communities” framework so that students can successfully integrate into campus life.

Lower-Division Courses

CHFY 001 (E-Z). CHASS F1RST Humanities Course (5) Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): first-year freshman standing in the College of Humanities, Arts, and Social Sciences. A College of Humanities, Arts, and Social Sciences course designed to introduce students to the humanities and to academic life. Segments of CHFY 001 (E-Z), CHFY 002 (E-Z), and/or CHFY 003 (E-Z) may be thematically and pedagogically linked.

CHFY 010. CHASS Gateway Lecture Course (5) Lecture, 3 hours; discussion, 1 hour; workshop, 1 hour. Prerequisite(s): first-year freshman standing in the College of Humanities, Arts, and Social Sciences. A College of Humanities, Arts, and Social Sciences course designed to introduce freshmen to the College’s annual theme.

CHYM 002 (E-Z), CHFY 002 (E-Z), and/or CHFY 003 (E-Z) may be thematically and pedagogically linked.

Chemical and Environmental Engineering

Subject abbreviations: CEE, CHE, ENVE

The Marlan and Rosemary Bourns College of Engineering

Yushan Yan, Ph.D., Chair
Department Office, A242 Bourns Hall
(951) 827-2859; www.cee.ucr.edu

Professors

Wilfred Chen, Ph.D., President’s Chair
Robert Haddad, Ph.D. (Chemistry/Chemical and Environmental Engineering)
Mark R. Matsumoto, Ph.D.
Ashok K. Mulchandani, Ph.D.
Joseph M. Norbeck, Ph.D. The Jacques and Eugene Yaeger Families Chair
Jianzhong Wu, Ph.D.
Charles Wyman, Ph.D.
Yushan Yan, Ph.D.

Associate Professors

David R. Cocker, Ph.D.
Nosang Myung, Ph.D.

Assistant Professors

Akua A. Adu-Awuku, Ph.D.
David Cwiertny, Ph.D.
David Kisailus, Ph.D.
Sharon Walker, Ph.D.

Adjunct Professors

Wayne Miller, Ph.D.
Marc A. Deshusses, Ph.D.

Assistant Professor

Eric M.V. Hoek, Ph.D.

Cooperating Faculty

Christopher Amrhein, Ph.D. (Environmental Sciences)
Matthew J. Barth, Ph.D. (Electrical Engineering)
William A. Jury, Ph.D. (Environmental Sciences)
John Y.-J. Shyy, Ph.D. (Biomedical Sciences)
Paul J. Ziemann, Ph.D. (Environmental Sciences)

Majors

The Department of Chemical and Environmental Engineering offers B.S. degrees in Chemical Engineering and in Environmental Engineering, and M.S. and Ph.D. degrees in Chemical and Environmental Engineering. For more details, see www.cee.ucr.edu.

Chemical Engineering focuses on transforming raw materials into useful everyday products. Chemical engineers turn the discoveries of chemists and physicists into commercial realities. They find work in a variety of fields including pharmaceuticals, materials, chemical, fuels, pollution control, medicine, and nuclear and electronic industries. At UCR, the B.S. degree in Chemical Engineering offers students three options: Biochemical Engineering, focusing on biochemical processes; Bioengineering, focusing on the biomedical industry; or Chemical Engineering, emphasizing traditional chemical engineering issues.

The program’s educational objectives are to produce graduates who demonstrate in their careers and professional pursuits the following:

• An ability to apply mathematics, engineering principles, computer skills, and natural sciences to chemical engineering practice
• Application of fundamental chemical engineering principles at an advanced level, and competence in synthesizing knowledge from multiple disciplines to develop and evaluate design solutions.
• Engagement in chemical engineering careers in diverse areas including bioengineering, nanotechnology, petrochemicals, alternative energy, and semiconductor manufacturing.
• Pursuit of graduate education and research in chemical engineering at major research universities.
• Exercise professional responsibility and sensitivity to a broad range of societal concerns, such as ethical, environmental, economic, regulatory, and global issues.
• Effective performance in a team environment, outstanding communication, and involvement in personal and professional growth activities.

The Chemical Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

Environmental Engineering deals with design and construction of processes and equipment intended to lessen the impact of man’s activities on the environment. With the growing importance of environmental quality, the environmental engineer plays a pivotal role in modern industrial activity. Environmental engineers are involved in a wide range of activities including the design of alternative fueled vehicles, the development of renewable energy sources, the design of equipment for solid waste collection and disposal, municipal and industrial wastewater treatment, air pollution control systems, and hazardous waste management. At UCR, the B.S. degree in Environmental Engineering allows students to concentrate on air and/or water quality.

The program’s educational objectives are to produce graduates who demonstrate in their careers and professional pursuits the following:

• An ability to apply mathematics, engineering principles, computer skills, and natural sciences to environmental engineering practice
• Application of fundamental environmental engineering principles at an advanced level, and competence in synthesizing knowledge from multiple disciplines to develop and evaluate design solutions.

• Engagement in environmental engineering careers in diverse areas including sustainability, air quality and pollution control, water quality engineering, bioremediation, and green engineering.

• Pursuit of graduate education and research in environmental engineering at major research universities

• Exercise professional responsibility and sensitivity to a broad range of societal concerns, such as ethical, environmental, economic, regulatory, and global issues

• Effective performance in a team environment, outstanding communication, and involvement in personal and professional growth activities.

The Environmental Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www.engr.ucr.edu/studentaffairs for details.

University Requirements
See Undergraduate Studies section.

College Requirements
See The Marian and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Chemical Engineering major and the Environmental Engineering major use the following major requirements to satisfy the college's Natural Sciences and Mathematics breadth requirement.

1. BIOL 005A, BIOL 051A
2. CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
3. MATH 008B or MATH 009A

Major Requirements

Chemical Engineering
Students must choose either a Biochemical Engineering, Chemical Engineering, Bioengineering or Nanotechnology option.

1. Lower-division requirements (62 units)
   a) BIOL 005A, BIOL 051A
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   c) CS 010
   d) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   e) PHYS 040A, PHYS 040B, PHYS 040C

2. Upper-division requirements (76 units)
   a) CEE 158
   b) CHEM 112A, CHEM 112B, CHEM 112C
   c) CHE 100, CHE 110A, CHE 110B, CHE 114, CHE 116, CHE 117, CHE 118, CHE 120, CHE 122, CHE 160B, CHE 160C, CHE 175A, CHE 175B
   d) CHE 130/ENVE 130, CHE 160A/ENVE 160A
   e) ENGR 118

3. Option requirements: choose one option
   a) Biochemical Engineering option (20 units)
      (1) BCH 110A
      (2) BIOL 121/MCBL 121
      (3) CEE 010
      (4) CHE 124, CHE 124L
      (5) Four (4) units of technical electives chosen from CEE 132, CEE 135, CHE 140, CHE 150, CHE 171, ENVE 121
   b) Chemical Engineering option (18 units)
      (1) CEE 010, CEE 125
      (2) Twelve (12) units of technical electives chosen from CEE 132, CEE 135, CHE 102, CHE 136, CHE 171, ENVE 120, ENVE 133, ENVE 134, ENVE 138
   c) Bioengineering option (24–26 units)
      (1) BCH 110A, BCH 110B
      (2) BIOL 005B, BIOL 005C
      (3) CEE 011
      (4) Six to eight (6–8) units of technical electives chosen from BIEN 140A/CEE 140A, BIEN 140B/CEE 140B, BIOL 107A, BIOL 107B, BIOL 115, BIOL 121/MCBL 121, BIOL 128/CBNS 128, CHE 147, CHE 159/BIEN 159, CHE 124, CHE 140, CHE 150
   d) Nanotechnology option (21 units)
      (1) CEE 010
      (2) CHE 105
      (3) CHE 161
      (4) CEE 135
      (5) Eight (8) units of technical electives chosen from CHE 102, CHE 131, ENVE 133, ME 114, MSE 160, MSE 161

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Environmental Engineering
Students must choose either an Air Pollution Control Technology or a Water Pollution Control Technology option.

1. Lower-division requirements (68 units)
   a) BIOL 005A, BIOL 051A
   b) CEE 010
   c) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   d) CS 010
   e) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   f) ME 010
   g) PHYS 040A, PHYS 040B, PHYS 040C

2. Upper-division requirements (78 units)
   a) CEE 158
   b) CHEM 112A, CHEM 112B
   c) CHE 100, CHE 114, CHE 120
   d) ENGR 118
   e) ENSC 100/SWSC 100
   f) ENVE 120, ENVE 133, ENVE 135, ENVE 142, ENVE 146, ENVE 160B, ENVE 160C, ENVE 171, ENVE 175A, ENVE 175B
   g) ENVE 130/CHE 130, ENVE 160A/CHE 160A

3. Option requirements: choose one option (12 units)
   a) Air Pollution Control Technology option
      (1) CHE 116
      (2) ENVE 134
   b) Water Pollution Control Technology option
      (1) CHE 124 or ENVE 121
      (2) Choose one from CEE 125, CHE 116, ENSC 136, ENSC 163
      (3) Choose one from CEE 132, ENSC 155, ENVE 144/ENSC 144, ENVE 158, ENVE 145

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Graduate Program
The Graduate Program in Chemical and Environmental Engineering offers training leading to the degrees of M.S. and Ph.D. in Chemical and Environmental Engineering. Fields of specialization include biochemical engineering and bioengineering, environmental biotechnology, air quality systems engineering, water quality systems engineering, thermodynamics, advanced materials, and nanotechnology.

Combined B.S. + M.S. Five-Year Program The college offers combined B.S.+ M.S. programs in both Chemical Engineering and Environmental Engineering designed to lead to a Bachelor of Science degree as well as a Master of Science degree in five years. Applicants for this program must have a high school GPA above 3.6, a combined SAT Reasoning score above 1950 (or ACT plus Writing equivalent), complete the Entry Level Writing Requirement before matriculation,
and have sufficient mathematics preparation to enroll in calculus in their first quarter as freshmen.

Interested students who are entering their junior year should check with their academic advisor for information on eligibility and other details.

**Admission**

Applicants should have a degree in chemical and environmental engineering or closely related fields, have a satisfactory overall GPA from their undergraduate studies, good letters of recommendation, and high scores on the GRE General Test. Normally, students admitted to regular standing have satisfied all prerequisite coursework. Under special circumstances, students who have not completed all undergraduate requirements may be admitted provided that the deficiencies are corrected before the beginning of the fall quarter.

Each quarter, all M.S. and Ph.D. students in residence must enroll in CEE 286 (Colloquium in Chemical and Environmental Engineering). In addition, all M.S. and Ph.D. students must participate each year in the CEE Graduate Student Symposium, usually held just before the beginning of the fall quarter.

**Master's Degree**

The Department of Chemical and Environmental Engineering offers the M.S. degree in Chemical and Environmental Engineering.

**Plan I (Thesis)** requires completion of a minimum of 36 units of approved course work including the core courses and submission of an acceptable M.S. thesis. At least 24 of these units must be in regular lecture graduate courses (200 series courses). No more than 4 units of CEE 290 or CEE 297 combined and 6 units of CEE 286 or special topics courses (CEE 250 or CEE 260 series) may apply towards the 36 units.

**Plan II (Comprehensive Examination)** requires completion of a minimum of 36 units of approved course work including the core courses and successful passage of a comprehensive examination. At least 28 of these units must be in regular lecture graduate courses (200-series courses), and none may be in courses numbered CEE 286, CEE 290, CEE 297, CEE 299, or CEE 302. Typically, the examination is a six-hour written, closed-book examination emphasizing fundamental knowledge and breadth of the study area rather than specifics covered in individual courses. An oral follow-up session may be requested by the examination committee following its evaluation of the written exam. No more than two attempts to pass the exam are allowed. Students who fail the exam once and then want to switch to the thesis plan should contact the graduate advisor. Students who fail the exam twice may not switch to the thesis plan.

**For the M.S. degree**, students must complete a minimum of three quarters in residence in the UC with a GPA of 3.00 or better in all 100- and 200-level course work related to the degree.

**Thesis Committee**

The committee consists of three members. The student and advisor nominate the committee before the end of the first year with the concurrence of the graduate committee. After review of the nominations, the dean of the Graduate Division appoints the committee on behalf of the Graduate Council. The committee, once approved by the graduate dean, rather than the department, becomes responsible for the student's academic guidance and evaluation. The chairman of the committee is the director of the candidate's research and is normally a faculty member of the CEE department or a cooperating faculty member. A member may be appointed who is a researcher on campus, from off-campus, or a visiting lecturer within the department; however, a memo indicating the academic degree and affiliation of the nominated member, as well as a curriculum vitae, must accompany such a request. (Memos need not accompany the nomination of an adjunct faculty member.) After the committee is formed, the committee must approve the subject of the thesis. A joint meeting of the committee members and the student should be held before work on the thesis is begun to ensure the topic is clear and acceptable to all. Once the thesis is completed, all three members of the committee must approve the thesis and sign the title page. Students must give a departmental seminar presentation of their thesis work to the department and members of the academic community before completing the thesis.

**Normative Time to Degree** 6 quarters

**Doctoral Degree**

The Department of Chemical and Environmental Engineering offers the Ph.D. degree in Chemical and Environmental Engineering. Satisfying the requirements for the degree consists of four parts:

1. Successful completion of an approved program of course work
2. Passing a written preliminary examination
3. Approval of a dissertation proposal
4. Defense and approval of the dissertation

**Course Work**

Upon choosing a faculty advisor, each Ph.D. student is appointed a Ph.D. advisory committee consisting of two CEE faculty members and the faculty advisor. This advisory committee is responsible for guiding the students in formulating their research activities and preparing for the preliminary and qualifying exams.

The program of course work is formulated by each student and a faculty advisor in the first or second quarter after admission to the program and must be approved by the student's advisor and advisory committee. Every student must complete a program of study that includes:

1. A major area of study intended to increase the student's depth of knowledge in an engineering research specialty
2. A minor area of study intended to support and increase the student's breadth of knowledge in the major area

The CEE graduate program requires a coherent program of

1. Sixteen (16) units of core courses and
2. Eight (8) units of graduate and/or upper-division work approved by the advisory committee
None of these credits may be in courses numbered between CEE 250 and CEE 270, CEE 286, CEE 290, CEE 297, CEE 299, or CEE 302.

**Preliminary Examination** The preliminary examination tests students’ understanding of the fundamental principles of chemical and environmental engineering at the undergraduate level. This comprehensive examination consists of three written tests in three different areas selected from the following five subjects:

1. Thermodynamics
2. Kinetics
3. Transport (heat and mass transfer, fluid dynamics)
4. Air pollution control and engineering
5. Water quality engineering

The three subjects selected should be closely connected to the student’s undergraduate training and approved by the student’s advisory committee. Students who fail any portion of the exam are granted a final attempt to pass a makeup written examination that includes an oral defense of their answers in front of a faculty committee. Students who fail one or two subjects after the retest must enroll in remedial undergraduate courses and pass with a grade of “B+” or better. Credits from these remedial courses do not count toward the Ph.D. course work requirement. Students who fail all three subjects after the retest must leave the Ph.D. program.

**Teaching Requirement** All students must be employed as teaching assistants for at least one quarter. All TAs must take CEE 302 (Teaching Practicum) to help them learn effective teaching methods such as handling discussion sections; preparing and handling laboratory sections; preparing and grading homework, examinations, and lab reports; and student relations.

**Oral Qualifying Examination** Selection of the Qualifying Committee is as follows: 2 members are selected by the Graduate Committee, 2 members are selected by the student, and the student’s advisor will chair the committee. All members of the qualifying committee are expected to have the appropriate expertise to guide and evaluate a candidate’s research. No more than 1 member can be a non-academic senate member. After review of the nominations, the dean of the Graduate Division appoints the committee on behalf of the Graduate Council. This committee becomes responsible for the student’s academic guidance and evaluation until advancement to candidacy and administers the qualifying examination.

**Dissertation Proposal** After successful completion of the written preliminary examination, each student, with advisement from an advisor, prepares a dissertation proposal. Typically, students submit a dissertation proposal to their qualifying committee within one year after successfully completing the written preliminary examination. The proposal should clearly demonstrate the student’s adequate preparation for the completion of the thesis research, which includes but is not limited to a thorough review of the pertinent literature, a presentation and discussion of the candidate’s own research, and a detailed research plan with sufficient breadth and depth for the completion of the thesis. The qualifying committee chair schedules an oral defense normally within one month of the written proposal submission. The presentation is given only to the dissertation committee members.

The oral presentation/defense of the proposal focuses on the dissertation problem. Students should demonstrate considerable depth of knowledge in the student’s area of specialization and a clear understanding of the research methods that are needed for successful completion of the dissertation research. The oral presentation/defense begins with a presentation by students on their dissertation topic and is followed by questions and suggestions from the qualifying committee.

On the basis of the written proposal and oral defense, the qualifying committee decides whether the student should be advanced to candidacy, asked to modify and enhance the proposal, or requested to withdraw from the program.

**Dissertation and Final Oral Examination** Following advancement to candidacy, students formally focus on their dissertation research. The progress of the dissertation is monitored by the student’s dissertation committee. Candidates should interact frequently with members of their dissertation committee to insure that dissertation progress is acceptable.

The graduate committee nominates and approves the dissertation committee after consideration of the suggestions made by the student and thesis advisor. The dissertation committee consists of a minimum of three UCR Academic Senate members. The chair and majority of members must be from Chemical and Environmental Engineering. All committee members should be in a position to offer guidance and be able to judge the scholarship of the dissertation work. Upon recommendation of the graduate advisor, doctoral dissertation committees are appointed by the dean of the Graduate Division.

After completing the dissertation research, students must submit a written copy of the dissertation for approval for defense by the student’s dissertation committee. Once a draft has been approved, an oral defense of the dissertation is scheduled. This defense consists of a seminar open to the entire academic community, followed by a question-and-answer period conducted by the dissertation committee.

Students must complete at least six quarters in residence in the UC with a GPA of 3.00 or better in all 100- and 200-level course work related to the degree.

**Normative Time to Degree** Three years for students with a UCR M.S. degree in Chemical and Environmental Engineering (five years for those without an M.S. degree in Chemical and Environmental Engineering)

**Lower-Division Courses**

**CEE 010. Introduction to Chemical and Environmental Engineering (2)** Discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): none. An introduction to chemical and environmental engineering for engineering majors and nonengineering majors. Aims to enrich students’ appreciation of chemical, biochemical, and environmental engineering. Discusses typical careers, key applications, latest developments in the field, and the need to engage in lifelong learning. Provides hands-on experiences and includes a field trip. Graded Satisfactory (S) or No Credit (NC).

**CEE 011. Introduction to Bioengineering (2)** Lecture, 1 hour; laboratory, 3 hours. An introduction to bioengineering for engineering and nonengineering majors. Discusses the application of concepts and methods of the physical sciences and mathematics to problems in the life sciences. Covers typical careers, key applications, latest developments in the field, and the need to engage in lifelong learning. Provides hands-on experiences and includes a field trip. Graded Satisfactory (S) or No Credit (NC).

**Upper-Division Courses**

**CEE 125. Analytical Methods for Chemical and Environmental Engineers (4)** Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): CHEM 001C, CHEM 01LC. Topics include chromatographic separations, mass spectrometry, atomic absorption, and electrophoresis. Presents total carbon analysis as an introduction to analytical methods and their use in the chemical and environmental engineering fields.

**CEE 132. Green Engineering (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): senior standing or consent of instructor. An introduction to the design, commercialization, and use of feasible and economical processes and products that minimize risks to human health and the environment. Topics covered include environmental risk assessment, regulations, chemical process flow-sheet analysis for pollution prevention, product life-cycle assessment, and industrial ecology. Credit is awarded for only one of CEE 132 or CEE 232.

**CEE 135. Chemistry of Materials (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 112A, MATH 009B. Introduction to the synthesis, structure, properties, and performance of modern materials. Topics include the science of materials, bonding and structure, the strength of materials, electrons in materials, semiconductors, superconductors, and optical properties of materials.

**CEE 140A. Biomaterials (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 140A or BIEN 140C. Covers the principles of materials science and engineering, with attention to topics in bioengineering. Discusses atomic structures, hardness treatment, fundamentals of corrosion, manufacturing processes, and characterization of materials. Cross-listed with BIEN 140A.

**CEE 140B. Biomaterials (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIEN 140A/CEE 140A. Covers the structure-property relations of metals, ceramics, polymers, and composites, as well as hard
and soft tissues such as bone, teeth, cartilage, ligament, skin, muscle, and vasculature. Focuses on behavior of materials in the physiological environment. Cross-listed with BIEN 140B.

**CHE 100. Engineering Thermodynamics** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C, MATH 010A, PHYS 040B; or consent of instructor. An introduction to engineering thermodynamics with emphasis on chemical and environmental engineering systems. Topics include concepts of equilibrium, temperature, and reversibility; the first law and concept of energy; and the second law and concept of entropy. Also examines equations of state, thermodynamic properties, and engineering applications used in the analysis and design of closed and open systems. Credit is awarded for only one of CHE 100 or ME 100A.

**CHE 102. Catalytic Reaction Engineering** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 122 or consent of instructor. Principles of surface reactions and heterogeneous catalysis. Catalyzed reaction kinetics, heterogeneous reactions, diffusion and heterogeneous catalysis, analysis and design of heterogeneous reactors.

**CHE 105. Introduction to Nanoscale Engineering** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C, MATH 010A, PHYS 040C; or consent of instructor. An introduction to nanotechnology engineering and its various applications. Includes electromagnetic waves, and quantum mechanics; synthesis of nanostructures; assembly of nanostructures; traditional and nontraditional methods of nanolithography, and interactions between electronic and optical properties. Also covers the forefront topics such as organic heterostructures, nanotubes, and quantum computing.

**CHE 110A. Chemical Process Analysis** (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C, MATH 009C, PHYS 040B; or consent of instructor. Introduces the principles of conservation of mass in chemical process systems. Topics include the development of steady-state mass balances, and application of mass balances to existing industrial processes.

**CHE 110B. Chemical Process Analysis** (3) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): CHE 110A or consent of instructor. Applies principles of conservation of energy to chemical process systems. Topics include the development of steady-state and unsteady-state energy balances, and combined mass and energy balances in industrial processes.

**CHE 114. Applied Fluid Mechanics** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A, MATH 010B, or consent of instructor. An introduction to fluid statics, fluid flow, compressible and incompressible fluids in conduits and open-channel flow, flow past immersed bodies, transportation and metering of fluids, and agitation and mixing of liquids. Credit is awarded for only one of CHE 114 or ME 113.

**CHE 116. Heat Transfer** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 100, CHE 114; or consent of instructor. An introduction to heat transfer, including steady-state and unsteady-state heat conduction, forced convection, radiation, conduction, and design of heat exchangers. Credit is awarded for only one of CHE 116 or ME 116A.

**CHE 117. Separation Processes** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 130/ENVE 130 (may be taken concurrently), CHE 116, CHE 120 or consent of instructor. Fundamentals of the science and engineering of separation processes, including methods for chemical and environmental engineering. Credit is awarded for only one of CHE 117 or ME 117A.

**CHE 122. Chemical Engineering Kinetics** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C, MATH 010A, MATH 046, PHYS 040B; or consent of instructor. Introduction to homogeneous and heterogeneous kinetics and reactor design for chemical and biochemical processes.
Emphasizes experimental design, analysis of results, and preparation of engineering reports. Cross-listed with ENVE 160A.

**CHE 160B. Chemical Engineering Laboratory (3)**
- Laboratory, 6 hours; written work, 3 hours.
- Prerequisite(s): CHE 116, CHE 122. Consists of laboratory exercises in chemical engineering. Includes experiments in physical measurements, heat transfer, reactor analysis, and chemical kinetics. Emphasis is on experimental design, analysis of results, and preparation of engineering reports.

**CHE 160C. Chemical Engineering Laboratory (3)**
- Laboratory, 6 hours; written work, 3 hours.
- Prerequisite(s): CHE 117, CHE 118 (CHE 117 and CHE 118 may be taken concurrently), CHE 122.
- Consists of laboratory exercises in chemical engineering. Includes experiments and simulations in separation processes and in process control. Emphasis is on experimental design, analysis of results, and preparation of engineering reports.

**CHE 161. Nanotechnology Processing Laboratory (3)**
- Laboratory, 6 hours; written work, 3 hours.
- Prerequisite(s): CHE 100 or consent of instructor. An introduction to growth and characterization techniques that involve nanomaterials and devices. Includes preparing thin films, synthesizing Au and CdS nanoparticles; synthesizing carbon nanotubes; synthesizing alumina nanotemplate; synthesizing gold and nickel nanowires; and assembling of nanowires. Also includes imaging samples with optical, scanning electron microscope, scanning tunneling microscope, and atomic force microscope.

**CHE 171. Pollution Control for Chemical Engineers (4)**
- Lecture, 3 hours; laboratory, 3 hours.
- Prerequisite(s): CHE 117 or consent of instructor. Principles of industrial pollution control in chemical engineering plants. Regulations, criteria, measurements, and pollution control systems associated with air, wastewater, and solid waste management.

**CHE 175A. Chemical Process Design (4)**
- Lecture, 1 hour; laboratory, 6 hours; consultation, 1 hour.
- Prerequisite(s): senior standing in Chemical Engineering. Introduction to chemical process plant design procedures through economic analysis and actual design of chemical processes. Topics address practical applications to current chemical and biochemical processes and economic constraints. Concentrates mainly on general design considerations and economic principles. Graded In Progress (IP) until CHE 175A and CHE 175B are completed, at which time a final, letter grade is assigned.

**CHE 175B. Chemical Process Design (4)**
- Lecture, 1 hour; laboratory, 6 hours; consultation, 1 hour.
- Prerequisite(s): CHE 175A; senior standing in Chemical Engineering. Introduction to chemical process plant design procedures through economic analysis and actual design of chemical processes. Topics address practical applications to current chemical and biochemical processes and economic constraints. Students complete a detailed analysis and design process of the projects begun in CHE 175A. A final report and oral presentation are required. Satisfactory (S) or No Credit (NC) grading is not available.

**CHE 190. Special Studies (1-5)**
- Individual study, 3-15 hours.
- Prerequisite(s): upper-division standing; consent of instructor and department chair. Individual study to meet special curricular needs. Course is repeatable to a maximum of 9 units.

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### Environmental Engineering

#### Upper-Division Courses

**ENVE 120. Unit Operations and Processes in Environmental Engineering (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENVE 133, ENVE 142; or consent of instructor. Fundamentals of physical-chemical unit processes used in environmental engineering. Coagulation and flocculation, sedimentation, filtration, adsorption, redox processes, and heat and mass transfer processes.

**ENVE 121. Biological Unit Processes (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENVE 120 (may be taken concurrently), ENVE 142. An introduction to the theory and design of biological unit processes used in environmental engineering. Suspended growth processes, attached growth processes, digestion processes, and nutrient removal systems are covered.

**ENVE 130. Advanced Engineering Thermodynamics (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 100, MATH 010B (MATH 010B may be taken concurrently); or consent of instructor. Advanced study of chemical thermodynamics and their applications to chemical and environmental engineering processes. Principles for the thermodynamic behavior of pure solutions and mixtures, phases, and chemical equilibria for homogeneous and heterogeneous systems are applied to a variety of processes common to chemical and environmental engineering. Cross-listed with CHE 130.

**ENVE 133. Fundamentals of Air Pollution Engineering (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 114, CHEM 112B, ENVE 171; or consent of instructor. Principles, modeling, and design of systems for atmospheric emission control of pollutants such as photochemical smog and by-products of combustion. Effects of air pollution on health.

**ENVE 134. Technology of Air Pollution Control (4)**
- Lecture, 4 hours. Prerequisite(s): ENVE 133. Processes and design of control technologies for gaseous and particulate pollutants. Methods and design of ambient air quality measurements and air pollution source sampling for both gaseous and particulate pollutants.

**ENVE 135. Fate and Transport of Environmental Contaminants (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 112B, ENVE 120; or consent of instructor. Fate and transport of contaminants in the air, water, and soil environment. Description and modeling of advection, dispersion, phase transfer, and chemical transformation mechanisms.

**ENVE 138. Combustion Engineering (4)**
- Lecture, 4 hours. Prerequisite(s): CHE 114, ENVE 133. Covers the fundamental development of the engineering and design principles underlying combustion engines and turbines and the associated emission control technology. Includes aspects of fuels, lubricants, instrumentations of combution, and kinetics related to the understanding of engineering processes, engine design, and emission control.

**ENVE 142. Water Quality Engineering (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 114, ENVE 171; or consent of instructor. An introduction to the engineering aspects of water quality management. Water quality characterization and modeling techniques for natural and engineered systems. Application of chemical equilibrium and kinetic models to water quality is discussed.

**ENVE 144. Solid Waste Management (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 05LA; both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC; or both ENSC 001H (or ENSC 001H1) and ENSC 002 (or ENSC 002H) or ENVE 171; MATH 009B (or MATH 09HB) or MATH 022; or consent of instructor. A study of the characterization, collection, transportation, processing, disposal, recycling, and composting of municipal solid waste. Emphasizes accepted management strategies and design procedures for recovering or disposing solid wastes while protecting public and environmental well-being. Cross-listed with ENSC 144.

**ENVE 145. Hazardous Waste Management (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENVE 120 and ENVE 142. Advanced course in the study of physio-chemical, thermal, and biological treatment of hazardous waste. Emphasis is placed on the technical understanding and design of physical, biological, and thermal treatment methods; transportation of hazardous waste; and hazardous waste characterization and site assessment.

**ENVE 146. Water Quality Systems Design (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 114, ENVE 142 (ENVE 142 may be taken concurrently); or consent of instructor. An introduction to methods of analysis and hydraulic design of water quality systems. Application of the basic theories of fluid flow to the design of water distribution networks, wastewater and storm water collection systems, structures for flow measurement and control, and pumps and pump stations. Emphasis is given to design projects aimed at developing design process skills, including problem specification, modeling, and analysis.

**ENVE 160A. Chemical and Environmental Engineering Laboratory (3)**
- Laboratory, 6 hours; written work, 3 hours.
- Prerequisite(s): CHE 114, CHE 120. Involves laboratory exercises in chemical and environmental engineering. Experiments cover physical measurements, fluid mechanics, and mass transfer. Emphasizes experimental design, analysis of results, and preparation of engineering reports. Cross-listed with CHE 160A.

**ENVE 160B. Environmental Engineering Laboratory (3)**
- Laboratory, 6 hours; written work, 3 hours.
- Prerequisite(s): ENVE 133. Consists of laboratory exercises in environmental engineering. Includes experiments in physical measurements, reaction kinetics, reactor analysis, and air pollution engineering. Emphasis is on experimental design, analysis of results, and preparation of engineering reports.

**ENVE 160C. Environmental Engineering Laboratory (3)**
- Laboratory, 6 hours; written work, 3 hours.
- Prerequisite(s): ENVE 120, ENVE 142. Consists of laboratory exercises in environmental engineering. Includes experiments in physical measurements, water quality, and unit operations and processes. Emphasis is on experimental design, analysis of results, and preparation of engineering reports.

**ENVE 171. Introduction to Environmental Engineering (4)**
- Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C, MATH 009C, PHYS 040B; or consent of instructor. Introduction to mass and energy balances. Overview of contaminants and their effects of human health and the environment. Provides a basic understanding of contaminants, their sources, and their movement and fate in the environment.
ENVE 175A. Senior Design Project (4) Lecture, 1 hour; laboratory, 6 hours; consultation, 1 hour. Prerequisite(s): senior standing in Environmental Engineering. Under the direction of a faculty member, studies (individually or in small teams with shared responsibilities) propose, design, build, and test environmental engineering devices or systems. A written report, giving details of the project and test results, and an oral presentation of the design aspects are required. Graded In Progress (IP) until ENVE 175A and ENVE 175B are completed, at which time a final, letter grade is assigned.

ENVE 175B. Senior Design Project (4) Lecture, 1 hour; laboratory, 6 hours; consultation, 1 hour. Prerequisite(s): senior standing in Environmental Engineering; ENVE 175A. Under the direction of a faculty member, studies (individually or in small teams with shared responsibilities) propose, design, build, and test environmental engineering devices or systems. A written report, giving details of the project and test results, and an oral presentation of the design aspects are required. Satisfactory (S) or No Credit (NC) grading is not available.

ENVE 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing; consent of instructor. Graduate study to meet special curricular needs. Course is repeatable to a maximum of 9 units.

Graduate Courses

CEE 200. Advanced Engineering Computation (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENGR 118 or consent of instructor. Problem-solving techniques for basic engineering systems including heat and mass transfer, coupled reactions, fluid flow potential, and control.

CEE 202. Transport Phenomena (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 114, CHE 116, CHE 120, ENGR 118; or consent of instructor. Topics include transport phenomena, potential flow, and boundary layer theories with applications to simultaneous heat and momentum, and mass transfer. Introduces numerical techniques used to solve advanced transport phenomena problems.

CEE 204. Advanced Kinetics and Reaction Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 102 or CHE 120 or consent of instructor. Emphasizes kinetics and mechanisms of heterogeneous reactions in different types of reactors. Specific topics include gas-solid noncatalytic reactions; catalytic surfaces and catalyst characterization; and adsorption, diffusion, reaction, and heat transfer in porous catalysts.

CEE 206. Advanced Chemical Engineering Thermodynamics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 130/ENVE 130 or consent of instructor. Application of the laws of thermodynamics to phase and chemical reaction equilibrium. Introduction to statistical thermodynamics, molecular simulations, and the evaluation of thermodynamic properties from molecular simulations.

CEE 210. Cell Engineering (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CHE 124 or consent of instructor. Introduction to genetic and environmental manipulation of cells for production of proteins and for enhanced biocatalytic and synthetic activities. Topics include cloning and gene expression in different host systems, posttranslational processing, metabolic controls and kinetics, in vivo nuclear magnetic resonance spectroscopy, cell modeling, and sensitivity analysis.

CEE 212. Bioseparations and Bioprocess Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 124 or consent of instructor. Examines fundamentals of separation processes used to isolate, purify, and biochemically functionalize products such as whole cells, enzymes, food additives, and pharmaceuticals. Covers selected aspects of biochemical engineering such as microbial interactions, economics, and mathematical modeling of bioprocesses.

CEE 220. Modeling Chemical, Biochemical, and Environmental Processes (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): graduate standing in Chemical and Environmental Engineering or consent of instructor. Introduces simulation softwares and the use of numerical modeling to solve dynamic chemical, biochemical, and environmental processes. Topics include model formulation and development, model sensitivity studies, and application of simulations to environmental, biochemical, and environmental processes.

CEE 221. Introduction to Microfluidics (4) Lecture, 4 hours. Prerequisite(s): CHE 160A/ENVE 160A or consent of instructor. Provides a theoretical and practical introduction to microfluidic devices. Covers traditional and new methods for making microfluidic devices and assembly of components into systems. Emphasizes the considerations underlying the design or operation of devices based on pressure-driven or electrokinetic flow. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CEE 225. Physical and Chemical Separation Processes (4) Lecture, 4 hours. Prerequisite(s): graduate standing in Chemical and Environmental Engineering or consent of instructor. Covers the fundamental and applied concepts of physical and chemical processes relevant to engineered and natural environmental systems. Topics include basic colloid chemistry and an introduction to DLVO theory, coagulation and flocculation, mechanisms of particle removal in filters and transport in porous media, absorption, disinfection, control of disinfection by-products, and advanced treatment processes such as membranes.

CEE 230. Biosensors (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BHC 110A, BHC 110B, BIOL 121/MCBL 121, CHE 124; or consent of instructor. Introduces the fundamentals and applications of biosensors. Covers enzyme-, whole cell-, tissue-, and antibody- or antigen-based electrochemical, optical, and piezoelectric biosensors. Applies such knowledge to biotechnological and control, environmental monitoring, and health care.

CEE 231. Scattering and Reflectometry for Environmental, Material, and Biological Applications (4) Lecture, 3 hours; discussion, 5 hours per quarter. Laboratory, 15 hours per quarter. Prerequisite(s): CEE 206 or equivalent. Covers experimental and theoretical aspects of conventional static and dynamic light scattering, small-angle X-ray scattering, small-angle neutron scattering, X-ray and neutron reflectivity for colloids and biological solutions, surfaces, and interfaces. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CEE 232. Green Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 120 or consent of instructor. A study of the design, commercialization, and use of feasible and economical processes and products that minimize risks to human health and the environment. Topics include environmental issues, risk assessment, and regulations; flow of chemical and manufacturing unit processes and flow-sheet analysis for pollution prevention; product life-cycle assessment; and industrial ecology. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Credit is awarded for only one of CEE 132 or CEE 232.

CEE 233. Advanced Air Pollution Control and Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CEE 202, CEE 206, CHEM 112A, CHEM 112B, ENVE 133, ENVE 134; or consent of instructor. Covers principles necessary to understand the atmospheric behavior of air pollutants. Topics include gas- and aerosol-phase chemistry, atmospheric diffusion, removal processes and residence times, and the formation and fate of gas and aerosol pollutants.

CEE 234. Vehicle Emissions Control Technology, Measurement Procedures, and Alternative Fuels (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing. Covers the nature of gaseous and particulate emissions and the technical aspects of energy efficiency from mobile sources. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CEE 241. Water Quality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENVE 142 or consent of instructor. Topics include assessment of surface water and groundwater quality for beneficial uses, fate and transport of waterborne pollutants, and water quality modeling in natural and engineered systems.

CEE 242. Pilot Plant Laboratory (4) Lecture, 1 hour; laboratory, 9 hours. Prerequisite(s): ENVE 120, ENVE 121; or consent of instructor. Laboratory investigations of physical, chemical, and biological processes for water treatment, wastewater treatment, and soil remediation.

CEE 245. Advanced Hydraulic Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 114, ENVE 142 (ENVE 142 may be taken concurrently); or consent of instructor. An introduction to the basic methods of hydraulic engineering. Includes flow in open channels, pressure control. Topics include design and analysis of basic flow and water containment structures, sanitary and storm sewers, pumps and valves, and pipe networks. Emphasis is given to design projects aimed at developing skills in problem specification, modeling, and analysis. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CEE 246. Surface and Interface Phenomena (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHE 100 or ME 100A or consent of instructor. An introduction to colloid systems, capillarity, surface tension and contact angle, and micelles and microemulsions. Also covers adsorption and desorption at the solid-liquid interface, electrostatic forces, and colloid stability.

CEE 247. Molecular Thermodynamics of Complex Fluids (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CEE 200, CEE 206, or consent of instructor. Introduces recent developments in applied thermodynamics and molecular simulations, with emphasis on current concerns in chemical and environmental engineering such as colloids, polymers, biomacromolecules, and fluids under inhomogeneous conditions.

CEE 249. Integration of Computational and Experimental Biology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005B; MATH 009B or MATH 009B, graduate standing. Multidisciplinary introduction to the mathematical concepts of design of experiments, information content, causation versus correlation, and statistical analysis with respect to hypothesis testing, model development, and parame-
Seminar, 1-2 hours. Prerequisite(s): graduate standing. Seminar in selected topics in chemical and environmental engineering presented by graduate students, staff, faculty, and invited speakers. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 251. Microbial Engineering and Environmental Biotechnology (1 or 2) Seminar, 1-2 hours. Discusses the recent development of novel biocatalysts and biological materials for degrading toxic pollutants or synthesizing environmentally friendly chemicals. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 253. Biodegradation and Bioremediation (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Reviews current research. Special emphasis is placed on biological techniques for air pollution control, bioremediation of methyl tert-butyl ether, and molecular techniques for microorganism monitoring. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

CEE 254. Organic Electronic Materials (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. A study of design, synthesis, purification, manufacture, and application of carbon-based electronic materials. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with CHEM 267.

CEE 255. Special Topics in Water Quality Engineering (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Involves reports and discussion by students, faculty, and visiting scholars on current research topics in water quality engineering. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 256. Special Topics in Particulate Measurement and Air Quality (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Topics include atmospheric chemistry, aerosol chemistry and physics, and measurement techniques used for source and ambient sampling of gases and aerosols. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

CEE 257. Special Topics of Bio-Nanotechnology (1-2) Seminar, 1 hour; consultation, 0-1 hour. Prerequisite(s): graduate standing or consent of instructor. Focuses on the application of nanotechnology for further developments in bioengineering and medicine. Students complete presentations on the latest developments in nanotechnology. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 258. Biosensing and Biodecontamination (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Involves oral presentations and intensive small-group discussions of current literature on biological detoxification of hazardous chemicals and biological-based sensors for environmental, clinical, food quality, and process monitoring. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CEE 259. Special Topics in Materials Electrochemistry (1) Seminar, 1 hour. Prerequisite(s): graduate standing. Topics include nanoelectrochemical systems, electrochemistry, bioelectrochemistry, magnetic materials, spintronics, microelectromechanical systems/nanoelectromechanical systems (MEMS/NEMS), nanosensor arrays, nanoelectronics, corrosion, fuel cells, batteries, thermoelectric materials, electroenzymology, electrodeposition, electroluminescence, and synthesis of nanowires and nanotubes. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable as topics change.

CEE 260. Structural Ordering in Colloidal Dispersions (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Introduces recent advances in understanding intercolloid and surface self-assembly of colloidal particles for the fabrication of new materials. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 261. Special Topics in Zeolites, Fuel Cells, and Nanostructured Materials (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Covers design, synthesis, and engineering of zeolite thin films for applications in semiconductors and in aerospace; development of fuel cell membranes and electrode catalysts and production of hydrogen; and synthesis and manipulation of nanomaterials. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 262. Special Topics in Systems Biology (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Consists of oral presentations and intense small-group discussions of the current literature and research on computational and experimental aspects of systems biology. Explores high-throughput experiments, experimental design, numerical methods, model development, written and oral presentation skills, ethics, and careers. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CEE 263. Membrane Separations (2) Seminar, 2 hours. Prerequisite(s): graduate standing. Covers theoretical and applied concepts of membrane separation processes. Topics may include basic membrane transport theory, membrane materials and formation processes, advances in understanding intercolloid forces and surface chemistry, Derjaguin-Landau-Verwey-Overbeek (DLVO) theory on colloidal stability, colloidal hydrodynamics, and transport in porous media. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CEE 264. Dynamics of Biological Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Covers engineering principles for the analysis and modeling of biological phenomena. Topics include molecular diffusion and transport, membranes, ligand-bioreceptor interactions, enzyme kinetics, and dynamics of metabolic pathways and the application of these principles to the design of bioreactors, biosensors, and other devices. Graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Cross-listed with BIEN 264. Credit is awarded for only one of BIEN 159/CEE 159 or BIEN 264/CEE 264.

CEE 265. Special Topics in Microbial Fate and Transport in Aquatic Environments (1 or 2) Seminar, 1 hour; individual study, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the theoretical and applied research currently being conducted in the area of microbial pathogen transport in natural and engineered aquatic systems. Topics include the theory of colloid transport and filtration, quantification and analysis of microbial adhesion or deposition kinetics, and whole-cell and molecular-scale microbial analysis techniques. Students who give class presentations receive credit for 2 units; other students receive credit for 1 unit. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CEE 266. Special Topics in Biological Conversion of Biomass (1 or 2) Seminar, 1 hour; individual study, 0-3 hours. Prerequisite(s): graduate standing. Consists of oral presentations and small group discussions of current and historic literature on biological conversion of biomass to fuels and chemicals. Students who make presentations receive credit for 2 units; other students receive credit for 1 unit. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as topics change.

CEE 267. Special Topics in Bionanotechnology (2) Seminar, 2 hours. Prerequisite(s): graduate standing. Explores recent advances in biomimetics, bioinstrumentalization, and bio-inspired materials for nanoscale devices, as well as for energy storage and conversion applications. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 18 units.

CEE 268. Special Topics in Environmental Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate standing. Addresses the key role that environmental chemical processes play in water quality, pollutant fate, and the development of strategies for the treatment and reuse of contaminated natural resources. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 18 units.

CEE 269. Colloquium in Chemical and Environmental Engineering (1) Colloquium, 1 hour. Prerequisite(s): graduate standing. Lectures on a current research topic in chemical engineering, environmental engineering, and other related fields presented by faculty members and visiting scientists. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CEE 290. Directed Studies (1-6) Individual study. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Individual study, directed by a faculty member, of selected topics in chemical and environmental engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units.

CEE 292. Concurrent Studies in Chemical and Environmental Engineering (1-4) Outside research, 3-12 hours. Prerequisite(s): consent of instructor. To be taken concurrently with a 100-series course but on an individual basis. Devoted to specific additional projects related to the 100-series course. Faculty provide guidance and evaluation throughout the quarter. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 8 units.
CEE 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Research conducted under the supervision of a faculty member on selected problems in chemical and environmental engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units.

CEE 298-I. Individual Internship (1-12) Written work, 1-12 hours; internship, 2-24 hours. Prerequisite(s): graduate standing; consent of instructor. Individual apprenticeship in chemical and environmental engineering with an approved professional individual or organization, and a faculty member. A written report is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

CEE 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Research in chemical and environmental engineering for the M.S. thesis or Ph.D. dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

Professional Course

CEE 302. Teaching Practicum (1-4) Seminar, 1-4 hours. Prerequisite(s): appointment as a teaching assistant or associate in Chemical and Environmental Engineering. Topics include effective teaching methods such as those involved in leading discussion sections, preparing and grading examinations, and student-instructor relations in lower- and upper-division Chemical Engineering and Environmental Engineering courses. Required each quarter of teaching assistants and associates in Chemical and Environmental Engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Chemistry

Subject abbreviation: CHEM

College of Natural and Agricultural Sciences

Eric L. Chronister, Ph.D., Chair
Leonard Mueller, Ph.D., Vice Chair
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Robert Haddon, Ph.D. (Chemistry/Chemical and Environmental Engineering)
Cynthia K. Larive, Ph.D.
François Mathey, Ph.D.
Thomas H. Morton, Ph.D.
Michael Pirrung, Ph.D. UC Presidential Chair in Chemistry
Dallas L. Rabenstein, Ph.D.
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Ludwig Bartels, Ph.D.
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Richard Hooley, Ph.D.
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Catharine Larseh, Ph.D.
Yadong Yin, Ph.D.
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Saeen Cutler, Ph.D. (Botany and Plant Sciences)
Richard Debus, Ph.D. (Biochemistry)
M. Mark Midland, Ph.D. (Chemical Engineering)
Jocelyn G. Millar, Ph.D. (Entomology)
Aashok Mulchandani, Ph.D. (Chemical Engineering)
Jerome S. Schultz, Ph.D. (Bioengineering)
Paul J. Ziemann, Ph.D. (Environmental Sciences)

Major

The Department of Chemistry offers a B.S. and B.A. degree in Chemistry and a B.S. in Chemistry with a Chemical Physics option or an Environmental Chemistry option.

The B.S. program is certified by the American Chemical Society and is designed for students interested in a professionally oriented major leading most often to a career or advanced study in chemistry.

The B.A. program is designed for students who wish to obtain a broad educational background with less intensive emphasis on chemistry. In this program, students have increased ease in meeting requirements for such areas as pre-medical, predental, or prepharmaceutical science; education; and administration. Check www.careers.ucr.edu.

A Chemical Physics option is available for students who wish to prepare for admission to a graduate program in chemical physics.

The Environmental Chemistry option is available for students who wish to become familiar with environmental processes and problems related to air, water, and soil, and to apply their chemical knowledge working in environmental-related areas. This option also prepares students for admission to a graduate program emphasizing environmental chemistry.

Pre-Health Science Chemistry majors in either the B.S. or B.A. programs can prepare for admission to medical, pharmacy, or dental schools by carefully planning their programs of study. Students planning to apply for post-graduate studies in the health sciences should make it a special point to consult with their Chemistry advisor early in their studies at UCR. Check www.mchp.ucr.edu.

Teaching Credential

Teachers in the public schools in California must have a credential approved by the State Commission on Teacher Credentialing. The credential requires an undergraduate major, baccalaureate degree, and completion of a graduate credential program such as that offered by the Graduate School of Education at UCR (see Education in this catalog and www.education.ucr.edu).

UCR has an approved undergraduate program for Chemistry majors who plan to get a Multiple Subjects Credential and teach in the elementary (K-6) grades. A breadth of course work is necessary, in addition to the specified requirements for the major. Students are urged to start early, preferably as freshmen, selecting courses most helpful for this career. Details and counseling on the Bridge to Teaching Program, a preparation program for the multiple subjects credential, are available in the Office of Interdisciplinary Programs, 2416 Humanities Building, (951) 827-2743; www.lsnid.ucr.edu. Details and counseling on other programs are available in the Graduate School of Education and www.education.ucr.edu/programs.html.

UCR does not yet have a state-approved undergraduate program for chemistry majors who wish to teach at the secondary level. The Teaching Credential in Science, chemistry emphasis, is required for chemistry teachers, grades 7-12. Students who plan to get this credential must take the commission’s subject-matter assessment examination and should make certain their academic program includes preparatory course work. The examination includes chemistry in depth and general science with introductory, college-level biology, chemistry, physics, and geoscience (geology, meteorology, oceanography, astronomy). Further information about courses, requirements, and examinations can be obtained in orientation meetings and the Graduate School of Education (1124 Sproul Hall).

California Teach-Science/Mathematics Initiative (CaTEACH-SM1)

California Teach-Science/Mathematics Initiative (CaTEACH-SM1) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SM1 at UCR offers undergraduate students paid/unpaid opportunities to explore STEM teaching as a career option. Through CaTEACH-SM1, students receive advising and mentoring to prepare for entrance into an intern teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SM1 Resource Center provides future STEM teachers with material and financial resources to promote planning and professional
development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit http://smi.ucr.edu or at the Resource Center at 1104 Pierce Hall.

Transfer Students
Students transferring to the Chemistry major must complete courses comparable to the following one-year sequences before they transfer:

1. General chemistry, equivalent to CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC, each course completed with a grade of “C” or better

2. First-year calculus, equivalent to MATH 009A, MATH 009B, MATH 009C, each course completed with a grade of “C” or better

At least one of the following one-year sequences:

1. General physics (calculus-based) equivalent to PHYS 040A, PHYS 040B, PHYS 040C, each course completed with a grade of “C” or better (strongly recommended)

2. Second-year calculus, equivalent to MATH 010A, MATH 010B, MATH 046, each course completed with a grade of “C” or better

3. Organic chemistry (one-year lower-division), each course completed with a grade of “B” or better

Students must have a minimum grade point average of 2.70 in transferable college courses. UCR has articulation agreements with most of the California community colleges. These agreements list specific community college courses that have been designated as comparable to UCR courses (see the statewide articulation Web site at www.assist.org). Transfer students will usually find it advantageous to complete most or all sequences before starting at UCR. All prospective transfers should try to complete all sequences they begin rather than divide a sequence between two campuses.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college’s breadth requirements. Consult with a professional academic advisor at the CNAS Advising Center, 1223 Pierce Hall.

Major Requirements
The major requirements for the B.A. and the B.S. degree in Chemistry are as follows:

Bachelor of Arts
1. Lower-division requirements (51-53 units)
   a) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
   (or CHEM 01HA and CHEM 1HLA, CHEM 01HB and CHEM 1HLB, CHEM 01HC and CHEM 1HLC), CHEM 005
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A
   c) PHYS 040A, PHYS 040B, PHYS 040C (or PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC)

2. Upper-division requirements (74 units)
   A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the B.A. degree.
   a) CHEM 110A, CHEM 110B, CHEM 112A, CHEM 112B, CHEM 112C, CHEM 113, CHEM 125, CHEM 150A, CHEM 191, and either CHEM 111 or CHEM 166
   b) Ten (10) additional upper-division units in Chemistry if the year of organic chemistry is taken at a community college

Bachelors of Science
1. Lower-division requirements (64-66 units)
   a) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC (or CHEM 01HA and CHEM 1HLA, CHEM 01HB and CHEM 1HLB, CHEM 01HC and CHEM 1HLC), CHEM 005
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D
   d) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C

2. Upper-division requirements (50 units)
   A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the B.S. degree.
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A, CHEM 112B, CHEM 112C, CHEM 113, CHEM 125, CHEM 150A, CHEM 191
   b) Two laboratory courses from CHEM 140, CHEM 166, BCH 102
   c) One course from BCH 110A, CHEM 135/ENSC 135/ENTX 135, CHEM 136/ENSC 136/ENSC 136/ENTX 136/SWSC 136, CHEM 150B

Chemical Physics Option
Students must consult with their Chemistry advisor before electing this option.

1. Lower-division requirements (64-66 units)
   a) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC (or CHEM 01HA and CHEM 1HLA, CHEM 01HB and CHEM 1HLB, CHEM 01HC and CHEM 1HLC), CHEM 005
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D
   d) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C

2. Upper-division requirements (50 units)
   A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the Chemical Physics option.
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A, CHEM 112B, CHEM 112C, CHEM 113, CHEM 140, CHEM 150A, CHEM 150B, CHEM 191
   b) Twenty-four (24) units of upper-division course work in Mathematics or Physics (110 or above excluding 190 series)
   c) Nine (9) additional units in physical chemistry

Environmental Chemistry Option
Students must consult with their Chemistry advisor before electing this option.

1. Lower-division requirements (76-78 units)
   a) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC (or CHEM 01HA and CHEM 1HLA, CHEM 01HB and CHEM 1HLB, CHEM 01HC and CHEM 1HLC), CHEM 005
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D
   d) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C

2. Upper-division requirements (66-67 units)
   A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the Environmental Chemistry option.
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A, CHEM 112B, CHEM 112C, CHEM 113, CHEM 125, CHEM 135/ENSC 135/ENSC 135/ENSC 135/ENSC 135/SWSC 136, CHEM 140, CHEM 150A, CHEM 166, CHEM 191
   b) One course from ENSC 104/SWSC 104 or GEO 137
   c) Two additional courses from CHEM 150B, CHEM 197, CHEM 199, ENSC 100, ENSC 101, ENSC 102, ENSC 104/SWSC 104, ENSC 140/SWSC 140, ENSC 142, ENSC 155, ENSC 163, ENTX 101, GEO 132, GEO 137, GEO 157 (4 units total from CHEM 197 and/or CHEM 199)

Undergraduate Research is strongly encouraged for students with the requisite ability. Students wishing to participate in this activity should consult Chemistry faculty, their Chemistry advisor, or visit the CNAS Undergraduate Research at UCR Web site, at www.cnas-undergradresearch.ucr.edu for research opportunities or check www.chem.ucr.edu/undergradresearch2008.html.

Sample Program
Student programs are planned on an individual basis with their advisors, and there is considerable flexibility in the sequence in which courses required for the major are taken. For example, PHYS 040A, PHYS 040B, PHYS 040C can be started equally well during either the fresh-
man or sophomore year. The sample program is typical for a well-prepared entering freshman who seeks the B.S. degree.

**Freshman Year**

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<th>Fall</th>
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<td>PHYS 040A, PHYS 040B, MATH 008B or MATH 009A, MATH 009B, MATH 009C</td>
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<td>Electives (optional)</td>
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**Sophomore Year**

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<td>PHYS 040C, PHYS 040D, MATH 010A, MATH 010B, MATH 046</td>
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**Senior Year**

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**Minor**

The minor in Chemistry consists of 28 upper-division units in chemistry.

1. Of the specified upper-division units, a minimum of 16 units must be unique to the minor and may not be used to satisfy major requirements.
2. At least one of the courses used to satisfy the 28 units must be in CHEM 125, CHEM 111, CHEM 140 or CHEM 166 (courses which include laboratory work).
3. No more than 4 units of 190-199 courses may be used in fulfilling the upper-division units for a minor.

All of the upper-division courses in chemistry have a prerequisite of CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01A, CHEM 01B, CHEM 01C, or CHEM 01HA and CHEM 1H1A, CHEM 01HB and CHEM 1H1B, CHEM 01HC and CHEM 1H1C and must have CHEM 005 as a prerequisite.

Students with a minor in Chemistry should consult with their Chemistry advisor to construct a specific program consistent with their career goals.

See Minors under the College of Natural and Agricultural Sciences in the Colleges and Programs section of this catalog for additional information on minors.

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**Graduate Program**

The Chemistry Department offers the M.S. and Ph.D. degrees in Chemistry.

Fields of specialization (subdisciplines) are analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry. Research is also carried out in bioanalytical, bioorganic, bioorganic, and biophysical chemistry and in chemical physics, environmental/atmospheric, organometallic chemistry, and neuroscience. For additional information on the latter, please see Neuroscience Graduate Program in the Programs and Courses section of this catalog.

**Admission**

All applicants must submit scores from the GRE General Test. A score from the Advanced Chemistry GRE is not required for admission. It is strongly recommended, however, that applicants submit this score in order to receive maximum consideration for fellowships. The department normally considers applications for teaching and research assistantships at the same time as fellowships; therefore, students are strongly encouraged to complete their applications for admission and support as early as possible. Normally applications for fellowships are awarded by February for students entering in the following fall quarter. Although most students begin their studies in the fall quarter, students may begin their studies in the winter or spring quarter.

**Orientation Examinations**

Admitted students must, at the beginning of their first quarter in residence, take orientation examinations. The examinations are normally given during two consecutive days starting up to one week prior to the first day of instruction. Although a notice of the times and places of these examinations is sent to each student admitted to regular graduate status in chemistry, it is the student's responsibility to be on the campus early enough to check the bulletin boards in Physical Sciences for this information. Students take these examinations in the four subdisciplines: analytical, inorganic, organic, and physical chemistry. The purpose of these examinations is to assess the student's undergraduate preparation. The results permit the faculty to determine the course program that will most effectively aid the students' development in their chosen subdisciplines.

**Master's Degree**

The Department of Chemistry offers the M.S. degree in Chemistry.

Requirements are:

1. Satisfactory performance in orientation examinations in analytical, inorganic, organic, and physical chemistry
2. General university requirements; and departmental requirements for either Plan I or Plan II.

**Plan I (Thesis)**

Students must take at least 36 units of approved courses and graduate research of which five regular lecture courses in the CHEM 200-249 series (CHEM 110A or CHEM 110B, CHEM 113, CHEM 125, and CHEM 150A or CHEM 150B may apply under certain circumstances). A maximum of 12 units of seminar courses (CHEM 250-259) and a maximum of 12 units of graduate research; (but not those numbered CHEM 260-289) may apply towards the 36 units. Students must complete a thesis, and a final oral examination on the thesis may be required.

**Plan II (Comprehensive Examination)**

Students must complete at least 36 units of approved courses of which at least 18 must be in regular lecture courses numbered CHEM 200-249 (CHEM 110A or CHEM 110B, CHEM 113, CHEM 125, and CHEM 150A or CHEM 150B may apply under certain circumstances) and up to 12 units of graduate seminar courses numbered CHEM 250-259. Those numbered CHEM 260-289 are specifically excluded.

**Doctoral Degree**

The Department of Chemistry offers the Ph.D. degree in Chemistry.

The requirements are orientation examinations in analytical, inorganic, organic, and physical chemistry; general university requirements; and departmental requirements.

**Program of Study**

The departmental committee on graduate study determines a program of study on the basis of the student's performance on the orientation examinations and a consideration of their subdisciplines. For students with a normal B.S. level preparation, the typical course pattern for each subdiscipline is as follows:

1. Analytical (a minimum of three courses selected from CHEM 221A, CHEM 221B, CHEM 221C, CHEM 221D, CHEM 221E plus two other courses)
2. Inorganic (CHEM 231A, CHEM 231B, CHEM 231C plus two other courses)
3. Organic (CHEM 211A, CHEM 211B, CHEM 211C plus two other courses)
4. Physical (a minimum of three courses selected from CHEM 201A, CHEM 201B, CHEM 201C, CHEM 201D, CHEM 201E plus two other courses)

**Second Year Research Evaluation**

Students seeking advancement to candidacy for the Ph.D. degree must undergo a Second-Year Research Evaluation (SYRE). The SYRE must take place by the end of the student's fourth academic quarter of residency and is administered by a four-member committee of the Chemistry faculty, one of whom is the student's dissertation advisor. The Chair of the SYRE Committee will be someone other than the dissertation advisor. Typically, these same four faculty members would also serve on the oral qualifying examination committee, with the Chair of the SYRE Committee continuing on as Chair of the oral qualifying examination committee.

The SYRE consists of both a written and oral component and the student is assessed on both
components. The written SYRE document should provide an introduction to the dissertation research, an outline of the goals and objectives, a description of the progress to date, and a delineation of the path forward. The SYRE document is limited to five single-spaced pages (12-point type), excluding references. The oral component of the SYRE will be a presentation of the written document. After presentation of the SYRE document, the student will be queried by committee to assess the student's general knowledge of the material. A student will receive a single grade of Pass, Qualified Pass, or Fail. A Pass signifies that the student has made satisfactory progress in research and is on track to pass the oral qualifying examination. A Qualified Pass signifies that a student's progress in research is reasonable, but that improvement is needed, and should be demonstrated at the time of the oral qualifying examination. A Fail signifies that a student has to date, not made satisfactory progress in research. A student who fails the SYRE would not be required to undergo a second evaluation; however, such students would be placed on notice that they are not on track to pass the oral qualifying examination unless major steps are taken to correct serious deficiencies in research performance.

Foreign Language Requirement A reading knowledge of German, French, or Russian is recommended but not required.

Oral Qualifying Examination This examination consists in part of defending an original proposition and is designed to test the extent of the candidates' development and their breadth of knowledge in chemistry and related fields.

Teaching Requirement Normally requires three quarters of service as a teaching assistant, or equivalent.

Normative Time to Degree 15 quarters

Lower-Division Courses

CHEM 001A. General Chemistry (4) F, W, Summer Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): a score of 3, 4, or 5 on the College Board Advanced Placement Chemistry Examination or a passing score on the California Chemistry Diagnostic Test or a grade of "C-" or better in MATH 005 or concurrent enrollment in MATH 008B or a grade of "C-" or better in MATH 008A or a grade of "C-" or better in CHEM 001A or grades of "C-" or better in CHEM 01HC and CHEM 01LA or grades of "C-" or better in CHEM 01HB and CHEM 01LA. An introduction to the basic principles of chemistry. Credit is awarded for only one of CHEM 001A or CHEM 01HC.

CHEM 01LB. General Chemistry Laboratory (1) W, S, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A or grades of "C-" or better in CHEM 010A and CHEM 010B or grades of "C-" or better in CHEM 010A and CHEM 010B. Honors course corresponding to CHEM 001B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001B. Credit is awarded for only one of CHEM 010A or CHEM 1HLA.

CHEM 011LB. General Chemistry Laboratory (1) W, S, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 01HA and CHEM 01LB; concurrent enrollment in CHEM 010A or CHEM 010B or a grade of "C-" or better in CHEM 010A. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 001C. General Chemistry (4) F, S, Summer Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010B and CHEM 010A or grades of "C-" or better in CHEM 01HA and CHEM 1HLA; concurrent enrollment in CHEM 01LB or a grade of "C-" or better in CHEM 01LB. An introduction to the basic principles of chemistry. Credit is awarded for only one of CHEM 001C or CHEM 01HC.

CHEM 011C. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010A. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011L. General Chemistry Laboratory (1) F, S, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011L. General Chemistry Laboratory (1) F, S, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 010A. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010A. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 010A. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 010A. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.

CHEM 011LA. General Chemistry Laboratory (1) F, W, Summer Laboratory, 3 hours. Prerequisite(s): grades of "C-" or better in CHEM 001A and CHEM 010A or grades of "C-" or better in CHEM 010A and CHEM 010B; concurrent enrollment in CHEM 001A or a grade of "C-" or better in CHEM 010B. An introduction to laboratory principles and techniques related to lecture topics in CHEM 001A. Credit is awarded for only one of CHEM 011A or CHEM 1HLA.
An introduction to thermodynamics, with applications to chemical systems.

CHEM 110B. Physical Chemistry: Introduction to Statistical Mechanics and Kinetics (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 110A with a grade of "C-" or better or consent of instructor; prior or concurrent enrollment in MATH 010B is recommended. Statistical mechanics, kinetic molecular theory, and chemical kinetics with applications to chemical systems.

CHEM 111. Physical Chemistry Laboratory (4) W Lecture, 2 hours; laboratory, 8 hours. Prerequisite(s): CHEM 110A and CHEM 110B with grades of "C-" or better (CHEM 110B may be taken concurrently), or consent of instructor. CHEM 113 recommended. Physical chemical measurements and laboratory experiments illustrating fundamental principles of physical chemistry. Modern electronic and optical measurement techniques.

CHEM 112A. Organic Chemistry (4) F, W, Summer Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): CHEM 001C and CHEM 011LC with grades of "C-" or better or CHEM 01HC and CHEM 1HLC with grades of "C-" or better. Covers modern organic chemistry including structure, nomenclature, reactivity, synthesis, and reaction mechanisms and the chemistry of carbohydrates, lipids, nucleic acids, amino acids, and proteins. Also includes laboratory techniques of purification, isolation, synthesis, reactions, and spectroscopic analysis.

CHEM 112B. Organic Chemistry (4) W, S, Summer Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): CHEM 112A with a grade of "C-" or better. Covers modern organic chemistry including structure, nomenclature, reactivity, synthesis, and reaction mechanisms and the chemistry of carbohydrates, lipids, nucleic acids, amino acids, and proteins. Also includes laboratory techniques of purification, isolation, synthesis, reactions, and spectroscopic analysis.

CHEM 112C. Organic Chemistry (4) F, S, Summer Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): CHEM 112B with a grade of "C-" or better. Covers modern organic chemistry including structure, nomenclature, reactivity, synthesis, and reaction mechanisms and the chemistry of carbohydrates, lipids, nucleic acids, amino acids, and proteins. Also includes laboratory techniques of purification, isolation, synthesis, reactions, and spectroscopic analysis.

CHEM 113. Physical Chemistry: Introduction to Quantum Chemistry (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001C and CHEM 011LC with grades of "C-" or better or CHEM 01HC and CHEM 1HLC with grades of "C-" or better; MATH 046 is recommended. Introduction to quantum mechanics with application to atomic and molecular structure and spectra.

CHEM 114. Advanced Physical Chemistry Laboratory (4) S Lecture, 2 hours; laboratory, 8 hours. Prerequisite(s): CHEM 111 with a grade of "C-" or better or consent of instructor; completion of or concurrent enrollment in CHEM 113. Involves measurements and laboratory exercises illustrating applications of physical chemistry to problems in environmental, materials, and biological chemistry. Covers modern data acquisition, analysis, and computational techniques.

CHEM 122H. Honors Discussion for Organic Chemistry (1) F Discussion, 1 hour. Prerequisite(s): concurrent enrollment in CHEM 112A; admission to the University Honors Program or consent of instructor. Involves advanced, in-depth discussions of current literature relevant to the content of CHEM 112A. Students work in small teams to solve advanced problem sets. Satisfactory (S) or No Credit (NC) grading is not available.

CHEM 123H. Honors Discussion for Organic Chemistry (1) W Discussion, 1 hour. Prerequisite(s): concurrent enrollment in CHEM 112B; admission to the University Honors Program or consent of instructor. Involves advanced, in-depth discussions of current literature relevant to the content of CHEM 112B. Students work in small teams to solve advanced problem sets. Satisfactory (S) or No Credit (NC) grading is not available.

CHEM 124. Discussion for Organic Chemistry (1) S Discussion, 1 hour. Prerequisite(s): concurrent enrollment in CHEM 112C. Involves in-depth discussions of problems relevant to the content of CHEM 112C. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of CHEM 124 or CHEM 124H.

CHEM 124H. Honors Discussion for Organic Chemistry (1) S Discussion, 1 hour. Prerequisite(s): concurrent enrollment in CHEM 112C; admission to the University Honors Program or consent of instructor. Honors course corresponding to CHEM 124. Involves advanced, in-depth discussions of current literature relevant to the content of CHEM 112C. Students work in small teams to solve advanced problem sets. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of CHEM 124 or CHEM 124H.

CHEM 125. Instrumental Methods (3 or 5) W Lecture, 3 hours; laboratory, 8 hours. Prerequisite(s): CHEM 005 with a grade of "C-" or better; PHYS 002C or PHYS 040C (PHYS 002C or PHYS 040C may be taken concurrently); or consent of instructor. Presents chromatographic separations, electrochemistry, and principles of spectroscopic techniques as an introduction to instrumental methods and their use in chemistry. Graduate students may register for either lecture only (3 units) or for lecture and laboratory (5 units).

CHEM 135. Chemistry of the Clean and Polluted Atmosphere (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 112A, CHEM 112B, or consent of instructor; ENSC 102 recommended. Structure of the troposphere and stratosphere; formation of atmospheric ozone; tropospheric NOx chemistry; methane oxidation cycle; phase distributions of chemicals; wet and dry deposition; chemistry of volatile organic compounds; formation of photochemical air pollution; modeling of air pollution and control strategies; stratospheric ozone depletion and global warming. Cross-listed with ENSC 135 and ENTX 135.

CHEM 136. Chemistry of Natural Waters (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 005 with a grade of "C-" or better or ENSC 104 / SWSC 104 with a grade of "C-" or better or consent of instructor. Introduction to processes controlling the chemical composition of natural waters. Topics include chemical equilibria, acid-base and coordination chemistry, oxidation-reduction reactions, precipitation-dissolution, air-water exchange, and use of equilibrium and kinetic models for describing marine nutrient, trace metal, and sediment chemistry. Cross-listed with ENSC 136, ENTX 136, and SWSC 136.

CHEM 140. Environmental Chemistry Laboratory (4) S Lecture, 2 hours; laboratory, 8 hours. Prerequisite(s): CHEM 125 with a grade of "C-" or better, CHEM 110A (or CHEM 109) with a grade of "C-" or better; or consent of instructor. Theory and application of chemical techniques for the analysis of environmentally relevant chemical processes. Discusses gas phase, condensed phase, surface, and particulate chemistry. Topics include "acid rain," photochemical smog, ozone depletion, and chemical analysis monitoring.

CHEM 150A. Inorganic Chemistry (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 112A, CHEM 112B, CHEM 112C all with grades of "C-" or better; CHEM 110A (or CHEM 109) with a grade of "C-" or better. A systematic introduction to the synthesis, reactions, structure, and bonding of important classes of inorganic compounds. Emphasis on non-transition metal chemistry.

CHEM 150B. Inorganic Chemistry (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 150A with a grade of "C-" or better. A systematic introduction to synthesis, reactions, structure, and bonding of important classes of inorganic compounds. Emphasis on transition metal chemistry.

CHEM 166. Advanced Structural and Synthetic Methods (2 or 4) S Lecture, 2 hours; laboratory, 8 hours. Prerequisite(s): CHEM 005 with a grade of "C-" or better or BCH 102 with a grade of "C-" or better; CHEM 112C with a grade of "C-" or better; consent of instructor is required for students enrolling only in the lecture (2 units); CHEM 125 and CHEM 150A are recommended. Enrollment priority is given to students with a grade of "B-" or better in CHEM 112C. Covers methods for the characterization of organic and inorganic compounds and advanced methods of synthesis of organic and inorganic compounds such as vacuum, inert atmosphere, high-pressure, and photochemical techniques. Involves hands-on use of spectroscopic (nuclear magnetic resonance and optical spectroscopy and mass spectrometry) and computer-based methods for structural characterization. Non-Chemistry majors and graduate students may enroll for the lecture (2 units) or for the lecture and laboratory (4 units).

CHEM 190. Special Studies (1-5) To be taken with the consent of the chair of the department as a means of meeting special curricular problems.

CHEM 191. Seminar in Chemistry Careers (1) S Seminar, 1 hour. Prerequisite(s): upper-division standing. Oral reports and discussions by students, faculty, and visiting speakers. Required of chemistry majors; normally taken in the spring of the junior year. Graded Satisfactory (S) or No Credit (NC).

CHEM 197. Research for Undergraduates (1-4) Outside research, 3-12 hours. Prerequisite(s): sophomore or junior standing; consent of instructor. An introduction to the methods of research in chemistry. Includes a research project completed under the supervision of a Chemistry faculty member. Students who submit a written research report receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 6 units.

CHEM 198-I. Individual Internship (1-12) Internship, 2-24 hours; term paper or preparation for presentation, 1-12 hours. Prerequisite(s): upper-division standing in chemistry; consent of instructor. Industrial work experience coordinated and supervised by a chemistry faculty member and an off-campus sponsor. Requires a term paper or presentation. Course is repeatable to a maximum of 12 units.

CHEM 199. Senior Research (1-4) Outside research, 3-12 hours. Prerequisite(s): senior standing; consent of instructor. Research project completed under the supervision of a Chemistry faculty member. Students who submit a written research report receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Total credit for CHEM 199 and/or CHEM 199H may not exceed 9 units.
CHEM 199H. Senior Honors Research (1-5) Outside research, 3-15 hours. Prerequisite(s): senior standing; consent of instructor; a minimum GPA of 3.00 in chemistry courses and in all university course work. Research in chemistry conducted under the supervision of a Chemistry faculty member. Students who submit a written research report receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Total credit for CHEM 199 and/or CHEM 199H may not exceed 9 units.

CHEM 1HLA. Honors General Chemistry Laboratory (1) F, W, summer Laboratory, 3 hours. Prerequisite(s): concurrent enrollment in CHEM 01HA or a grade of “B” or better in CHEM 01HA. Honors course corresponding to CHEM 01LA. An introduction to laboratory principles and techniques related to lecture topics in CHEM 01HA. Credit is awarded for only one of CHEM 01LA or CHEM 1HLA.

CHEM 1HLB. Honors General Chemistry Laboratory (1) W, S, summer Laboratory, 3 hours. Prerequisite(s): grades of “B” or better in CHEM 001A and CHEM 01LA or grades of “B” or better in CHEM 01HA and CHEM 1HLA; concurrent enrollment in CHEM 01HB or a grade of “B” or better in CHEM 01HB. Honors course corresponding to CHEM 01LB. An introduction to laboratory principles and techniques related to lecture topics in CHEM 01HB. Credit is awarded for only one of CHEM 01LB or CHEM 1HLB.

CHEM 1HLC. Honors General Chemistry Laboratory (1) F, S, summer Laboratory, 3 hours. Prerequisite(s): grades of “B” or better in CHEM 001B and CHEM 01LB or grades of “B” or better in CHEM 01HB and CHEM 1HLB; concurrent enrollment in CHEM 01HC or a grade of “B” or better in CHEM 01HC. Honors course corresponding to CHEM 01LC. An introduction to laboratory principles and techniques related to lecture topics in CHEM 01HC. Credit is awarded for only one of CHEM 01LC or CHEM 1HLC.

Graduate Courses

CHEM 201A. Advanced Physical Chemistry: Quantum Mechanics (3) Lecture, 3 hours. Prerequisite(s): CHEM 113 with a grade of “C” or better. Covers concepts in quantum mechanics with particular applications to spectroscopy.

CHEM 201B. Advanced Physical Chemistry: Quantum Mechanics and Spectroscopy (3) Lecture, 3 hours. Prerequisite(s): CHEM 113 with a grade of “C” or better. Covers concepts in quantum mechanics with particular applications to spectroscopy.

CHEM 201C. Advanced Physical Chemistry: Elementary Statistical Mechanics (3) Lecture, 3 hours. Prerequisite(s): CHEM 110A and CHEM 110B with grades of “C” or better. Covers concepts in elementary statistical mechanics including ensembles, interpretations of thermodynamic functions, and quantum statistical thermodynamics.

CHEM 201D. Advanced Physical Chemistry: Thermodynamics (3) Lecture, 3 hours. Prerequisite(s): CHEM 110A and CHEM 110B with grades of “C” or better. Covers concepts in thermodynamics including fundamental equations, potentials, Maxwell relations, and stability criteria.

CHEM 201E. Advanced Physical Chemistry: Kinetics (3) Lecture, 3 hours. Prerequisite(s): CHEM 110A and CHEM 110B with grades of “C” or better. Covers concepts in kinetics including reaction mechanisms and the molecular interpretation of reaction dynamics.

CHEM 202. Advanced Instrument Design (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): graduate standing in Chemistry or consent of instructor; consent of instructor of CHEM 202 or both concurrent enrollment in and consent of instructor of CHEM 297 or both concurrent enrollment in and consent of instructor of CHEM 299. Focuses on the technical aspects of design and manufacture of instrumentation for physical chemistry and related fields. Introduces design and simulation software and provides hands-on experience in the realization of advanced instrumentation development projects. Students who complete a project and take the final examination receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade.

CHEM 203. Nanoscale and Nanotechnology (3) Lecture, 3 hours. Prerequisite(s): graduate standing in Chemistry, Physics, Engineering, or a related subject or consent of instructor. Gives a condensed, interdisciplinary overview of selected fields of nanoscience and emerging nanotechnological applications. Special focus is on applications relevant for the campus research community that are not based on electronic applications of silicon.

CHEM 207. Chemical Group Theory (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. The principles of group theory and molecular symmetry. Applications in several areas of chemistry.

CHEM 208. Interdisciplinary Overview of Current Issues in Semiconductor Processing (3) Lecture, 3 hours. Prerequisite(s): graduate standing in Chemistry, Physics, Engineering, or a related subject or consent of instructor. An interdisciplinary overview of present-day semiconductor processing. Introduces topics such as properties of semiconductors, cleanroom environment, epitaxy, ion implantation, etching, lithography, device architecture, testing, and fault detection. May offer field trips. Cross-listed with PHYS 202. Bartels.

CHEM 209 (E-Z). Advanced Topics in Physical Chemistry (2-3) lecture, 2 hours (2 units) or 3 hours (3 units). Prerequisite(s): consent of instructor. Additional prerequisites are required for some segments of this course; see department. Selected advanced topics from modern physical chemistry.

CHEM 210. Advanced Organic Reactions (3) Lecture, 3 hours. Prerequisite(s): CHEM 112C. Covers modern organic reactions and reagents and their mechanistic pathways, with emphasis on recent developments.

CHEM 211A. Advanced Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 112C, CHEM 113. Covers structure and bonding in organic compounds, with emphasis on more advanced aspects of the field.

CHEM 211B. Advanced Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 112C, CHEM 113. Covers the kinetics and mechanism of organic reactions, with emphasis on more advanced aspects of the field.

CHEM 211C. Advanced Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 112C, CHEM 113. Covers synthetic organic chemistry, with emphasis on more advanced aspects of the field.

CHEM 215A. Organic Synthesis (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of synthetic organic chemistry. CHEM 215A is not a prerequisite to CHEM 215B.

CHEM 215B. Organic Synthesis (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of synthetic organic chemistry.

CHEM 216A. Physical Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of physical organic chemistry.

CHEM 216B. Physical Organic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 211A, CHEM 211B, CHEM 211C. An advanced treatment of physical organic chemistry.

CHEM 217. Polymers: Synthesis and Characterization (3) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing in Biochemistry and Molecular Biology, Biology, Chemical and Environmental Engineering, Chemistry, Electrical Engineering, Mechanical Engineering, or Physics or consent of instructor. Introduces fundamentals of polymer synthesis, types of polymers, stereo architectures, and applications. Explores modern methods of synthesis, emphasizing catalytic methods. Describes industrial synthetic methods. Examines polymer physics and characterization, emphasizing physical methods.

CHEM 221A. Advanced Analytical Chemistry: Separation Science (3) Lecture, 3 hours. Prerequisite(s): CHEM 125. Provides an overview of modern analytical separations including theory, instrumentation, and applications.

CHEM 221B. Advanced Analytical Chemistry: Optical Spectroscopy (3) Lecture, 3 hours. Prerequisite(s): CHEM 125. Provides an overview of modern optical spectroscopic techniques including theory, instrumentation, and applications.

CHEM 221C. Advanced Analytical Chemistry: Electrochemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 125. Provides an overview of modern electrochemistry including basic theory, applications, and instrumentation of potentiometry and amperometry.

CHEM 221D. Advanced Analytical Chemistry: Mass Spectroscopy (3) Lecture, 3 hours. Prerequisite(s): CHEM 125. Provides an overview of modern mass spectroscopy including basic theory, instrumentation, and applications. Focus is on biological applications.

CHEM 221E. Advanced Analytical Chemistry: Introduction to Bioanalytical Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 125. Covers important aspects of modern chemical measurements, with particular emphasis on bioanalysis. Discusses analytical challenges associated with drug discovery and development, including analysis of combinatorial libraries, high-throughput screening, metabonomics, genomics, and proteomics, as well as new developments in analytical methods and instrumentation.

CHEM 222 (E-Z). Advanced Topics in Analytical Chemistry (2-3) lecture, 2 hours (2 units) or 3 hours (3 units). Prerequisite(s): consent of instructor. Selected advanced topics from modern analytical chemistry. The contents of these courses will vary. Course may be repeated with different topic (and different letter).

CHEM 231A. Structure and Bonding in Inorganic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 150A, CHEM 150B. Covers advanced synthesis, structure, and bonding in inorganic, coordination, and organometallic chemistry.

CHEM 231B. Reactivity and Mechanism in Inorganic and Organometallic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM 231A. Covers advanced synthesis, reactivity, and mechanism in inorganic, coordination, and organometallic chemistry.

CHEM 231C. Solid State and Materials in Inorganic Chemistry (3) Lecture, 3 hours. Prerequisite(s): CHEM
231A. Covers the advanced synthesis, structure, bonding, and properties of inorganic materials.

CHEM 239 (E-Z). Advanced Topics in Inorganic Chemistry (2-3) Lecture, 2 hours (2 units) or 3 hours (3 units). Prerequisite(s): graduate standing. Prerequisites are required for some segments of this course; see department. Covers selected advanced topics in modern inorganic chemistry. The content of the segments vary.

CHEM 241. Biorganic Chemistry (3) Lecture, 3 hours. Prerequisite(s): BCH 100 or BCH 110A; BCH 184 or CHEM 110B; CHEM 112A, CHEM 112B, CHEM 112C; graduate standing or consent of instructor. Biochemical reactions discussed from a chemical standpoint, including reactions associated with bioenergetics, biosynthesis, and enzyme catalysis. Emphasis on reaction mechanisms. Cross-listed with BCH 241.

CHEM 242. Combinatorial Chemistry and Chemical Genomics (3) Lecture, 3 hours. Prerequisite(s): BIOL 104/BPSC 104, CHEM 112C, or equivalents; a passing grade on the Chemistry Department organic orientation examination. Explores topics in chemical genomics. Part I involves combinatorial principles, library methods, solid-phase and split-pool synthesis, deconvolution, library design and informatics, and parallel synthesis. Part II involves screening and selection systems, forward and reverse chemical genetic approaches, phenocopies and epistasis, preparation and use of molecular arrays, and target identification. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CHEM 244. Airborne Toxic Chemicals (3) Lecture, 3 hours. Prerequisite(s): CHEM 109 or CHEM 110A, and CHEM 110B or CHEM 135/ENSC 135/ENTX 135; or consent of instructor. Atmospheric chemistry of airborne chemicals. Intermedia partitioning. Structure of the atmosphere. Gas-particle distributions of chemicals, and wet and dry deposition of gases and particles. Atmospheric reactions of organic compounds, with emphasis on toxics. Theoretical and experimental methods for determination of atmospheric lifetimes and products of chemicals. Cross-listed with ENTX 244.

CHEM 245. Chemistry and Physics of Aerosols (3) Lecture, 3 hours. Prerequisite(s): CHEM 109, CHEM 110B; or consent of instructor. Fundamentals of chemical and physical processes controlling behavior and properties of airborne particles. Topics include particle mechanics; electrical, optical, and thermodynamic properties; nucleation; surface and aqueous-phase chemistry; gas-particle partitioning; sampling; size and chemical analysis; atmospheric aerosols; and environmental effects. Cross-listed with ENTX 245 and SWSC 245.

CHEM 246. Fate and Transport of Chemicals in the Environment (4) Lecture, 4 hours. Prerequisite(s): CHEM 109 or CHEM 110B; CHEM 112A, CHEM 112B, CHEM 112C; or consent of instructor. Covers the identification of toxics and their sources in the environment; equilibrium partitioning of chemicals in the environment (between air, water, soil, sediment, and biota) using physico-chemical properties; and the transport and chemical transformations of chemical compounds in air, water, and soil media. Includes case studies of fate and transport of selected toxic chemicals. Cross-listed with ENSC 200 and ENTX 200.

CHEM 250. Graduate Seminar in Chemistry (1) Seminar, 1.5 hours. Prerequisite(s): graduate standing. Oral reports by graduate students, faculty, and visiting scholars on current research topics in chemistry. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CHEM 251. Graduate Seminar in Analytical Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate student status. Oral reports and discussion by students, faculty, and visiting scholars on current research topics in analytical chemistry. The course is offered each quarter. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 252. Graduate Seminar in Inorganic Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate student status. Oral reports and discussion by students, faculty, and visiting scholars on current research topics in inorganic chemistry. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 253. Graduate Seminar in Organic Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate student status. Oral reports and discussion by students, faculty, and visiting scholars on current research topics in organic chemistry. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 254. Graduate Seminar in Physical Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate student status. Oral reports and discussion by students, faculty, and visiting scholars on current research topics in physical chemistry. The course is offered each quarter. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 256. Chemistry of Nanostructured Materials (2) Seminar, 2 hours. Prerequisite(s): graduate standing in Chemistry or consent of instructor. Explores the chemistry of nanostructured materials. Introduces nanotechnology, solid state chemistry and physics of nanomaterials, nanoscale characterization tools, lithography, micro- and nanofabrication, physical and chemical methods to nanomaterials, surface modification, sol-gel chemistry, self assembly at various length scales, and bio-inspired materials. Emphasis is on development of novel functional nanstructured materials through chemical synthesis, surface modification, and self-assembly. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 257. Graduate Seminar in Unsaturated Hydrocarbons (2) Seminar, 2 hours. Prerequisite(s): graduate student status. Explores the chemistry of unsaturated hydrocarbons. Emphasis will be placed on the synthesis, properties, and reactivity of unsaturated hydrocarbons.

CHEM 258. Seminar in Surface Science (1) Seminar, 1 hour. Prerequisite(s): graduate standing in Physics or Chemistry or consent of instructor. Oral presentations by participating visiting scholars, postdoctoral researchers, students, and UCR faculty on current research topics in surface science. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with PHYS 258. Zeera

CHEM 259. Bioanalytical Chemistry (2) Seminar, 2 hours. Prerequisite standing in Chemistry or consent of instructor. Explores bioanalytical separation and detection techniques. Topics include liquid chromatography, capillary electrophoresis, field flow fractionation, flow cytometry, multidimensional or multiplexed chromatography, microfluidics, mass spectrometry, biological sample preparation, and biosensors. Emphasis is on development of new bioanalytical techniques for detection of pathogens and study of pathogen-host interactions. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Zhong

CHEM 261. Scanning Probe Microscopy in Surface Science (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Focuses on theory and applications of scanning probe microscopy in surface science, including the use of scanning tunneling microscopy to image surfaces on the atomic and molecular length scale, and scanning probe techniques to investigate and control elementary steps of surface reactions. Reviews surface crystallography, electronic, and phononic band structure. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Bartels

CHEM 262. Ultrafast Dynamics in Condensed Matter (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. The extremely fast relaxation and dephasing of nuclear (vibrational) and electronic excitations in condensed matter are probed by the use of coherent spectroscopy (sub-picosecond) light pulses. Decay mechanisms are studied by making spectroscopic measurements at cryogenic temperatures (approximately 1K) and at various high pressures (greater than 100 Kbar). Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade based on seminar participation. Course is repeatable. Reed

CHEM 265. Raman Spectroscopy of Biological Systems (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Applications of Raman spectroscopy to the study of the structure and function of biological membranes and membrane proteins. Emphasis will be placed on resonance enhanced Raman scattering, including the theoretical origins of resonance enhancement. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Bocian

CHEM 267. Organic Electronic Materials (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. A study of design, synthesis, purification, manufacture, and application of carbon-based electronic materials. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with CEE 254. Haddon

CHEM 269. New Trends in Main Group Chemistry (2) Seminar, 2 hours. Prerequisite(s): senior or graduate standing in Chemistry or consent of instructor. A study of design, synthesis, purification, manufacture, and application of carbon-based electronic materials. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BCH 269. Haddon

CHEM 29. Advanced Topics in Inorganic Chemistry (2-3) Lecture, 2 hours (2 units) or 3 hours (3 units). Prerequisite(s): graduate standing. Requires are required for some segments of this course; see department. Covers selected advanced topics in modern inorganic chemistry. The content of the segments vary.
CHEM 270. Theoretical Quantum Chemistry: Methods and Applications (2) Seminar, 2 hours. Prerequisite(s): graduate standing in Chemistry or consent of instructor. Explores topics in computational quantum chemistry relevant to both wave function and density functional theories. Emphasizes new computational algorithms and physical approximations that can be used to accelerate calculations and the applications of these methods to solve chemical problems. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Beran

CHEM 271. Design, Synthesis, and Applications of Highly Conjugated Organic Systems (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on the design and synthesis of highly conjugated organic molecules and polymers for application in molecule-based devices such as sensors, light emitting diodes, and conductors. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Marsella

CHEM 272. Gaseous Ion Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate standing in Chemistry or consent of instructor. Surveys all aspects of ion chemistry in the gas phase. Topics include mass spectrometry, ion mobility, electrospray ionization, matrix-assisted laser desorption ionization, ion-molecule reactions, ion-ion reactions, quantum calculations, instrumentation, and photodissociation spectroscopy. Emphasis is on bioanalytical applications for the study of protein structure, folding, and assembly. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Julian

CHEM 273. Bioanalytical Nuclear Magnetic Resonance Spectroscopy (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Development of Pulse Fourier transform NMR techniques and their application to the characterization of peptides, proteins and intact cells. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. May be repeated for credit. Rabenstein

CHEM 274. Chemical Biology (2) Seminar, 2 hours. Prerequisite(s): senior or graduate standing in Chemistry or consent of instructor. Involves formal presentations by graduate students on topics in the current literature and their research. Presentation responsibilities rotate among enrolled students and postdoctoral fellows. Also entails team work on problem sets and oral presentation of solutions. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Switzer

CHEM 275. Bioorganic Chemistry of Nucleic Acids (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. The design, synthesis, and evaluation of nucleotides with novel hydrogen-bonding capabilities as well as oligonucleotides capable of regulating gene expression. Discussion of ribonuclease acid catalysis, including possible catalytic functions that have not yet been determined. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Pirring

CHEM 277. Surface Chemistry (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Discussions for new advances in surface science, concentrating mainly on the use of molecular level. Letter grades will be assigned to students who present a paper; others will be graded Satisfactory (S) or No Credit (NC). May be repeated for credit. Zaera

CHEM 278. Nuclear Magnetic Resonance: Theory, Techniques, and Applications (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on the development of solid-state and liquid-state nuclear magnetic resonance (NMR) as a probe of molecular structure, function, and dynamics with applications that range from chemistry to physics and biology. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade based on seminar participation. Course is repeatable. Mueller

CHEM 279. Molecular Spectroscopy (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Properties of excited states of molecules. Molecular photophysics and photochemistry. Theory of radiationless transitions. Kinetics and mechanism of excited state decay. Laser spectroscopy. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. May be repeated for credit. Scott

CHEM 280. Chemistry and Biochemistry of Gaseous Molecules (2) Lecture, 1 hour; discussion, 1 hour. Prerequisite(s): consent of instructor. Reactions and properties of organic compounds and ions in the absence of bulk media. Preparative mass spectrometry and ion-molecule reactions. Molecular mechanisms in the sense of smell. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. May be repeated for credit. Morton

CHEM 281. Interface between Heteroatom and Transition Metal Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate standing in Chemistry or consent of instructor. Discusses heteroatom chemistry as a source of new ligands for transition metal chemistry and applications in catalysis and material science. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Mathey

CHEM 282. Elementary Processes in Atmospheric Chemistry (2) Seminar, 2 hours. Prerequisite(s): graduate standing in Chemistry or consent of instructor. Applies state-of-the-art laser techniques to investigate elementary processes in atmospheric chemistry. Emphasis is on quantitative understandings of atmospheric free-radical intermediates, their photochemistry, and their reaction mechanisms. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Zhong

CHEM 283. Development of Inorganic Solid State Materials (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Focuses on the development of advanced materials such as optical, electronic, and porous materials. Topics include synthetic methods, characterization techniques, property measurements, and device applications. Special emphasis is placed on the design of synthetic strategies for the discovery of new functional materials with novel properties. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade based on seminar participation. Course is repeatable. Feng

CHEM 284. Biological Mass Spectrometry (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. A study of the synthesis, purification, and mass spectrometric characterization of biomolecules, nucleic acids in particular. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 285. Bio-inspired Materials and Chemical Sensors (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. A study of bio-materials and their application in analytical chemistry. Focus is on the design and synthesis of new materials, electrochemical detection, and the Surface Plasmon Resonance (SPR) technique. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 286. Time-Resolved Spectroscopy and Microscopy and Dynamics in Complex Systems (2) F, W, S Seminar, 2 hours. Prerequisite(s): senior or graduate standing in Chemistry or consent of instructor. A comprehensive survey of modern time-resolved spectroscopy and microscopy techniques. Emphasizes applications to outstanding problems in materials science and biology. Specific problems include the measurement of energy transport in organic semiconductors and DNA dynamics in biological media. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Bardeen

CHEM 288. Bioanalytical Applications of Nuclear Magnetic Resonance (NMR) and Mass Spectrometry (MS) (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Focuses on the study of ligand-protein interactions, metabonomics, with special emphasis on the application of hyphenated NMR and MS experiments. Also discusses new NMR pulse sequences and microcoil probes. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

CHEM 289. Special Topics in Neuroscience (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. An interdisciplinary seminar consisting of student presentations and discussion of selected topics in neuroscience. Content and instructor(s) vary each time course is offered. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BCH 289, BIOL 289, ENTM 289, NRRSC 289, and PSY 289. Hatton in charge

CHEM 297. Directed Research (1-6) Prerequisite(s): consent of a staff member. Research in analytical, inorganic, organic, or physical chemistry under the direction of a member of the staff. A written report is required of the research study. Graded Satisfactory (S) or No Credit (NC).

CHEM 299. Research for Thesis or Dissertation (1-12) Prerequisite(s): consent of a staff member. Research in analytical, inorganic, organic, or physical chemistry under the direction of a member of the staff. This research is to be included as part of the dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

CHEM 301. Oral Presentations in Chemistry (1) Lecture, 1 hour. The technique of oral presentation, emphasizing the problems that arise in chemistry laboratory and classroom situations. Designed primarily for new graduate students in the Chemistry Department. Graded Satisfactory (S) or No Credit (NC).
The Chicano Bilingual-Bicultural Studies Minor

College of Humanities, Arts, and Social Sciences

Adalberto Aguirre, Jr., Ph.D., Chair
Office, 1225 Watkins Hall
(951) 827-5507; chicanobbstudies.ucr.edu

Committee in Charge
Philip Gercke, Ph.D. (Spanish and Portuguese)
Alfredo M. Miranda, Ph.D. (Ethnic Studies)
Yolanda Venegas, Ed.D.
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Chicano Bilingual-Bicultural Studies minor provides the student with a basic understanding of the Spanish language and of the Mexican American bicultural contacts in which that language is used in the southwestern United States.

1. Lower-division requirements (8 units)
   a) Four (4) units from ETST 002, ETST 004/HIST 004
   b) Four (4) units from one of the following:
      (1) SPN 006
      (2) Any upper-division course taught in Spanish language

2. Upper-division requirements (16 units)
   a) One course in the general area of Education and Bilingualism from ETST 146/EDUC 146, ETST 163/SOC 163, ETST 165/SOC 165, ETST 166
   b) One course from the general area of Societal Perspectives on the Chicano Experience ETST 142
   c) One course from ETST 123, ETST 124, ETST 126, ETST 128/SOC 128
   d) One course in Chicano Art or Literature from ETST 108P, ETST 114, ETST 153/LNST 153, ETST 191N

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Comparative Literature and Foreign Languages

College of Humanities, Arts, and Social Sciences

Thomas F. Scanlon, Ph.D., Chair
Department Office, 2402 Humanities and Social Sciences
(951) 827-1462; complitforlang.ucr.edu

Professors
David K. Danow, Ph.D. Russian/Comparative Literature
Stephanie B. Hammer, Ph.D. Germanic Studies/Comparative Literature
Eugene Perry Link, Ph.D., Eminent Scholar, Chinese Literature, Language and Culture
Hendrik M.J. Maier, Ph.D. Literature of Southeast Asia and Indonesia/Comparative Literature
Lisa A. Raphals, Ph.D. Chinese/Comparative Literature
Thomas F. Scanlon, Ph.D. Classics/Comparative Ancient Civilizations/Comparative Literature
Marguerite Walker, Ph.D. Italian/Comparative Literature (Women’s Studies/Comparative Literature and Foreign Languages)
Yenna Wu, Ph.D. Chinese/Civilizations/Comparative Literature

Professors Emeriti
Anastasius C. Bandy, Ph.D. Classics
Sam J. Borg, Ph.D. French
Donald G. Daviau, Ph.D. Germanic Studies
Henry W. Decker, Ph.D. French
Robert B. Griffin, Ph.D. Comparative Literature/French
Reinhold Grimm, Ph.D. Comparative Literature/German Studies
Georg M. Gugelberger, Ph.D. Comparative Literature
Jules F. Levin, Ph.D. Linguistics/Russian
Elid Martínez, Ph.D. Comparative Literature (Comparative Literature and Foreign Languages/Creative Writing)
Louis A. Pedrotti, Ph.D. Russian
Josef Purkart, Ph.D. Germanic Studies
Lubomir Radotycz, M.A. Russian/Comparative Literature
George E. Slusser, Ph.D., Emeritus, Comparative Literature
Ben F. Stoltzfus, Ph.D., Litt.D. Comparative Literature/French (Comparative Literature and Foreign Languages/Creative Writing)

Associate Professors
Michelle E. Bloom, Ph.D. Comparative Literature/French
Theda Shapiro, Ph.D. French/Comparative Literature
Yang Ye, Ph.D. Chinese/Comparative Literature

Assistant Professors
Heidi Brevik-Zender, Ph.D, French/Comparative Literature
Sabine Doran, Ph.D. European Literature/Comparative Literature
Kelly Jeong, Ph.D. Korean Literature and Culture
John N. Kim, Ph.D. German/Japanese/Comparative Literature
Manami Beasi Lam, Ph.D. Comparative Literature/Vietnamese
Margherita Long, Ph.D. Japanese/Comparative Literature

Lecturers
Hanjua, Ph.D. Chinese
Jingsong Chen, Ph.D. Chinese
Christine Duverge, Ph.D. French
Yoshiko T. Hain, M.A. Japanese
Young Hong, Ph.D. Korean
Shuliang Hsu, M.A. Chinese
Benjamin King, Ph.D. Classics
Bochunyu Lee, Ph.D. Korean
Nicoletta Tinozzi Mehrmand, Ph.D. Italian
Kim Dzung Pham, M.A. Vietnamese
Jennifer Ramos, M.A. French
Wendy J. Raschke, Ph.D. Classics/Comparative Literature/Comparative Ancient Civilizations
K. Sagawa, M.A. Japanese
R. Safa, M.A. Japanese
Cheryl Tarantino, M.A. Italian/French
Sabine Thueneuechter, Ph.D. German/Comparative Literature
Kalle Truby, Ph.D. French
Heidi Waltz, Ph.D. Linguistics/German Studies
Ekaterina Yudina, Ph.D. Russian

Majors
The Department of Comparative Literature and Foreign Languages offers courses and degree programs in Western and non-Western national literatures, languages, and civilizations. It also has programs in Comparative Literature, Comparative Ancient Civilizations, and Linguistics. The department believes in the importance of offering fundamental training in the humanities in their own literary and linguistic contexts as well as in their cultural and inter-disciplinary dimensions. Accordingly, students may obtain degrees or take courses in a specialized field, while at the same time enhancing the breadth of their education within and outside of the department.

The department offers the following majors leading to the B.A. degree.

Asian Literatures and Cultures
The B.A. degree in Asian Literatures and Cultures offers a diverse, flexible program for students interested in the study of Asian languages, cultures, and literatures. Under this heading, students can choose either the Chinese or Japanese track.

Classical Studies
The B.A. in Classical Studies combines the study of Greek and/or Latin language and literature with courses which explore the historical, philosophical, political, and cultural developments of Greece and Rome and their impact on Western civilization. The department is a joint member of the UC Tri-Campus Graduate Program in Classics (UCI, UCR, UCSD), which offers M.A. and Ph.D. degrees in Classics.

Jeffrey Sacks, Ph.D. Arabic Literature/Comparative Literature
Annmaria Shimabuku, Ph.D. Japanese Literature and Culture

**
Comparative Ancient Civilizations
For the B.A. in Comparative Ancient Civilizations, students employ the methods of humanities and social sciences in the comparison study of several major cultures of the past. They acquire skills of historical and social analysis, multicultural awareness, and insight into constructions of civilizations in general.

Comparative Literature
The department offers the B.A. degree in Comparative Literature and the M.A. and Ph.D. graduate degrees.

While students majoring in Comparative Literature must have a knowledge of the languages involved in the literatures of their choice, Comparative Literature courses themselves are open to all students. All work is done in translation and the courses are given in English.

French, Germanic Studies, and Russian Studies
The B.A. degree is offered in French, Germanic Studies, and Russian Studies. Requirements for degrees include proficiency in the language of the literature.

(a) The Literature Option is available for majors in French
(b) The Civilization Option is available for majors in French. Civilization studies are concerned with the culture of the language or literature of a student's focus, and with the people of the country where that language or literature exists or existed. Specific requirements for the various civilization options are listed under French.

Language
The Language Major allows a student to specialize in two or three foreign languages through a knowledge not only of the languages themselves but also of the bases of language (linguistics), examples of their creative use (literature), and the cultures which they reflect (civilization).

Linguistics
A B.A. in Linguistics is available through a program administered by an interdepartmental committee. Some foreign language study is essential for specialization in this discipline, as well as the pursuit of research projects and other kinds of practical work in linguistic-related areas.

Other Course Work
The department also offers course work in Asian literature, Chinese (language, literature, and culture), Civilization, Italian (language and literature), Japanese (language, literature, and culture), Korean (language), Tagalog (language), Vietnamese (language, literature, and culture), and World Literature.

Graduate Degrees
Comparative Literature (interliterary) M.A.
Comparative Literature (interliterary or interdisciplinary) Ph.D.
UC Tri-Campus Graduate Program in Classics M.A. and Ph.D.

Teaching Assistantships and Fellowships
Teaching assistantships and fellowships are available. Teaching assistants are normally held for CPLT 301 (Teaching of Foreign Language at the College Level). Course work and/or teaching experience at another college-level institution may be accepted in fulfillment of this requirement.

Teaching Credential Preparation Programs
Details and counseling on the Bridge to Teaching Program, a program for the multiple subjects teaching credential, are available in the Office of Interdisciplinary Programs, 2417 Humanities and Social Sciences, (951) 827-2742. Details and counseling on other programs are available in the Graduate School of Education.

Education Abroad Program
The EAP is an excellent opportunity to become deeply familiar with another country and its culture while earning academic units towards graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR's International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
Requirements for the majors and courses offered are described in the following sections.

Arabic Language
Arabic Literatures and Cultures
Asian Literatures and Cultures
Chinese
Japanese
Korean
Southeast Asian Studies
Tagalog
Vietnamese

Comparative Ancient Civilizations
Comparative and World Literature
French
Germanic Studies
Italian Studies
Language
Linguistics
Literatures and Languages
Russian Studies

Arabic Language

Foreign Language Placement Examination
A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placementtest.ucr.edu for date and time. Transfer students who have taken a college-level language course cannot take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Lower-Division Courses

ARBC 001. Elementary Arabic (4) Lecture, 4 hours.
Prerequisite(s): Student must take the Arabic placement examination or obtain the consent of the instructor. An introduction to modern standard Arabic, with attention to the development of the four language skills: listening, speaking, reading, and writing. Also introduces aspects of Arabic cultures. Classes conducted primarily in Arabic.

ARBC 002. Elementary Arabic (4) Lecture, 4 hours.
Prerequisite(s): ARBC 001 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Arabic placement examination as determined by the department faculty or consent of instructor. An introduction to modern standard Arabic, with attention to the development of the four language skills: listening, speaking, reading, and writing. Also introduces aspects of Arabic cultures. Classes conducted primarily in Arabic.

ARBC 003. Elementary Arabic (4) Lecture, 4 hours.
Prerequisite(s): ARBC 002 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Arabic placement examination as determined by the department faculty or consent of instructor. An introduction to modern standard Arabic, with attention to the development of the four language skills: listening, speaking, reading, and writing. Also introduces aspects of Arabic cultures. Classes conducted primarily in Arabic.
Arabic Literatures and Cultures

Foreign Language Placement Examination A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placement test ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Lower-Division Courses

ARLC 001. Introduction to Arabic Literatures and Cultures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to Arabic literatures and cultures. Focuses on the close reading of texts, specifically on language and rhetoric. Examines texts from the major periods (classical and modern) and modes of writing (poetry, literature, history, the novel, the law, and philosophy).

Upper-Division Courses

ARLC 120. Classical Arabic Literary Prose (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores aspects of classical Arabic literary prose. Includes the modes of quotation, citation, falsification, fabrication, and forgery. Focuses upon selected writings of al-Hamadhai, al-Jahiz, al-Ma’arri, Ibn Tufayl, and Ibn Hazim.

ARLC 151. Palestine/Algeria (4) Lecture, 3 hours; extra reading, 24 hours per quarter; screening, 6 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. Considers two distinct and related literary and historical moments—Palestine and Algeria. Topics include the relations between language and context; literature and literary historiography; genre and idiom; violence and the body; and the state and institutional practices of reading. Cross-listed with CPLT 151.

ARLC 152. Modern Arabic Poetry in a Multilingual Frame (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers selected writings of Adunis (’Ali Ahmed Sa’id), Mahmoud Darwish, Abdelatif La’abi, and Eiel Adnan, published originally in Arabic, French, and English. Topics include language (idiom, statement, utterance, translation, repetition, rhythm) and history (loss, violence, mourning, inheritance, future, legacy). Course is taught in English. Cross-listed with CPLT 152.

Asian Literatures and Cultures

Subject abbreviations: CHN, JPN, KOR, SEAS, TAG, VNM

Committee in Charge

Yenna Wu, Ph.D., Chair, Chinese/Civilizations/Comparative Literature
Kelly Jeong, Ph.D. Korean Literature and Culture
John N. Kim, Ph.D., German/Japanese/Comparative Literature
Mariam Beevi Larm, Ph.D. Vietnamese/Comparative Literature
Margherita Long, Ph.D. Japanese/Comparative Literature
Perry Link, Ph.D. Chinese Literature, Language and Culture
Hendrik M.J. Maier, Ph.D. Southeast Asian Literature/Comparative Literature
Lisa Raphael, Ph.D. Chinese/Comparative Literature
Anmariia Shimabuku, Ph.D. Chinese Literature and Culture
Yang Ye, Ph.D. Chinese/Civilizations/Comparative Literature
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major

The Asian Literatures and Cultures Major offers a diverse and flexible program for students interested in the study of Asian languages, cultures, and literatures. While language proficiency and some courses in literature or culture are required, students have considerable freedom within the major to make course selections based on their own areas of interest. Students may either study a national literature in depth in the original language or focus more broadly on culture, history, and literature using texts in English translation. They may also choose to concentrating on one national literature and cultural tradition or including other Asian literatures and cultures. The major is flexibly interdisciplinary, giving students the opportunity to combine courses from different UCR departments (e.g., Art, History, History, Religious Studies) as appropriate for their field of study.

Chinese Track (44 units)

1. Lower-division requirements (8 units plus language proficiency)
   a) Proficiency in Chinese through the intermediate level (CHN 006 or its equivalent)
   b) Eight (8) units from lower-division lecture courses on Chinese literature and culture: AST 030/CHN 030, AST 040/CHN 040, AST 046/CHN 046, AST 048/CHN 048. Four (4) units can be from other courses on Asian literature and culture from the department as well as China-related courses from other departments (with adviser’s consent).

2. Upper-division requirements (36 units)
   a) Sixteen (16) units in Chinese language from CHN 101A, CHN 101B, CHN 101C, CHN 105, CHN 108, CHN 110 (E-Z), CHN 115 (E-Z)
   b) Twelve (12) units in Chinese literature and culture from CHN 104, CHN 105, AST 107/CHN 107/RLST 107, CHN 108, CHN 110 (E-Z), CHN 115 (E-Z), AST 135/CHN 135, AST 136/CHN 136, AST 142/CHN 142, CPLT 142E/WMST 142E, AST 148/CHN 148, AST 185/CHN 185/MCS 169, CHN 190
   c) Eight (8) units in Asian literatures and cultures: can be chosen from all the upper-division lecture courses on Asian literature and culture from the department as well as China-related upper-division courses from other departments (with adviser’s consent), including the courses listed under (b).

Japanese Track (44 units)

1. Lower-division requirements (8 units plus language proficiency)
   a) Proficiency in Japanese through the intermediate level (JPN 006 or its equivalent)
   b) Eight (8) units from lower-division lecture courses on Japanese literature and culture: AST 022/JPN 022, AST 032/JPN 032, AST 034/JPN 034, JPN 035. Four (4) units can be from other lower-division lecture courses on Asian literature and culture from the department as well as Japan-related lower-division courses from other departments (with adviser’s consent).

2. Upper-division requirements (36 units)
   a) Twelve (12) upper-division units in Japanese language from JPN 101A, JPN 101B, JPN 101C, JPN 110
   b) Twelve (12) units in upper-division Japanese literature and culture from JPN 110, CPLT 142J/WMST 142J, JPN 150/AST 150, JPN 151/JPN 151, AST 152 (E-Z)/JPN 152 (E-Z), AST 153 (E-Z)/JPN 153 (E-Z), AST 154 (E-Z)/JPN 154 (E-Z), AST 184/MCS 184/JPN 184, AST 190, JPN 190
   c) Twelve (12) units in Asian literatures and cultures: can be chosen from all the upper-division lecture courses on Asian literature and culture from the department as well as Japan-related upper-division courses from other departments (with adviser’s consent), including the courses listed under (b).

Minor

The Asian Literatures and Cultures minor provides students with the opportunity to enhance their knowledge of Asian languages, cultures, and literatures.
Chinese Track (24 units)

1. Lower-division requirements (4 units plus language proficiency)
   a) Proficiency in Chinese through the intermediate level (second year)
   b) Four (4) units from lower-division lecture courses on Chinese literature and culture: AST 030/CHN 030, AST 040/CHN 040, AST 046/CHN 046, AST 048/CHN 048

2. Upper-division requirements (20 units)
   a) Eight (8) upper-division units in Chinese language from CHN 101A, CHN 101B, CHN 101C, CHN 105, CHN 108, CHN 110 (E-Z), CHN 115 (E-Z)
   b) Eight (8) units from lower-division lecture courses on Asian literature and culture: CHN 110C, CHN 113, CHN 136/CHN 136, CHN 142/CHN 142, CHN 142E/CHN 142E, CHN 148, CHN 185/CHN 185/MCS 169, CHN 190
   c) Four (4) units in Asian literatures and cultures: can be chosen from all the upper-division lecture courses on Asian literature and culture from the department as well as China-related upper-division courses from other departments (with adviser's consent), including the courses listed under (b).

Japanese Track (24 units)

1. Lower-division requirements (4 units plus language proficiency)
   a) Proficiency in Japanese through the intermediate level (JPN 006 or its equivalent)
   b) Four (4) units from lower-division lecture courses on Japanese literature and culture: JPN 101A, JPN 101B, JPN 101C, JPN 110

2. Upper-division requirements (20 units)
   a) Eight (8) upper-division units in Japanese language from: JPN 101A, JPN 101B, JPN 101C, JPN 110
   b) Eight (8) units in Japanese literature and culture from: JPN 110, CPTL 142/AST 142/CHN 142/WMST 142, JPN 150/AST 150, JPN 151/CHN 151, JPN 152 (E-Z)/CHN 152 (E-Z), JPN 153 (E-Z)/AST 153 (E-Z)/CHN 153 (E-Z), JPN 154 (E-Z)/CHN 154 (E-Z), JPN 184/MCS 184/JPN 184, JPN 190
   c) Four (4) units in Asian literatures and cultures: can be chosen from all the upper-division lecture courses on Asian literature and culture from the department as well as Japan-related upper-division courses from other departments (with adviser's consent), including the courses listed under (b).

Southeast Asian Track (24 units)

1. Lower-division requirements (8 units plus language proficiency)
   a) Proficiency in one of the Southeast Asian languages (Vietnamese/Indonesian/Tagalog) through the first-year level
   b) Eight (8) units from lower-division lecture courses on Southeast Asian literature and culture: AST 062/CPTL 062, AST 063/CPTL 063, AST 064/WMST 064, AST 065

2. Upper-division requirements (20 units)
   a) Eight (8) units in Chinese literature and culture from: JPN 110C, CHN 113, CHN 136/CHN 136, CHN 142/CHN 142, CHN 142E/CHN 142E, CHN 148, CHN 185/CHN 185/MCS 169, CHN 190
   b) Eight (8) units in Chinese literatures and culture: can be chosen from all the upper-division lecture courses on Chinese literature and culture as well as China-related upper-division courses from other departments (with adviser's consent), including the courses listed under (b).
   c) Four (4) units in Asian literatures and cultures: can be chosen from all the upper-division lecture courses on Asian literature and culture from the department as well as China-related upper-division courses from other departments (with adviser's consent), including the courses listed under (b).

Chinese Courses

Foreign Language Placement Examination
A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placement-test.ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Lower-Division Courses

CHN 001. First-Year Chinese (4) Lecture, 4 hours. Prerequisite(s): Student must take the Chinese placement examination or obtain the consent of the instructor. An introduction to the sound system and grammar of Chinese, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes are conducted in Chinese as much as possible. Audio-lingual learning materials are available in the language laboratory. Credit is awarded for only one of the following sequences: CHN 001, CHN 002, CHN 003, and CHN 004; CHN 001, CHN 002, and CHN 020B; CHN 020A and CHN 020B.

CHN 002. First-Year Chinese (4) Lecture, 4 hours. Prerequisite(s): CHN 001 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Chinese placement examination as determined by the department faculty or consent of instructor. An introduction to the sound system and grammar of Chinese, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes are conducted in Chinese as much as possible. Audio-lingual learning materials are available in the language laboratory. Credit is awarded for only one of the following sequences: CHN 001, CHN 002, CHN 003, and CHN 004; CHN 001, CHN 002, and CHN 020B; CHN 020A and CHN 020B.

CHN 003. First-Year Chinese (4) Lecture, 4 hours. Prerequisite(s): CHN 002 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Chinese placement examination as determined by the department faculty or consent of instructor. An introduction to the sound system and grammar of Chinese, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes are conducted in Chinese as much as possible. Audio-lingual learning materials are available in the language laboratory. Credit is awarded for only one of the following sequences: CHN 001, CHN 002, CHN 003, and CHN 004; CHN 001, CHN 002, and CHN 020B; CHN 020A and CHN 020B.

CHN 004. Second-Year Chinese (4) Lecture, 4 hours. Prerequisite(s): CHN 003 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Chinese placement examination as determined by the department faculty or consent of instructor. Continued development of the four skills: understanding, speaking, reading, and writing. Classes are conducted primarily in Mandarin. Credit is awarded for only one of the following sequences: CHN 001, CHN 002, CHN 003, and CHN 004; CHN 001, CHN 002, and CHN 020B; CHN 020A and CHN 020B.

CHN 005. Second-Year Chinese (4) Lecture, 4 hours. Prerequisite(s): CHN 004 or CHN 020B or equivalent or a sufficiently high test score on the Chinese placement examination as determined by the department faculty or consent of instructor. Continued development of the four skills: understanding, speaking, reading, and writing. Classes are conducted primarily in Mandarin.

CHN 006. Second-Year Chinese (4) Lecture, 4 hours. Prerequisite(s): CHN 005 or equivalent or a sufficiently high test score on the Chinese placement examination as determined by the department faculty or consent of instructor. Continued development of the four skills: understanding, speaking, reading, and writing. Classes are conducted primarily in Mandarin.

CHN 020A. First-Year Chinese for Heritage Learners (4) Lecture, 4 hours. Prerequisite(s): Student must take the Chinese placement examination or obtain the consent of the instructor. A first-year Mandarin Chinese course specially designed for Mandarin heritage learners who have some proficiency in listening comprehension and speaking but are unable to read and write. Credit is awarded for only one of the following sequences: CHN 001, CHN 002, CHN 003, and CHN 004; CHN 001, CHN 002, and CHN 020B; CHN 020A and CHN 020B.
CHN 020B. First-Year Chinese for Heritage Learners (4) Lecture, 4 hours. Prerequisite(s): CHN 002 with a grade of "C"- or better or CHN 020A with a grade of "C"- or better or equivalent or a sufficiently high test score on the Chinese placement examination as determined by the department faculty or consent of instructor. A first-year Mandarin Chinese course specially designed for Mandarin heritage learners who have some proficiency in listening comprehension and speaking but are unable to read and write. Credit is awarded for only one of the following sequences: CHN 001, CHN 002, CHN 003, and CHN 004; CHN 001, CHN 002, and CHN 020B; CHN 020A and CHN 020B.

CHN 030. Introduction to Chinese Civilization (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): none. An introduction to Chinese civilization through an interplay of philosophical, historical, religious, and literary readings from the ancient times through the modern age. Uses audiovisual media. All work is in English. Cross-listed with AST 030. Ye

CHN 040. Masterworks of Chinese Literature (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. Reading and discussion of selected great works of Chinese literature (in English translation) with attention to cultural contexts. Various critical methods and approaches are used. Cross-listed with AST 040. Wu, Ye

CHN 046. Responses to Political Repression in Modern Chinese Literature and Film (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An examination of the various responses to political repression in China over the course of the twentieth century through selected literary and artistic representations. Cross-listed with AST 046.

CHN 048. Chinese Cinema (4) Lecture, 2 hours; discussion, 1 hour; screening, 2 hours; outside research, 1 hour. Prerequisite(s): none. Study of selected films from China and Taiwan with attention to cultural context. Questions addressed may include the following: What do we look for in a film? What are the film's interrelations with theatre, photography, and literature? How do we understand the film as an art form? Cross-listed with AST 048. Ye

CHN 090. Special Studies (1-5) Individual study, 3-15 hours. To be taken with the consent of the Chair of the Department as means of meeting special curricular problems in either language or literature. Course is repeatable.

Upper-Division Courses

CHN 101A. Third-Year Chinese (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): CHN 006 or equivalent or consent of instructor. Further development of the four skills: understanding, speaking, reading, and writing; with an emphasis on reading and writing. Classes conducted in Mandarin.

CHN 101B. Third-Year Chinese (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): CHN 101A or equivalent or consent of instructor. Further development of the four skills: understanding, speaking, reading, and writing; with an emphasis on reading and writing. Classes conducted in Mandarin.

CHN 101C. Third-Year Chinese (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): CHN 101B or equivalent or consent of instructor. Further development of the four skills: understanding, speaking, reading, and writing; with an emphasis on reading and writing. Classes conducted in Mandarin.

CHN 104. Introduction to Classical Chinese Texts (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): CHN 003 or equivalent or consent of instructor. Introduction to classical Chinese philosophical and historical texts. Readings of primary source materials and analysis of grammar and usage. Class is conducted in English.

CHN 105. Classical Chinese Prose (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): CHN 101C. Close reading of selected texts from the Han and pre-Han period, chosen to illustrate the main features of the Chinese Ku-wen (classical prose). Ye

CHN 107. Taoist Traditions (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AST 030/CHN 030 or upper-division standing or consent of instructor. A survey of the ancient mystical and philosophical aspects of Taoism as well as the living religious tradition, their relationships to each other, and their expression in Chinese culture and civilization. Topics include the Tao Te Ching, the Chuang-tzu, the Taoist canon, meditation, immortality, alchemy, and ritual. Cross-listed with AST 107 and RLST 107. Raphals

CHN 108. Introduction to Classical Chinese Poetry (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): CHN 101C or equivalent or consent of instructor. Reading and explication of representative texts in various genres and forms, chosen to illustrate the development of classical Chinese poetry from its origin through the premodern age. Classes are conducted primarily in Chinese. Ye

CHN 110 (E-Z). Readings in Twentieth-Century Chinese Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): CHN 101C or equivalent or consent of instructor. Representative works of major authors. Readings and discussions are conducted in Chinese. E: Contemporary Chinese Fiction; M: Modern Chinese Fiction; S: Modern Chinese Poetry; W: Modern Chinese Prose. Wu, Ye

CHN 115 (E-Z). Readings in Thirteenth- to Nineteenth-Century Chinese Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): CHN 101C or equivalent or consent of instructor. Vernacular literature from the Yuan to the Qing dynasties. Readings and discussions are conducted in Chinese. G: Honglou meng; M: Ming Novel; Q: Qing Novel; S: The Short Story; Y: Yuan Drama. Wu

CHN 131. Readings in the Origins of Science in China and Greece (4) Lecture, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the ancient scientific traditions of China and Greece and compares to modern scientific categories. Includes ideas about nature, the body, and systematic accounts of the natural world. Cross-listed with AST 131, CLA 131, and CPAC 131.

CHN 132. Medical Traditions in China and Greece (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative examination of the early development of Western medical traditions in classical Greece and the origins and development of the Chinese medical systems now referred to as traditional Chinese medicine, with specific attention to their cultural and social contexts. Cross-listed with AST 132, CLA 132, and CPAC 132.

CHN 135. Great Novels of China (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative examination of the early development of Western medical traditions in classical Greece and the origins and development of the Chinese medical systems now referred to as traditional Chinese medicine, with specific attention to their cultural and social contexts. Cross-listed with AST 135. Wu

CHN 136. Family and Gender in the Chinese Short Story (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines a broad array of short stories from the Tang to the Qing dynasties (approximately ninth to eighteenth century). Investigates love, marriage, family, gender dynamics, and the representation of women in Chinese literature. No knowledge of Chinese required. Cross-listed with AST 136. Wu

CHN 141. Militarism and Hegemony in the Ancient World (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative study of ancient warfare and hegemony in two or more civilizations of the ancient world. Perspectives may include social and political contexts, gender and war, acquisition of empire, religious wars, and weapons, strategies and tactics in theory and practice. Study of primary source material in texts and visual arts. Cross-listed with AST 145, CLA 141, CPAC 141, and POSC 140.

CHN 142. Chuang-tzu (4) Lecture, 1 hour; discussion, 2 hours; outside research, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): RLST 005 or RLST 006 or AST 107/CHN 107/CLST 107 or consent of instructor. An examination of chaos, epistemological and linguistic relativism, fate, skill, and the character of the sage in perhaps the most significant of Chinese Taoist texts, the Chuang-tzu. Discussion of the structure and style of this literary masterpiece. Students with knowledge of classical Chinese may arrange additional work through special studies. Cross-listed with AST 142 and RLST 142. Nylitray

CHN 148. Chinese Poetry and Poetics in Translation (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examination of traditional Chinese poetry through the study of selected major texts, emphasizing forms, themes, and Chinese poetics in its close relation to the development of Chinese literature. Classes are conducted in English. Cross-listed with AST 148. Ye

CHN 185. New Chinese Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of representative films from the People's Republic of China, with a focus on those made during the last decade. Conducted in English; most films have English subtitles. Cross-listed with AST 185 and MCS 169. Ye

CHN 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing or consent of instructor. To be taken with the consent of the Chair of the Department as a means of meeting special curricular problems in either language or literature. Course is repeatable.

CHN 195. Senior Thesis (2-4) Thesis, 6-12 hours. Prerequisite(s): senior standing; consent of instructor. Individual research and preparation of a thesis completed under the supervision of a faculty member. Course is repeatable to a maximum of 12 units.

Japanese Courses

Foreign Language Placement Examination A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placement-test.ucr.edu for date and time. Transfer students who have taken a college-level language
course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

**Lower-Division Courses**

**JPN 001. First-Year Japanese (4)** Lecture, 4 hours. Prerequisite(s): none. An introduction to the sound system and grammar of Japanese with emphasis on speaking, reading, writing, and understanding. Classes are conducted in Japanese insofar as possible. Credit is awarded for only one of the JPN 001, JPN 002, and JPN 003 or JPN 010A and JPN 010B sequences.

**JPN 002. First-Year Japanese (4)** Lecture, 4 hours. Prerequisite(s): JPN 001 with a grade of "C-" or better or equivalent. An introduction to the sound system and grammar of Japanese with emphasis on speaking, reading, writing, and understanding. Classes are conducted in Japanese insofar as possible. Credit is awarded for only one of the JPN 001, JPN 002, and JPN 003 or JPN 010A and JPN 010B sequences.

**JPN 003. First-Year Japanese (4)** Lecture, 4 hours. Prerequisite(s): JPN 002 with a grade of "C-" or better or equivalent. An introduction to the sound system and grammar of Japanese with emphasis on speaking, reading, writing, and understanding. Classes are conducted in Japanese insofar as possible. Credit is awarded for only one of the JPN 001, JPN 002, and JPN 003 or JPN 010A and JPN 010B sequences.

**JPN 004. Second-Year Japanese (4)** Lecture, 4 hours. Prerequisite(s): JPN 003 with a grade of "C-" or better or JPN 010B with a grade of "C-" or better or equivalent. An introduction to the sound system and grammar of Japanese with emphasis on speaking, reading, writing, and understanding. Classes are conducted in Japanese insofar as possible. Credit is awarded for only one of the JPN 001, JPN 002, and JPN 003 or JPN 010A and JPN 010B sequences.

**JPN 005. Second-Year Japanese (4)** Lecture, 4 hours. Prerequisite(s): JPN 004 or equivalent. Concentrates on advanced speech levels and their cultural underpinnings.

**JPN 006. Second-Year Japanese (4)** Lecture, 4 hours. Prerequisite(s): JPN 005 or equivalent. Emphasizes the academic style of written and spoken Japanese and academic comprehension of the cultural background.

**JPN 009. Supplementary Work in Kanji (1)** Lecture, 1 hour. Prerequisite(s): JPN 001 or equivalent, concurrent enrollment in JPN 002 or JPN 003 or JPN 004; or consent of instructor. Introduction to Kanji skills beyond that covered in JPN 001. Provides background information on the use, systematics, and function of Kanji characters. Supplements Japanese language classes and provides additional instruction for heritage learners. Course is repeatable as student's language level changes.

**JPN 010A. Intensive First-Year Japanese (6)** Lecture, 4 hours; discussion, 2 hours. Prerequisite(s): none. Intensive introduction to Japanese, with emphasis divided among speaking, reading, writing, and understanding. The intensive JPN 010A and JPN 010B sequence covers the same material as the normal JPN 001, 002, and 003 sequence. Credit is awarded for only one of the JPN 001, JPN 002, and JPN 003 or JPN 010A and JPN 010B sequences.

**JPN 010B. Intensive First-Year Japanese (6)** Lecture, 4 hours; discussion, 2 hours. Prerequisite(s): JPN 010A with a grade of "C-" or better or equivalent. Conclusion of intensive first-year Japanese, with emphasis among speaking, reading, writing, and understanding. The intensive JPN 010A and JPN 010B sequence covers the same material as the JPN 001, JPN 002, and JPN 003 sequence. Credit is awarded for only one of the JPN 001, JPN 002, and JPN 003 or JPN 010A and JPN 010B sequences.

**JPN 022. Introduction to Japanese Film (4)** Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An introduction to Japan's major directors and to watching and writing about Japanese film. Works studied range from the samurai epics of Kurosawa to recent anime. All films have subtitles. No previous knowledge of Japanese language or culture is required. Cross-listed with AST 022 and MCS 022.

**JPN 032. Introduction to Japanese Folklore (4)** Lecture, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): none. Focuses on narrative genres of myth, legend, and folktale, with additional attention paid to festivals, folk craft, belief systems, and the development of folklore studies (minzokugaku) as an academic discipline. Examines the relationship of folklore to ethnic and national identity. Cross-listed with AST 032.

**JPN 034. Early Japanese Civilization (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): none. An introduction to Japanese civilization from earliest times to the dawn of the twentieth century. Devotes particular attention to aesthetic activity and to the relationship between history, culture, and the arts. Cross-listed with AST 034.

**JPN 035. Modern Japanese Society (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to Japanese culture and society with emphasis on the day-to-day lives of the modern Japanese people at home, work, and play.

**JPN 090. Special Studies (1-5)** Individual study, 3-15 hours. To be taken with the consent of the Chair of the Department as a means of meeting special curricular problems in either language or literature. Course is repeatable.

**Upper-Division Courses**

**JPN 101A. Third-Year Japanese (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): JPN 006. Designed to develop students' reading, writing, and speaking abilities in Japanese. The course is conduct- ed in Japanese.

**JPN 101B. Third-Year Japanese (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): JPN 101A. Designed to develop students' reading, writing, and speaking abilities in Japanese. The course is conduct- ed in Japanese.

**JPN 101C. Third-Year Japanese (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): JPN 101B. Designed to develop students' reading, writing, and speaking abilities in Japanese. The course is conduct- ed in Japanese.

**JPN 110. Advanced Reading in Japanese (4)** Lecture, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): previous or concurrent enrollment in JPN 101C or equivalent. Reading of extended authentic texts in Japanese. Texts may include newspaper or magazine articles, literature, or nonfiction. Emphasis may extend to translation, textual analysis, basic research using primary sources, or discussion of texts in Japanese. Course is repeatable as content changes.

**JPN 134. Cinematic War Memory (4)** Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines cinematic confrontations involving World War II in Germany and Japan. Topics include desire between victims and perpetrators, representation of trauma, and ethical responsibility. All screenings have English subtitles. Cross-listed with CPLT 134, GER 134, and MCS 114.

**JPN 145. Modern Japanese Thought (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Survey of modern Japanese thought from a theoretical and intel- lectual historical perspective. Topics include philo- sophical discussions of modernization, "Westernization," "nationalism," colonialism and imperialism, "comfort women," Japanese war crimes in continental Asia, the American bombing of Hiroshima and Nagasaki, post-World War II remem- brance and denial. All readings are in English. Cross-listed with CPLT 145.

**JPN 150. In Women's Hands: Reading Japanese Women Writers (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines major works of Japanese women writers from Heian (ninth century) to contemporary, focusing on themes, genres, representations of genders, ideas of love and romance, and feminine aesthetics. Readings include fiction, poetry, essays, and drama, with the main emphasis on fictional writing. Courses are conducted in English. Cross-listed with AST 150.

**JPN 151. Early Japanese Literature (4)** Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An in-depth introduction to early Japanese literature. Focuses on fiction, from early poem tales and court romances to warrior tales and stories of the floating world. Careful attention is given to the works' historical and cultural backgrounds and visual and artistic dimensions. All works are read in English translation. Course is repeatable as content changes. Cross-listed with AST 151.

**JPN 152 (E-Z). Themes in Modern Japanese Literature (4)** Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to modern Japanese literature through translation, as seen through the lens of a particular theme or issue. All materials are read in English translation. E. Supernatural Japan; F. Warrior Japan; G. The Culture of the Floating World: Tokugawa Period Literature, Drama, and Art. Cross-listed with AST 153 (E-Z).

**JPN 153 (E-Z). Themes in Early Japanese Literature (4)** Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to early Japanese literature, as seen through the lens of a particular theme or issue. All materials are read in English translation. E. The End of the World in Japanese Literature; F. The Mask in Japanese Fiction; G. Love and Death; J. Classics and Canon; K. Dreams and Other Virtual Worlds. Cross-listed with AST 152 (E-Z).

**JPN 154 (E-Z). Themes in the Folklore and Popular Culture of Japan (4)** Lecture, 2 hours; discussion, 1 hour; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include myth, legend, folklore, folk performance, festival, ritual, and the development of popular or commercial culture. Considers literary versus oral traditions, ethnicity, identity, authenticity, nationalism, modernity, commodification, and the invention of tradition. E. Ancient Myth to Contemporary Legend: A Study of Japanese Folk Narrative; F. History of Japanese Popular Culture. Cross-listed with AST 154 (E-Z).
JPN 184. Japanese Film and Visual Culture (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigates popular visual culture in Japan primarily through film, from the early masters to contemporary directors. May draw additional material from fields such as theatre, television, visual art, architecture, and illustrated fiction. All materials are read or viewed in English. Course is repeatable to a maximum of 12 units. Cross-listed with AST 184 and MCS 184.

JPN 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing or consent of instructor. To be taken with the consent of the Chair of the Department as a means of meeting special curricular problems in either language or literature. Course is repeatable.

Korean Courses

Foreign Language Placement Examination A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placementtest.ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Lower-Division Courses

KOR 001. First-Year Korean (4) Lecture, 4 hours. Prerequisite(s): Student must take the Korean placement examination or obtain the consent of the instructor. An introduction to the sound system and grammar of Korean with emphasis on reading, writing, understanding, and speaking. Credit is awarded for only one of the following sequences: KOR 001, KOR 002, KOR 003, and KOR 004; KOR 001, KOR 002, and KOR 020B; KOR 020A and KOR 020B.

KOR 002. First-Year Korean (4) Lecture, 4 hours. Prerequisite(s): KOR 001 with a grade of "C" or better or KOR 020A with a grade of "C" or better or equivalent. An introduction to the world of Southeast Asia, including Southeast Asian studies. Course is repeatable.

KOR 003. Second-Year Korean (4) Lecture, 4 hours. Prerequisite(s): KOR 001 or KOR 020A or KOR 025 or consent of instructor. Emphasizes reading, writing, grammar, and conversation. Conducted primarily in Korean.

KOR 020A. First-Year Korean for Heritage Learners (4) Lecture, 4 hours. Prerequisite(s): Student must take the Korean placement examination or obtain the consent of the instructor. A first-year Korean course specially designed for heritage learners who have some proficiency in listening comprehension and speaking but are unable to read and write. Credit is awarded for only one of the following sequences: KOR 001, KOR 002, KOR 003, and KOR 004; KOR 001, KOR 002, and KOR 020B; KOR 020A and KOR 020B.

KOR 020B. First-Year Korean for Heritage Learners (4) Lecture, 4 hours. Prerequisite(s): KOR 002 with a grade of "C" or better or KOR 020A with a grade of "C" or better or equivalent or a sufficiently high test score on the Korean placement examination as determined by the department faculty or consent of instructor. A first-year Korean course specially designed for heritage learners who have some proficiency in listening comprehension and speaking but are unable to read and write. Credit is awarded for only one of the following sequences: KOR 001, KOR 002, KOR 003, and KOR 004; KOR 001, KOR 002, and KOR 020B; KOR 020A and KOR 020B.

KOR 025. Conversation and Composition (4) Lecture, 4 hours. Prerequisite(s): KOR 003 or equivalent. Practice at the intermediate level in speaking and writing Korean. Regular discussion and oral presentation of assigned written topics. Provides a review of basic grammar with the goal of achieving oral and written command.

Upper-Division Course

KOR 101. Advanced Korean (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): KOR 005 or consent of instructor. Designed to develop students' fluency in Korean to the level of intellectual conversation. Students review Korean web sites, view Korean films, read Korean short stories and journal articles, and discuss current issues of Korean society. Course is repeatable as content changes.

South Korean Studies Course

Upper-Division Course

SEAS 145. Buddhism in Southeast Asia (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): RSLT 106 or consent of instructor. Explores various texts, magical practices, forms of meditation, rituals, and beliefs of an ancient and modern Buddhism, focusing on the ways in which they are transformed by nuns, monks, and the laity in Burma, Cambodia, Laos, Thailand, and China. Cross-listed with RSLT 145.

Graduate Courses

SEAS 200. Topics in Southeast Asian Studies (4) Seminar, 3 hours; written work, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An introduction to the world of Southeast Asia and the scholarly discussions about it, with an emphasis on cultural aspects, embedded in their historical context. Materials are in English. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with CPLT 200.

SEAS 203. Southeast Asian Cultures (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys ethnographic literature on Southeast Asian cultures with an emphasis on contemporary research. Covers anthropological approaches to the study of text, ritual, and performance practices; intercultural dynamics; the impact of colonialism and nationalism on traditional cultures; and globalization. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with ANTH 203.

SEAS 204. Approaches to Southeast Asian History (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to central historical problems, historiographical debates, materials, and theoretical approaches in Southeast Asian history. Readings each week focus on a different theme. Course is repeatable to a maximum of 8 units. Cross-listed with HIST 242.

SEAS 205. Literature of Southeast Asia (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys the literary and historical themes and theories related to understanding literature and literary culture in Southeast Asia, insisting that the space of literature reaches beyond the text to include all disciplines. Students critically read, engage in, and question discourses of nationhood, identity, loss, mourning, history, and memoir. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with CPLT 205.

SEAS 243A. Seminar in Southeast Asian History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Discusses Southeast Asian topics from regional, comparative, and local perspectives. May be undertaken as a one- or two-quarter course (HIST 243A/SEAS 243A, HIST 243B/SEAS 243B). Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned. After completing both HIST 243A/SEAS 243A and HIST 243B/SEAS 243B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Cross-listed with HIST 243A.

SEAS 243B. Seminar in Southeast Asian History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Discusses Southeast Asian topics from regional, comparative, and local perspectives. Students produce a substantial research paper that continues their work from HIST 243A/SEAS 243A. May be undertaken as a one- or two-quarter course (HIST 243A/SEAS 243A, HIST 243B/SEAS 243B). After completing both HIST 243A/SEAS 243A and HIST 243B/SEAS 243B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Cross-listed with HIST 243B.

SEAS 290. Directed Studies (1-6) Individual study, 3-18 hours. Prerequisite(s): consent of instructor and graduate advisor. Directed study to meet special curricular needs. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SEAS 292. Concurrent Analytical Studies in Southeast Asian Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Taken concurrently with a 100-series course, but on an individual basis. Devoted to research, criticism, and written work at the gradu-
Lower-Division Courses

VNM 001. Elementary Vietnamese (4) Lecture, 4 hours. Prerequisite(s): Student must take the Vietnamese placement examination or obtain the consent of the instructor. An introduction to the sound system and grammar of Vietnamese with attention to the development of the four skills: comprehension, speaking, reading, and writing. Classes are conducted in Vietnamese insofar as possible. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 002. Elementary Vietnamese (4) Lecture, 4 hours. Prerequisite(s): VNM 001 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Vietnamese placement examination as determined by the department faculty or consent of instructor. An introduction to the sound system and grammar of Vietnamese with attention to the development of the four skills: comprehension, speaking, reading, and writing. Classes are conducted in Vietnamese insofar as possible. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 003. Elementary Vietnamese (4) Lecture, 4 hours. Prerequisite(s): VNM 002 with a grade of "C-" or better or equivalent or a sufficiently high test score on the Vietnamese placement examination as determined by the department faculty or consent of instructor. An introduction to the sound system and grammar of Vietnamese with attention to the development of the four skills: comprehension, speaking, reading, and writing. Classes are conducted in Vietnamese insofar as possible. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 004. Intermediate Vietnamese (4) Lecture, 4 hours. Prerequisite(s): VNM 003 or VNM 020B with a grade of "C-" or better or equivalent or a sufficiently high test score on the Vietnamese placement examination as determined by the department faculty or consent of instructor. Emphasis is on the development of vocabulary, reading, writing, comprehension, and speaking skills. Classes are conducted in Vietnamese insofar as possible. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 005. Intermediate Vietnamese (4) Lecture, 4 hours. Prerequisite(s): VNM 004 or equivalent or a sufficiently high test score on the Vietnamese placement examination as determined by the department faculty or consent of instructor. Emphasis is on the development of vocabulary, reading, writing, comprehension, and speaking skills. Classes are conducted in Vietnamese insofar as possible. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 020A. Beginning Vietnamese for Advanced Heritage Learners (4) Lecture, 4 hours. Prerequisite(s): Student must take the Vietnamese placement examination or obtain the consent of the instructor. Structured for the beginning level heritage student who has advanced comprehension and some speaking skills. Focuses on developing all four language skills and on improving existing reading and writing skills. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 020B. Beginning Vietnamese for Advanced Heritage Learners (4) Lecture, 4 hours. Prerequisite(s): VNM 020A with a grade of "C-" or better or equivalent or a sufficiently high test score on the Vietnamese placement examination as determined by the department faculty or consent of instructor. Builds upon course work covered in VNM 020A. Includes integrating situational lessons with vocabulary, sentence patterns, grammar, and socio-linguistics used in daily life. Credit is awarded for only one of the following sequences: VNM 001, VNM 002, and VNM 003; VNM 020A and VNM 020B.

VNM 064. Introduction to Vietnamese and Diasporic Film Culture (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Engages students in critical viewing strategies and analytical visual critique. Explores the revival of film production in Vietnam following the Vietnam War, with a focus on the means of production, state control, and international distribution. Readings are in translation; classes are conducted in English. Cross-listed with AST 064 and MCS 049.

Upper-Division Courses

VNM 101. Advanced Vietnamese (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): VNM 005 or equivalent or a sufficiently high test score on the Vietnamese placement examination as determined by the department faculty or consent of instructor. Designed to develop fluency in Vietnamese to the level of intellectual conversation. Emphasis is on reading and writing of Vietnamese literature and criticism, visual culture, and discussion of current issues of Vietnamese society.

VNM 162. Vietnamese Literary History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. A historical analysis of Vietnamese literature from its oral tradition to contemporary fiction, with close readings of major authors. Follows the formation of the nation-state and struggle with the Chinese, French, Japanese, and Americans. No knowledge of Vietnamese is required. Readings are in translation or bilingual editions; classes are conducted in English. Cross-listed with AST 162 and HIST 187.

Beevi Lam

VNM 164. Vietnamese American Culture (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the pervasive aspects of Vietnamese American culture, including shared histories, acculturation patterns, class diversity, identity struggles, community-building literary and cultural production, youth issues, and cultural survival. Introduces foundational literature, visual culture, and scholarship in the field. Cross-listed with AST 164.

VNM 165 (E-Z). Themes in Vietnamese Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An exploration of Vietnamese literature in translation, as seen through the lens of a particular theme or issue. Segments pay particular attention to the implications of gender and sexuality on nation formation. All materials are read or viewed in English. E. Women and War. Cross-listed with AST 165 (E-Z) and WMST 165 (E-Z).

VNM 166. Vietnam and the Philippines (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the comparative national histories of Vietnam and the Philippines by way of great literary works in various genres: poetry, short fiction, and novels. All materials are read in English. Cross-listed with AST 166 and CPLT 166.

VNM 189. Encountering Vietnam (5) Lecture, 6 hours; tutorial, 6 hours; project, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on literary and historical accounts of Vietnam.
through a study of travel writing from different genres and eras. Students read primary texts in translation, participate in language tutorials, produce a travel-writing project with a local Vietnamese institution. Proficiency in Vietnamese is not required. Taught in Vietnam and offered only in summer. Cross-listed with HIST 189.

### Civilization

**Committee in Charge**

Sabine Doran, Ph.D. Germanic Studies  
Wendy J. Raschke, Ph.D. Classics/Comparative Literature  
Thea Shapiro, Ph.D. French/Comparative Literature  
Nicoletta Tinazzi Mehrmand, Ph.D. Italian  
Yang He, Ph.D. Chinese/Civilizations/Comparative Literature  
Stephen E. Cullenberg, Ph.D.  
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Civilization concentration is available in French and Russian Studies. See specific requirements under each respective section.

### Lower-Division Courses

**EUR 017A. Introduction to European Literature and Culture (4)** Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): none. An introduction to a succession of works and cultural issues.

**EUR 017B. Introduction to European Literature and Culture (4)** Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): none. An introduction to European literature from the Middle Ages through the Enlightenment in their historical and cultural context. Introduces basic methods for approaching literary works and cultural issues.

**EUR 026. New European Cinemas: Experiment and Innovation (4)** Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An introduction to a succession of New Waves in European Cinema: Neorealism in Italy, New Wave in France, and New Cinema in Germany, Russia, and Britain. Study of political engagements and technical innovations. Topics include the concept of the auteur, key manifestos, and attempts to define European cinema in film theory. Cross-listed with CPLT 026 and MCS 026.

**EUR 030 (E-Z). Themes in French Civilization (4)** Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): none. An introduction to a succession of works and cultural issues.

**EUR 047. Introduction to Russian Culture (4)** Lecture, 3 hours; consultation, 1 hour. A multimedia introduction to Russian culture. Emphasis on Russian masterpieces in art, architecture, dance, theatre, literature, film, and music which are characteristic of the culture and life of their period. All work is done in English. Strongly recommended for Russian majors.

### Upper-Division Courses

**EUR 110A. Vienna: Sensuality and Seduction (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Cultural study of Vienna from fin de siecle to the present through literature, film, philosophy, and the visual arts. Topics include sexuality, visual desire, crisis of language, anti-Semitism, and the post-World War II confrontation with the Nazi period. All readings are in English; selected readings in German for German majors and minors. Cross-listed with CPLT 110A, GER 110A, and WMST 110.

**EUR 110B. Berlin Metropolis in Literature, Film, Music, and Art (4)** Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the metropolis Berlin as gateway between the East and West. Explores topography of the city through film, art, music, and literary texts. A study of Berlin's dramatic transformations as a microcosm of Germany and Europe's troubled history in the twentieth century. Course is conducted in English. Cross-listed with AHS 120, CPLT 110B, GER 110B, and MCS 178.

**EUR 111A. Survey of Russian Civilization (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers pre-twentieth century Russian music, architecture, and art. Any course within the EUR 111A, EUR 111B, and EUR 111C sequence may be taken independently. No knowledge of Russian is necessary.

**EUR 111B. Survey of Russian Civilization (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers Russian symbolism and the Great Emigration. Any course within the EUR 111A, EUR 111B, and EUR 111C sequence may be taken independently. No knowledge of Russian is necessary.

**EUR 111C. Survey of Russian Civilization (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers Soviet culture. Any course within the EUR 111A, EUR 111B, and EUR 111C sequence may be taken independently. No knowledge of Russian is necessary.

**EUR 112A. Survey of Germanic Cultures and Institutions (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers German civilization, 1750 to 1880. No knowledge of German is required.

**EUR 112B. Survey of Germanic Cultures and Institutions (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers German civilization, 1880 to the present. No knowledge of German is required.

**EUR 115 (E-Z). French Studies (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Varying topics relating to the literature, thought, and culture of France. Possible topics might include: the Paris mystique, French literary existentialism, individualism in the Renaissance, F: Paris; M: Medieval Women in France. No knowledge of French is necessary.

**EUR 116. Modern and Contemporary France: 1914-1958 (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Interdisciplinary study of French society, culture, politics, and institutions. No knowledge of French is necessary.

**EUR 119 (E-Z). Topics in Italian Culture (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. In-depth study of major topics in Italian institutions, society, and culture. E. Contemporary Italian Arts; R. Risorgimento: Birth of the Italian Nation; U. Italian Urban Culture. No knowledge of Italian is required.

**EUR 124. Nordic Mythology, Folklore, and Fairytales (4)** Seminar, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces the representation of animals, plants, and other appearances of the natural world such as sunrise and sunset in European creation and destruction mythology, fairytales, and folklore. Cross-listed with GER 124.

**EUR 137. Passions, Apparitions, and Automata (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory study of German Romanticism from its origins in Goethe to its development in Hoffmann. Topics include madness, sexual desire, doppelganger, homicide, and automata. All readings are in English; selected readings are in German for German majors and minors. Cross-listed with CPLT 137 and GER 137.

**EUR 138. From Expressionism to Epic Theatre: Benn, Brecht, Kafka, and the Bauhaus (4)** Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction of the German avant-garde of the twentieth century. Explores expressionism, New Objectivity, the Bauhaus movement, the manifestation of an anti-art in dadaism, and Epic Theatre. Studies works of Franz Kafka in the context of his implicit criticism of the avant-gardist movements of his time. Course is conducted in English. Cross-listed with AHS 121, CPLT 138, GER 138, and MCS 182.

**EUR 192. Workshop in European Languages (1)** Workshop, 1 hour. Prerequisite(s): concurrent enrollment in an upper-division course in European literature or culture that is taught in English. Taken in conjunction with an upper-division course in European literature or culture, provides discussion and alternative assignments in the language of the student’s emphasis. Course is repeatable to a maximum of 6 units.

### Classical Studies

**Committee in Charge**

Thomas F. Scanlon, Ph.D., Chair Classics/Comparative Ancient Civilizations/Comparative Literature  
David Goldin, Ph.D. (Philosophy)  
Robert Griffin, Ph.D. (Comparative Literature and Foreign Languages, Emeritus)  
Benjamin King, Ph.D., Classics  
Wendy J. Raschke, Ph.D. Classics/Comparative Literature/Comparative Ancient Civilizations  
Stephen E. Cullenberg, Ph.D.  
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The objective of the B.A. in Classical Studies is the furthering of knowledge of classical civilization through two emphases: the study of Greek and/or Latin language(s) and literature(s) and the study of courses in English translation on topics including classical literature, history, politics, religion, mythology, and art in order to aid students' appreciation of the Greek and Roman contributions to later Western civilization.
The student who majors in Classical Studies acquires a balanced yet focused view of the language, literature, thought, and civilization of Greece and Rome. The student also obtains the valuable skills of a better vocabulary, a sharper critical sense, logical analysis of texts, coherent argumentation, and a valuable perspective on our own society. Classical Studies majors receive a liberal arts education of traditional excellence and one widely esteemed by business and professional schools. A student may also pursue graduate training in Classics, Art History, History, Philosophy, or other related disciplines.

**Major**

**Language Proficiency** All students in Classical Studies must complete either LATN 001, LATN 002, LATN 003, and LATN 004 (or equivalents) or GRK 001, GRK 002, and GRK 003 (or equivalents). They must also complete 12 upper-division units (or the equivalent) of course work in Latin or Greek.

1. Language proficiency requirement:
   a) either LATN 001, LATN 002, LATN 003, and LATN 004 (or equivalents) or GRK 001, GRK 002, and GRK 003 (or equivalents)
   and
   b) Twelve (12) upper-division units or the equivalent of course work in Latin or Greek

2. Civilization requirement
   Either two courses from CLA 010A, CLA 010B, CLA 010C or both CLA 027A and CLA 027B

3. CPLT 015

4. Twenty-four (24) units from the following:
   a) Upper-division Latin or Greek literature courses beyond the language proficiency requirement
   b) AHS 147, AHS 148, CLA 100/HISE 110, CLA 110 (E-Z)/LATN 110 (E-Z), CLA 112/CPLT 112/RSLT 117, CLA 114/CPLT 114, CLA 120 (E-Z), CLA 165, CLA 190, GRK 190, LATN 190, PHIL 121Q, POSC 110, RSLT 136, THEA 125E
   c) Other courses outside the Classics program related to the major with approval of the student's advisor.

A highly recommended lower-division course is CLA 040 (Classical Mythology). In their course selection, students should seek exposure to both the Greek and Roman components of the major.

**Minor**

The Classical Studies minor offers students a fundamental understanding of classical language and culture which form the basis of much of western civilization. The minor naturally complements liberal arts degrees in many areas, including History, Art History, Philosophy, English, and Religious Studies. Students profit from the skills associated with a degree in the classics, such as enhancement of analytical and critical abilities, communication skills, and verbal proficiency.  

1. One course from CLA 010A, CLA 010B, CLA 010C, CLA 027A, or CLA 027B
2. Either LATN 001, LATN 002, LATN 003, and LATN 004 (or equivalents) or GRK 001, GRK 002, and GRK 003 (or equivalents)
3. One upper-division course (4 units) in either Latin or Greek
4. Three courses from among the following (12 units)
   a) Greek at or above the 100 level
   b) Latin at or above the 100 level
   c) AHS 147, AHS 148, CLA 100/HISE 110, CLA 110 (E-Z)/LATN 110 (E-Z), CLA 112/CPLT 112/RSLT 117, CLA 120 (E-Z), CLA 114/CPLT 114, CLA 165, CLA 190, GRK 190, LATN 190, PHIL 121Q, POSC 110, RSLT 136, THEA 125E
   
See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

**Classics**

**Subject abbreviation: CLA**

### Lower-Division Courses

**CLA 010A. Ancient Civilization: Early Greece and the Mediterranean (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): none. A broad treatment of history, art, and archaeology, and literature, read in translation, comprising a cultural survey of the origins and the first formation of Western civilization. Raschke

**CLA 010B. Classical Civilization: Classical Greece (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): none. A broad treatment of history, art, and archaeology, and literature, read in translation, comprising a cultural survey of the origins and the first formation of Western civilization. Raschke

**CLA 010C. Ancient Civilization: Rome (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): none. A broad treatment of history, art, and archaeology, and literature, read in translation, comprising a cultural survey of the origins and the first formation of Western civilization. Raschke

**CLA 017. Rome: The Ancient City (4)** Lecture, 3 hours; extra reading, 3 hours. Traces the development of the city of ancient Rome. By studying the literary and historical evidence alongside the physical remains of the city—its monuments, art, and historical and archaeological remains—this course seeks to introduce students to the Romans and to their importance for later ages. Cross-listed with AHS 030 and HIST 027.

**CLA 020. Word Power from Greek and Latin Roots (4)** Lecture, 3 hours; consultation, 1 hour. An intensive study of Greek and Latin elements in English etymology and word derivation. No knowledge of Greek or Latin is necessary. King, Scanlon

**CLA 027A. Classical Literature in Translation: Love and Death (4)** Lecture, 3 hours; consultation, 1 hour. Selected readings in Greco-Roman epic, drama, lyric, history, and philosophy. King, Raschke, Scanlon

**CLA 027B. Classical Literature in Translation: Illusion and Reality (4)** Lecture, 3 hours; consultation, 1 hour. Selected readings in Greco-Roman epic, drama, lyric, history, and philosophy.

**CLA 030. Scientific Word Power from Latin and Greek Roots (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. A systematic analysis of the scientific terminology in English derived from Greek and Latin stems, including those in the biological and natural sciences. Aims to teach word-analysis, to increase technical and taxonomic vocabulary, and to study our linguistic and cultural debt to Greek and Roman scientific language. King

**CLA 040. Classical Mythology (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introductory survey of the mythology of Greece and Rome, including the divine myths, heroic legends, and the implications of these polytheistic systems for ancient culture. King, Scanlon

**CLA 045. The Ancient World in Film and Television (4)** Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. A study of representations of Greece and Rome in film, television, and other modern media. Introduces these ‘visual texts’ both as popular art forms on their own and in relation to their ancient and modern literary sources. Cross-listed with MCS 038.

**CLA 050. Folktales, Monsters, and Magic in Ancient Greece and Rome (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. Examines beliefs of the supernatural as part of life in the ancient world. Topics include magic and witchcraft, the fear of demons and ghosts, and the wish to manipulate invisible powers. Utilizes a variety of media and sources both ancient and modern. Raschke

### Upper-Division Courses

**CLA 100. Ancient Historians (4)** Lecture, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The historical development of historiography as evidenced in ancient historical writings from Near Eastern king lists and biblical histories to the narrative histories of Greece and Rome. Focuses on the ideas of history in the various cultures of the ancient Near East and Mediterranean and their relation to modern historical thought. Cross-listed with HISE 110.

**CLA 102. Ancient Civilizations and Later Identities (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topical survey of aspects of ancient civilizations appropriated and re-applied to modern cultures. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with CPAC 102.

**CLA 110 (E-Z). Latin Literary Genres (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Readings and discussion of the principal genres of Classical Latin Literature. Attention is given to contemporary ancient critical theory, and its divergence from modern literary constructs. Includes analysis of primary ancient texts and modern scholarship. This course may meet certain college or major language requirements for those students who choose, with instructor's
CLA 120 (E-Z). Themes and Issues of the Classical World (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. F. Themes in the history and culture of the ancient world. Includes material drawn from epics, religious texts, divine hymns, creation myths, heroic legends, and concepts of the afterlife as reflected in literary and nonliterary contexts. Cross-listed with CPLT 112 and RLST 117.

CLA 121. Monarchy (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural survey of the history and culture of the ancient world and its role in political, social, economic, and religious life. Cross-listed with CPAC 121 and POSC 121.

CLA 131. Readings in the Origins of Science in China and Greece (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the ancient scientific traditions of China and Greece and compares to modern scientific categories. Includes ideas about nature, the body, and systematic accounts of the natural world. Cross-listed with AST 131, CHN 131, and CPAC 131.

CLA 132. Medical Traditions in China and Greece (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative examination of the early development of Western medical traditions in classical Greece and the origins and development of the Chinese medical systems now referred to as traditional Chinese medicine, with specific attention to their cultural and social contexts. Cross-listed with AST 132, CHN 132, and CPAC 132.

CLA 141. Militarism and Hegemony in the Ancient World (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative study of ancient warfare and hegemony in two or more civilizations of the ancient world. Perspectives may include social and political contexts, gender and war, acquisition of empire, religious wars, and weapons, strategies and tactics in theory and practice. Study of primary source material in texts and visual arts. Cross-listed with AST 145, CHN 141, CPAC 141, and POSC 140.

CLA 150. Special Studies (1-5) To be taken with the consent of the instructor. Course is repeatable.

Graduate Courses

See also UC Tri-Campus Graduate Program in Classics.

CLA 200A. Contemporary Literary Theory and the Classics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to contemporary literary theory focusing on important critical approaches. Topics vary each year. Requires written work that explores theoretical issues and engages with a primary source. See also UC Irvine CLASSIC 200A. Course is repeatable.

CLA 200B. Diachronic Perspectives on Classical Antiquity (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to the history and development of classical literature. Includes ideas about nature, the body, and systematic accounts of the natural world. Cross-listed with AST 131, CHN 131, and CPAC 131.

CLA 200C. Greece and Rome in Their Contemporary Cultural Contexts (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to the history and development of classical literature. Includes ideas about nature, the body, and systematic accounts of the natural world. Cross-listed with AST 131, CHN 131, and CPAC 131.

CLA 201. Computing in Classical Studies (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to the latest methods of computing for research and teaching. Taught at UC Irvine. Same as UC Irvine CLASSIC 201. Course is repeatable.

CLA 250. Seminar in Classics (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Focuses on a major literary topic. Taught at UC Irvine. Same as UC Irvine CLASSIC 250. Course is repeatable.

CLA 290. Research for the Thesis or Dissertation (1-12) Outside research, 3-18 hours. Prerequisite(s): permission, to do select readings in Latin. E. Drama; J. Historical Literature. Cross-listed with LATN 110 (E-Z). Raschke, Scanlon

CLA 292. Concurrent Studies in Classics (2) Individual study, 6 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Concurrent enrollment in an advanced undergraduate Greek or Latin course, with credit awarded for additional reading and separate examinations. Same as UC Irvine CLASSIC 292. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CLA 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Research in preparation for the Candidacy Examination. Same as UC Irvine CLASSIC 297. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CPLT 213. Rhetoric and Argument in Ancient China and Greece (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): grade of A or A- in an advanced undergraduate Greek or Latin course. A study of theories and practices of rhetoric, argument, persuasion, and, in some cases, poetic allusions in ancient China and Greece (texts dating from the fifth to the third centuries B.C.), as well as some of their implications for contemporary theory and practice. Students who submit a seminar paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. This course may also be taken on a Satisfactory (S) or No Credit (NC) basis by students advanced to candidacy for the Ph.D. Cross-listed with POSC 213.

CPLT 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CPLT 290 (E-Z). Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and department chair. To be taken as a means of meeting special curricular needs in literature. E. English; F. French; G. German; H. Greek; I. Italian; J. Japanese; K. Chinese; L. Latin; M. Latin American; R. Russian; S. Spanish; T. Scandinavian; U. American; V. Slavic. Segments are repeatable.

Professional Course

CLA 302. Teaching Practicum (1-4) Practicum, 3-12 hours. Prerequisite(s): CPLT 301 or equivalent; graduate standing; employment as a teaching assistant or associate in. Supervised teaching in lower-division courses. Required of all teaching assistants in Classics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
Greek Courses
Subject abbreviation: GRK

Foreign Language Placement Examination A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placementtest.ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Lower-Division Courses

GRK 001. Introduction to Classical Greek (4) Lecture, 4 hours. Prerequisite(s): none. Intensive study of the fundamentals of Attic Greek with practice in reading and writing. King

GRK 002. Introduction to Classical Greek (4) Lecture, 4 hours. Prerequisite(s): GRK 001 with a grade of "C-" or better or equivalent. Intensive study of the fundamentals of Attic Greek with practice in reading and writing. King

GRK 003. Introduction to Classical Greek (4) Lecture, 4 hours. Prerequisite(s): GRK 002 with a grade of "C-" or better or equivalent. Intensive study of the fundamentals of Attic Greek with practice in reading and writing. King

Upper-Division Courses

GRK 101 (E-Z). Advanced Greek Reading and Grammar (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): GRK 003 with a grade of "C-" or better or equivalent. One or two of the following will be offered every year, according to need. E. Homer Iliad; F. Homer Odyssey; G. Lyric Poets; H. Aeschylus; I. Sophocles; J. Euripides; K. Aristophanes; L. Herodotus; M. Thucydides; N. Xenophon; O. The Attic Orators; P. Plato; Q. Aristotle; R. New Testament; T. Hellenistic and Later Greek.

GRK 190. Special Studies (1-5) To be taken with the consent of the instructor as a means of meeting special curricular problems. Course is repeatable.

Graduate Courses

See also UC Tri-Campus Graduate Program in Classics.

CPLT 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CPLT 290 (E-Z). Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and department chair. To be taken as a means of meeting special curricular needs in literature. E. English; F. French; G. German; H. Greek; I. Italian; J. Japanese; K. Chinese; L. Latin; M. Latin American; R. Russian; S. Spanish; T. Scandinavian; U. American; V. Slavic. Segments are repeatable.

GRK 292. Concurrent Analytical Studies (2) Outside research, 6 hours. Prerequisite(s): consent of instructor; concurrent enrollment in GRK 100-series course. To be taken on an individual basis. Each student completes a graduate paper based on research related to the GRK 100-series course. Course is repeatable.

Professional Course

CPLT 301. Teaching of foriegn Language at the College Level (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Readings and discussions of the principal genres of Classical Latin literature. Attention is given to contemporary ancient critical theory, and its divergence from modern literary constructs. Includes analysis of primary ancient texts and modern scholarship. This course may meet certain college or major language requirement for those students who choose with instructor’s permission to do select readings in Latin. E. Drama; J. Historical Literature. Cross-listed with CLA 110 (E-Z).

LATN 135. The Roman Novel (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): LATN 004 or equivalent. Reading and discussion of Latin prose fiction as represented by Petronius’ Satyricon and Apuleius’ Metamorphoses. Emphasis given to the development of the romantic novel in Latin. Raschke

LATN 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): LATN 004 or equivalent or consent of instructor. To be taken as a means of meeting special curricular problems. Course is repeatable.

Scanlon

Graduate Courses

See also UC Tri-Campus Graduate Program in Classics.

CPLT 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CPLT 290 (E-Z). Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and department chair. To be taken as a means of meeting special curricular needs in literature. E. English; F. French; G. German; H. Greek; I. Italian; J. Japanese; K. Chinese; L. Latin; M. Latin American; R. Russian; S. Spanish; T. Scandinavian; U. American; V. Slavic. Segments are repeatable.

LATN 292. Concurrent Analytical Studies (2) Outside research, 6 hours. Prerequisite(s): consent of instructor; concurrent enrollment in LATN 100-series course. To be taken on an individual basis. Student will complete a graduate paper based on research related to the LATN 100-series course. Course is repeatable with different topic.

Professional Course

CPLT 301. Teaching of Foreign Language at the College Level (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing, or senior standing with consent of instructor. Covers first and second language acquisition; general models of L2 learning; learning different types of grammar; learning other components of language: acquisition of pronunciation, vocabulary, and discourse; multilingual societies and the goals of language teaching; and implications of second language acquisition research for the foreign language classroom. Graded Satisfactory (S) or No Credit (NC).
The UC Tri-Campus Graduate Program in Classics

web2.hnet.uci.edu/classics/tricampus

(UC Irvine, UC Riverside, UC San Diego)
The UC Tri-Campus Graduate Program in Classics is a joint venture that combines faculty in Classics and related disciplines from the three southernmost UC campuses.

Students accepted into the program may enroll at any of the three campuses, but they normally apply for admission to the Tri-Campus program through UC Irvine, which is the main location for instruction and administration. Applications to the Tri-Campus program are reviewed by an admissions committee composed of faculty members from all three campuses.

The goal of the program is to provide a graduate education that unites the main currents of modern literary, cultural, and social-scientific theory with the traditional skills and methodologies of classical philology. Candidates for degrees must exhibit facility in Greek and Latin, competence in research, including theoretical approaches to texts and objects, technical mastery of computing for research and teaching, and experience in teaching.

These goals are realized through the four core courses (CLA 200A, CLA 200B, CLA 200C, and CLA 201), seminars (UC Riverside CLA 250/UC Irvine CLASSIC 220) and reading courses (UC Riverside CLA 292/UC Irvine CLASSIC 205). All students are admitted into the Ph.D. program. With the exception of those granted advanced standing because they hold the M.A. degree in Classics from another institution, entering students are concurrently enrolled in the M.A. program.

Master's Degree

Students are admitted into the Ph.D. program only. Entering students who do not already hold a master's degree in Classics from another institution will be required to complete M.A. requirements while pursuing the Ph.D.

The requirements for the M.A. degree in Classics are two years (six quarters) of course work, passage of a special set of examinations, and completion of a master's paper. The normal course load is three 200-level courses each quarter. Minimum course requirements are four quarters of CLA 200A, CLA 200B, CLA 200C, and CLA 201; four quarters of UC Riverside CLA 292/UC Irvine CLASSIC 220; and four quarters of UC Riverside CLA 250/UC Irvine CLASSIC 205. (UC Riverside CLA 290/UC Irvine CLASSIC 280 may be substituted for these courses at the discretion of the faculty.) Requires a reading knowledge of either Germanic Studies, French, Italian, or equivalent language, demonstrated by examination or other means.

Normative Time to Degree

Two years

Doctoral Degree

The requirements for the Ph.D. degree in Classics are three years (nine quarters) of course work. Minimum course requirements are four quarters of CLA 200A, CLA 200B, CLA 200C, and CLA 201; five quarters of UC Riverside CLA 292/UC Irvine CLASSIC 205; and six quarters of UC Riverside CLA 250/UC Irvine CLASSIC 220 or an equivalent course. (UC Riverside CLA 290/UC Irvine CLASSIC 280 may be substituted for these courses at the discretion of the Program faculty.) Students are encouraged to take courses and seminars in relevant areas outside the program at any of the three campuses.

Students must demonstrate reading proficiency in a second modern language by the end of the third year. By the end of the third year and during the fourth year of study, students must have read extensively in the primary texts and in literary history and theory and in ancient history. To qualify as a candidate and enter the dissertation stage, a student must pass an individually designed set of qualifying examinations, including translation examinations in Greek and Latin, written examinations or lengthy papers in special authors and field, and an oral examination.

The facilities, course offerings, programs, and individual faculty mentorship of all three campuses are available to students in the Tri-Campus degree program. The resources of the program are enhanced through a cooperative teaching arrangement among the Tri-Campus program and the Classics graduate programs of UC Los Angeles and the University of Southern California.

Foreign Language Requirement

Students must demonstrate reading proficiency in a second modern language by the end of the third year.

Teaching Requirement

Experience in supervised teaching and/or research activity is normally required.

Normative Time to Degree

Six years

Faculty

Michèle Saltman, Ph.D., Director
Professor of History, UCR; Late Antiquity; Roman History and Literature, Religion, Women's Studies
Georgios Anagnostopoulos, Ph.D.
Professor of Philosophy, UCSD; Ancient Greek Philosophy, Ethics, Metaphysics
Luci Berkowitz, Ph.D.
Professor Emerita of Classics, UCI; Greek Literary History, Computer Application to Literature
Charles Chamberlain, Ph.D. Lecturer in Classics and Comparative Literature, UCSD; Greek and Latin Literature, Aristotle, Poetics
Cynthia L. Claxton, Ph.D.
Lecturer in Classics, and graduate teaching supervisor, UCI; Greek prose, Historiography
Page duBois, Ph.D.
Professor of Classics and Comparative Literature, UCSD; Greek Literature, Rhetoric, Critical Theory, Cultural Studies

Anthony Edwards, Ph.D., Associate Professor of Classics and Comparative Literature; Program Director, UCSD; Epic, Greek Comedy, Critical Theory
Leslie Collins Edwards, Ph.D., Lecturer in Classics and Comparative Literature, UCSD; Homer, Greek Drama, Education in Ancient Greece
Richard I. Frank, Ph.D., Associate Professor Emeritus of History and Classics, UCI; Roman history, Latin Elegy and Satire, Classical Tradition
Zina Giannopoulou, Ph.D., Assistant Professor of Classics, UCI; literary theory and Platonic hermeneutics, classical and Hellenistic philosophy, Greek tragedy and epic.
David Gildean, Ph.D., Professor of Philosophy, UCR; Greek and Roman Philosophy
Max Goldman, Ph.D., Lecturer in Classics, UCI; Latin poetry, ancient novel, literary criticism
Anna Gonosova, Ph.D., Associate Professor of Art History, UCI; Byzantine and Medieval Art
Benjamin King, Ph.D., Lecturer in Classics, UCR; Greek Literature and Philosophy
Edward N. Lee, Ph.D., Professor Emeritus of Philosophy, UCSD; Greek Philosophy, Plato
Marianne McDonald, Ph.D., Professor of Theatre and Classics, UCSD; Greek and Roman Theatre, Ancient Drama in Modern Plays, Film, and Opera
Margaret M. Miles, Ph.D., Associate Professor of Art History, UCI; Greek and Roman Art and Archaeology, Ancient Sicily, Greek Religion
Alden A. Moshammer, Ph.D., Emeritus, Professor of History, UCSD; Early Christian Thought, Greek Chronography, Early Greek History
Sheldon Nodelman, Ph.D., Associate Professor of Visual Arts, UCSD; Classical Art and Architecture, Roman Portraiture, Critical Theory
Maria C. Pantelia, Ph.D., Associate Professor of Classics, and Director, Thesaurus Linguae Graecae, UCI; Greek Epic Poetry, Hellenistic Poetry, Computer Applications to Classics
Lisa Raphals, Ph.D., Professor of Chinese/Comparative Literature
Wendy J. Raschke, Ph.D., Lecturer in Classics, UCR ; Roman Satire, Greek Art and Archaeology
B. P. Reardon, D.U., Professor Emeritus of Classics, UCI; Late Greek Literature, Ancient Novel
Gerassimos Santas, Ph.D., Professor of Philosophy, UCI; Ancient Philosophy, History of Philosophy, Ethics
Thomas F. Scanton, Ph.D., Professor of Classics, UCR; Greek and Roman Historiography, Ancient Athletics
Gary Shifman, Ph.D., Assistant Professor of Political Science, UCSD; Greek Political Theory
Patrick Sinclair, Ph.D., Associate Professor Emeritus of Classics, UCI; Roman Historiography, Latin Lexicography, Rhetoric
Dana F. Sutton, Ph.D., Professor Emeritus of Classics, UCI; Greek and Latin drama, Greek poetry, Anglo-Latin Literature
Nicholas White, Ph.D., Professor of Philosophy and Classics, UCI; ancient...
Graduate Courses

Most of the following courses are taught at the UC Irvine campus. See also CLA 302 under the Classics section.

CLA 200A. Contemporary Literary Theory and the Classics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to contemporary literary theory focusing on important critical approaches. Topics vary from year to year. Requires written work that explores theoretical issues and involves engagement with a Greek or Latin text. This work may, for example, illuminate some aspect of a theorist’s work, put two theorists into dialogue, or explore the usefulness of a particular approach to texts, authors, or genres. Taught at UC Irvine. Same as UC Irvine CLASSIC 200A. Course is repeatable.

CLA 200B. Course is repeatable.

CLA 200C. Greece and Rome in Their Contemporary Contexts (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to the methods and perspectives of social scientific theory used to study the material and social dimensions of the ancient cultures of Greece and Rome. Taught at UC Irvine. Same as UC Irvine CLASSIC 200C. Course is repeatable.

CLA 200CC. Greece and Rome in Their Contemporary Cultural Contexts (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to the methods of computing for research and teaching. Taught at UC Irvine. Same as UC Irvine CLASSIC 200CC. Course is repeatable.

CLA 201. Computing in Classical Studies (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. An introduction to the latest methods of computing for research and teaching. Taught at UC Irvine. Same as UC Irvine CLASSIC 201. Course is repeatable.

CLA 250. Seminar in Classics (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Focuses mainly, but not exclusively, on major literary topics. Subject matter varies. Taught at UC Irvine. Same as UC Irvine CLASSIC 250. Course is repeatable.

CLA 290. Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): consent of instructor and graduate advisor; normally open only to students in the UC Tri-Campus Graduate Program in Classics. Supervised independent research. Same as UC Irvine CLASSIC 290. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CLA 292. Concurrent Studies in Classics (2) Individual study, 6 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Concurrent enrollment in an advanced undergraduate Greek or Latin course, with credit awarded for additional reading and separate examinations. Same as UC Irvine CLASSIC 205. Course is repeatable.

CLA 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Research in preparation for the Candidacy Examination. Same as UC Irvine CLASSIC 297. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CLA 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): admission to the UC Tri-Campus Graduate Program in Classics or consent of instructor. Directed research for the M.A. thesis or Ph.D. dissertation. Same as UC Irvine CLASSIC 299. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Comparative Ancient Civilizations

Subject abbreviation: CPAC

Committee in Charge
Lisa Raphael, Ph.D., Chair, Comparative Literature and Foreign Languages
Wendy Ashmore, Ph.D. (Anthropology)
Christopher Chase-Dunn, Ph.D. (Sociology)
Lucile Chia, Ph.D. (History)
David Gilcken, Ph.D. (Philosophy)
John Laursen, Ph.D. (Political Science)
Hendrick Maier, Ph.D. (Comparative Literature and Languages)
Justin McDaniel, Ph.D. (Religious Studies)
Vivian Nytro, Ph.D. (Religious Studies)
Thomas Patterson, Ph.D. (Anthropology)
Wendy Raschke, Ph.D. (Classics/Comparative Literature)
Michele Saltzman, Ph.D. (History)
Thomas Scanlon, Ph.D., Classics/Comparative Literature and Foreign Languages
Karl Taube, Ph.D. (Anthropology)
Stephen C.ullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Comparative Ancient Civilizations B.A. combines the breadth of an interdisciplinary major with the focus of more traditional majors like History or Classical Civilization. By undertaking a comparison of several major cultures of the past that have continued importance in the construction of our present world, the program affords a truly liberal education. Students have a unique opportunity to employ the methods of humanities and social sciences in their major study. They acquire skills of historical and social analysis, multicultural awareness, insight into constructions of gender and sexuality, and mental flexibility. The major is an excellent choice as a double major taken along with any of the traditional disciplines to add distinction and intellectual breadth to one’s background.

Major

1. Lower-division requirements (12 units): Choose from ANTH 003, ANTH 004, CHN 030/AST 030, CLA 010A, CLA 010B, CLA 010C, CPAC 001, CPAC 002, CPLT 017A

2. Upper-division requirements (44 units)
   a) At least 16 units from CPAC 102/CLA 102, CPAC 112/CLA 113/HISE 113, CPAC 121/CLA 121/POSC 121, CPAC 131/AST 131/CHN 131/CLA 131, CPAC 132/AST 132/CHN 132/CLA 132, CPAC 133/HISE 114, CPAC 134/HIST 110, CPAC 141/CHN 141/CLA 141/AST 145/POSC 140
   b) The balance from any of the following upper-division courses in related disciplines; students are recommended, in consultation with their advisor, to focus on one or two ancient civilizations in related courses to obtain special depth in those areas. Since related course offerings in these areas are often added, some of the most recent courses acceptable to fulfill this requirement may not be listed and students are advised to consult with the major advisor.

Anthropology
   ANTH 102/AHS 102 (Anthropology of Art)
   ANTH 110 (Prehistoric Agriculture)
   ANTH 117A (History of Old World Archaeology)
   ANTH 117B (History of New World Archaeology)
   ANTH 162 (Culture and Medicine)
   ANTH 171 (Field Course in Maya Archaeology)

Art History
   AHS 102/ANTH 102 (Anthropology of Art)
   AHS 144/AST 144 (Japanese Painting; Twelfth to Nineteenth Centuries)
   AHS 146/AST 147 (The Japanese House)
   AHS 147 (The Art of Greece)
   AHS 148 (The Art of Rome)
   AHS 155 (Early Christian Art)

Asian Studies
   AST 136/CHN 136 (Family and Gender in the Chinese Short Story)
   AST 142/CHN 142/RLST 142 (Chuang-tzu)
   AST 144/AHS 144
   AST 147/AHS 146
   AST 148/CHN 148 (Chinese Poetry and Poetics in Translation)

Chinese
   CHN 142/AST 142/RLST 142
   CHN 148/AST 148

Classics
   CLA 100/HISE 110 (Ancient Historians)
   CLA 110 (E-Z)/LATN 110 (E-Z) (Latin Literary Genres)
   CLA 112/CPLT 112/RLST 117 ( Mythology)
   CLA 113/CPAC 112/HISE 113
   CLA 114/CPLT 114 (The Classical Tradition)
   CLA 120 (E-Z) (Themes and Issues of the Classical World)
   CLA 121/CPAC 121/POSC 121
   CLA 131/CPAC 131/AST 131, CHN 131
   CLA 132/CPAC 132/AST 132/CHN 132
Comparative Literature and Foreign Languages / Comparative Ancient Civilizations / Comparative and World Literature / 171

CLT 141/CPAC 141/AST 145/CHN 141/POSC 140, CLA 165 (Greco-Roman Cult and Credence)

Comparative Literature
CLA 112/CPLT 112/RLST 117
CLA 114/CPLT 114

English
ENGL 100 (Scriptures, Myth, and Interpretation)
ENGL 149 (Old English Literature)
ENGL 151A (Middle English Literature: 1066-1500)
ENGL 151B (Middle English Literature: Later Fourteenth Century)

Ethnic Studies
ETST 115 (E-Z)/HISA 144 (E-Z) (Topics in American Indian History)

Greek
GRK 101 (E-Z) (Advanced Greek Reading and Grammar)

History
HISA 144 (E-Z)/ETST 115 (E-Z) (Topics in Native American History)
HISE 110/CLA 100 (Ancient Historians)
HISE 115 (The Roman Republic)
HISE 116 (The Roman Empire)
HISE 117 (Decline and Fall of the Roman Empire)
HISE 130/RLST 135 (History of Christianity)
HISE 150 (Ancient and Medieval England)
HISE 171 (Early Russia)
HIST 103 (History of Science from Antiquity to Copernicus)
HIST 110/CPAC 134 (History of Ancient Astronomy)
HIST 180 (Early Traditional China)
HIST 181 (Late Traditional China)

Japanese
JPN 151/AST 151 (Early Japanese Literature)

Latin
LATN 101 (E-Z) (Advanced Latin Reading and Grammar)
LATN 110 (E-Z)/CLA 110 (E-Z)
LATN 135 (The Roman Novel)

Philosophy
PHIL 120 (E-Z) (Ancient Philosophy)
PHIL 122E (Topics in the History of Philosophy: Ancient Philosophy)

Political Science
POSC 110 (The Origins of Our Political Ideas)

Religious Studies
RLST 101 (Religions of India)
RLST 103 (Confucianism)
RLST 105 (Religions of Japan)
RLST 106 (Buddhism)
RLST 107 (Taoist Traditions)
RLST 111 (Islam)
RLST 117/CLA 112/CPLT 112 (Mythology)
RLST 121 (The Hebrew Bible/Old Testament)
RLST 124 (E-Z) (Studies in Judaism from 70 C.E. to the Modern Period)
RLST 128E (Contemporary Views of Jesus)
RLST 130 (Bible: New Testament)

Sociology
SOC 123 (Human Societies)

RLST 131 (Jesus)
RLST 135 (History of Christianity)
RLST 136 (Augustine and Aquinas)
RLST 142/AST 142/CHN 142 (Chuang-tzu)

Lower-Division Courses

CPAC 001. Comparative Ancient Civilizations: An Introduction (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. An introduction to the comparative study of ancient civilizations of the world, their origins and development, some of the common traits and themes of world civilizations, and some of the unique qualities of particular cultures. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 002. Ancient Civilizations and Modern Identities: An Introduction (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. Asks how people conceptualize ancient civilization and make claims to it as a source of their cultural heritage. By examining a number of exemplary cases, explores ways in which the idea of an ancient civilization in either the West, the “Old World” and the “New,” is constructed, assimilated, and appropriated by later times and other cultures inter alia for political empowerment and cultural legitimation. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

Upper-Division Courses

CPAC 102. Ancient Civilizations and Later Identities (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topical survey of aspects of ancient civilizations appropriated and re-applied to modern cultures. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with CLA 102. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 112. Comparative Ancient Historical Writing (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the literary aspects of historical writing in ancient cultures, with some comparison of the ancient contribution to later authors of the genre. Cross-listed with CLA 113 and HISE 113. See the Student Affairs Office in the College of Humanities, Arts, and Social Sciences for breadth requirement information.

CPAC 121. Monarchy (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural survey of the institution of monarchy in the ancient world and its role in political, social, economic, and religious life. Cross-listed with CLA 121 and POSC 121. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 131. Readings in the Origins of Science in China and Greece (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the ancient scientific traditions of China and Greece and compares to modern scientific categories. Includes ideas about nature, the body, and systematic accounts of the natural world. Cross-listed with AST 131, CHN 131, and CLA 131. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 132. Medical Traditions in China and Greece (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative examination of the early development of Western medical traditions in classical Greece and the origins and development of the Chinese medical systems now referred to as traditional Chinese medicine, with specific attention to their cultural and social contexts. Cross-listed with AST 132, CHN 132, and CLA 132. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 133. Ancient Writing and Literacy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Uses cross-cultural comparison to survey writing and literacy in ancient civilizations and how they are related in the origin and development of selected ancient cultures. Cross-listed with HISE 114. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 134. History of Ancient Astronomy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the origins and history of ancient astronomy from Mesopotamia to the Greco-Roman world. Topics include the problems of the calendar and planetary motion, and the relation between astronomy and astrology in the ancient world. Focuses on readings from primary texts. Cross-listed with HIST 110. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

CPAC 141. Militarism and Hegemony in the Ancient World (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative study of ancient warfare and hegemony in two or more civilizations of the ancient world. Perspectives may include social and political contexts, gender and war, acquisition of empire, religious wars, and weapons, strategies and tactics in theory and practice. Study of primary source material in texts and visual arts. Cross-listed with AST 145, CHN 141, CLA 141, and POSC 140. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

Comparative and World Literature

Subject abbreviations: CPLT

Committee in Charge
Yang Ye, Ph.D., Chair, Chinese/Comparative Literature
Michelle E. Bloom, Ph.D. Comparative Literature/French
David K. Danow, Ph.D. Russian/Comparative Literature
Sabine Doran, Ph.D. European Literature/Comparative Literature
Stephanie B. Hammer, Ph.D. Comparative Literature/Germanic Studies
John N. Kirm, Ph.D. Germanic
Comparative Literature encourages study of the various literary periods and second literatures. They are expected to work in their non-English areas of literary specializations: Chinese, English (either British or American), French, German, Classical Greek, Italian, Indonesian, Japanese, Latin, Phillipino, Portuguese, Russian, Spanish, and Vietnamese.

### Graduate Programs

The Department of Comparative Literature and Foreign Languages grants graduate degrees based on the comparative studies of world literatures and cultures. The Ph.D. degree has two tracks: Interliterary Studies and Interdisciplinary Studies, described below. The department faculty, well balanced between Asianists and Europeanists, share a strong commitment to the study of literature through comparative and interdisciplinary approaches. We have particular strengths in comparative Asian and European studies; comparative ancient studies; gender and feminist studies; global cultures and post-colonialism; film and visual culture studies; narrative and cultural translation; and science and science fiction.

Students are admitted into the Ph.D. program only. Entering students who do not already hold a master's degree in Comparative Literature, in literature, or in comparable fields from another institution must complete M.A. requirements while pursuing the Ph.D.

### Admission

All applicants must supply GRE General Test (verbal, quantitative, analytical) scores.

S/NC Courses No S/NC-graded courses may be applied toward the minimum unit requirement for the graduate degree(s).

### Note

Students must take at least one graduate course in each of the following four areas: European, Asian, Ancient, and Modern Literature.

After completing the course requirements, the student has two options:

- a) Submit a portfolio of three essays, each one representing one of their three literary or interdisciplinary areas, and write a 750-1000 word commentary explaining the aims and achievements of the essays in relation to one another.

- b) Write a comprehensive research paper (40-50 pages) that incorporates their three interliterary or interdisciplinary areas; this paper may develop topics of previous papers, or explore a new topic area.

The student then undergoes oral examination on the portfolio or the research paper. Following the examination, the graduate committee, after evaluation of the student's entire graduate record, determines the candidate's suitability for continuing in the Ph.D. program.

### Doctoral Degree

The Department of Comparative Literature and Foreign Languages offers the Ph.D. degree in Comparative Literature with three tracks: Interliterary Studies, Interdisciplinary Studies, and Science Fiction, Science, and Literature. Areas of particular strength in the Interdisciplinary Studies are comparative Asian and European studies; comparative ancient civilizations; gender and feminist studies; global cultures and post-colonialism; film and visual culture studies; narrative and cultural translation; and science and science fiction.

### Interliterary Studies

This program is designed for students wishing to concentrate in Comparative Literature as an interliterary discipline. Students examine the relation among various national literatures. They are expected to work in three of the following literatures: Chinese, English (either British or American), French,
German, Classical Greek, Italian, Indonesian, Japanese, Latin, Portuguese, Russian, Spanish, and Vietnamese. Permission is granted in exceptional cases to work in other literatures related to the Germanic, Romance, or Slavic families, in Hebrew or Arabic literature, in other Asian Literatures, and the literatures of Africa. Students must obtain comprehensive knowledge of their first literature (the major specialty), in its language, literary history, and critical scholarship. In their two other literatures, they specialize in a genre, a period, critical school or theoretical approach, always in combination with their main literature. Work in the three literatures must be done in the languages of these literatures.

Students entering the interliterary Ph.D. program with an M.A. in literature must take two courses from the canons or masterworks of literature series (CPLT 210, CPLT 217A, CPLT 217B, or CPLT 217C), CPLT 214, and CPLT 215A (or demonstrate having taken similar courses). Course requirements are two graduate courses in a first literature, two graduate courses in a second literature, two graduate courses in a third literature, and three additional elective graduate courses in Comparative Literature.

**Note** Students must take at least one graduate course in each of the following four areas: European, Asian, Ancient, and Modern Literature.

Students entering the interliterary Ph.D. program with an M.A. in another discipline must do course work equivalent to the M.A. degree in Comparative Literature while proceeding with course work for the Ph.D. program.

**Interdisciplinary Studies** This program is designed for students with interests in interdisciplinary studies. Students examine relationships between literary studies and other disciplines (such as art, ethnic studies, film, history, law, music, philosophy, political science, psychology, religious studies, science, sociology, theater). Students complete the literary requirements of the program but substitute an appropriate discipline for one of the second or third literatures. This option is recommended to students who enter Comparative Literature having an M.A. in a non-literary discipline.

Students entering the interdisciplinary studies Ph.D. program with an M.A. in any discipline must take two courses from the canons or masterworks of literature series (CPLT 210, CPLT 217A, CPLT 217B, or CPLT 217C), as well as CPLT 214 and CPLT 215A (or demonstrate having taken similar courses). In addition, course requirements are two graduate courses in each of two literatures; two courses in another discipline; and three elective graduate courses in Comparative Literature. The graduate advisor may require appropriate courses on an individual basis.

**Note** Students must take at least one graduate course in each of the following four areas: European, Asian, Ancient, and Modern Literature.

**Science Fiction, Science, and Literature** This option is designed for students with interests in science fiction studies and the relations of science to world literature. It builds upon the current widespread interest in Science Fiction and draws on the Eaton Collection. The program is intended for students who have already completed an undergraduate degree in Comparative Literature, English or kindred studies. It draws on the speculative richness of science fiction literature in a wide variety of social contexts, including the role of science in society (genetic engineering, artificial environments, nanotechnology, etc.), race and ethnicity, and social ethics. This track interacts with existing programs in the humanities, arts, social sciences and sciences. It is inherently cross-disciplinary both within the humanities, and between the humanities and sciences.

Students entering the Science Fiction, Science, and Literature Ph.D. program with an M.A. in any discipline must take courses from the following areas:

1. Two theory courses from among CPLT 213, CPLT 214, CPLT 215A, CPLT 215B, CPLT 216
2. Three science fiction literature courses, including CPLT 274
3. One history of science course, (PHIL 237, PHIL 239, CHN/CLA 231, CHN/CLA 232, CPAC 134)
4. One course in Film and Media Studies (SOC 211, CPLT 174, CPLT 173, MCS 175, MCS 139, MCS 146)
5. One course in Philosophy or Religion from among either PHL 234, PHL 237, PHL 238 and PHL 239 -- or RLST 200A, RLST 200C, and RLST 224)
6. One course in Social Sciences (ANTH 261, ANTH 277, ANTH 279, CHN/CLA 141, MCS 247, SOC 261, SOC 281)
7. Two elective courses from any of the groups listed above.

Among all the various courses selected there must be at least one course on non-Western materials and two graduate literature courses with readings in the original language in each of the student's two language areas. Language areas include: Arabic, Chinese, English, French, German, Classical Greek, Italian, Indonesian, Japanese, Latin, Philopino, Portuguese, Russian, Spanish, and Vietnamese. The graduate advisor may require appropriate courses on an individual basis. When taking any upper-division undergraduate course listed here, the student must enroll in a 292 course.

**Teaching Requirement** Normally some teaching experience is required; such experience is obtained through a teaching assistantship whereby a student is assigned either to Comparative Literature or to another program. Students are strongly recommended to take one of the pedagogy courses in the department (CPLT 222 or CPLT 301) which may be used as one of their required elective courses.

**Written and Oral Qualifying Examinations** The written qualifying examination consists of the following:

1. For a student in the track of Interliterary Studies, the examination consists of four parts, which include the three national literatures that the student specializes in, with a comparative perspective, and on critical theory.
2. For a student in the track of Interdisciplinary Studies, the examination consists of four parts, which include two national literatures and one non-literary discipline that the student specializes in, with a comparative perspective, and on critical theory.

Prior to the examination for either track, students in consultation with the designated members of their committee, formulate a Special Reading List based on available departmental reading lists for each of the four parts that reflects the student's chosen fields of study and research and provides a basis for the examination.

Each of the four parts of the written examination for either the Interliterary or the Interdisciplinary Track is a three-hour exam. The written examinations are followed by an oral qualifying examination.

**Dissertation and Final Oral Examination** Candidates must write a dissertation on a topic approved by the dissertation committee and may be required to successfully undergo an oral examination on the dissertation.

**Normative Time to Degree** 18 quarters

**Lower-Division Courses**

CPLT 012. The Writer in Writing (4) Lecture, 3 hours; written work, 2 hours; outside research, 1 hour. Prerequisite(s): none. Targeted at the fledgling creative writer and apprentice literary critic, surveys the complex legacy surrounding the figure of the writer in world literature. Discussion and weekly writing exercises demonstrate the use of brainstorming in creating and critiquing literature. Cross-listed with CRWT 012.

CPLT 015. Language, Literature, and Culture (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): none. Introduces students to the connections between language, literature, and culture over the centuries and across national traditions through study of an array of literary forms and genres. Close reading of masterworks, selected to provide an overview of the fields of literary, linguistic, and cultural analysis.

CPLT 017A. Masterworks of World Literature (4) Lecture, 3 hours; discussion, 1 hour. Reading and discussion of selected great works from around the world in historical and cultural contexts. Covers antiquity to the early Renaissance stressing textual analysis.

CPLT 017B. Masterworks of World Literature (4) Lecture, 3 hours; discussion, 1 hour. Reading and discussion of selected great works from around the world in historical and cultural contexts. Covers the early Renaissance to the Enlightenment, stressing textual analysis.
CPLT 017C. Masterworks of World Literature (4) Lecture, 3 hours; discussion, 1 hour. Reading and discussion of selected great works from around the world in historical and cultural contexts. Covers the modern period, stressing critical methods and approaches to comparative literature.

CPLT 018. The Nature of Narrative (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): none. Examines the basic features of narrative (including plot, character, point of view, and time and space relations) within various literary forms, such as the anecdote, story, tale, novella, and novel.

CPLT 020. Tales of the Supernatural: Literature of the Monstrous and the Uncanny (5) Lecture, 3 hours; screening, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): none. Explores fiction relating to the supernatural, the uncanny, and the monstrous. Considers a wide variety of texts from diverse national literatures and traditions. Focuses on the interaction of notions of the supernatural with concepts of modernity and technological “progress.”

CPLT 021. Introduction to Film, Literature, and Culture (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Surveys critical approaches to the cinema such as auteur and genre theory. Studies literature and film, including Neorealism, and film movements. Cross-listed with MCS 021.

CPLT 022A. Introduction to World Literature by Women (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to world literature by women across many centuries. Covers the creative work of women from ancient to early modern periods, examining both texts and the historical circumstances of the earliest women writers. Emphasis is on texts originally written in languages other than English, from around the globe. Cross-listed with WMST 022A.

CPLT 022B. Introduction to World Literature by Women (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to the increasingly powerful voices of women writers in modernity and postmodernity. Emphasis is on texts originally written in languages other than English, from around the globe. Topics include the question of feminine writing and feminist theories about literature by women. Cross-listed with WMST 022B.

CPLT 024. World Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Introduction to world cinema as a fusion of national and international, culturally specific, and globally universal characteristics. Topics include realism, the role of world wars, Hollywood’s global reach, alternative aesthetics of third-world cinemas, cross-fertilization between Europe and Asia, and the function of international film festivals and the international film market. Cross-listed with MCS 024.

CPLT 025. The Sciences and Humanities through Science Fiction (4) Lecture, 3 hours; outside research, 3 hours. An interdisciplinary course that considers science fiction as an interface between today’s scientific and humanistic disciplines. Using books, films, and works of art, the course examines the interplay of these disciplines in science fiction’s treatment of such “big” themes as time, space, God, nature, mind, and the future.

CPLT 026. New European Cinemas: Experiment and Innovation (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An introduction to a succession of New Waves in European Cinema: Neorealism in Italy, New Wave in France, and New Cinema in Germany, Russia, and Britain. Study of political engagements and technical innovations. Topics include the concept of the auteur, key manifestos, and attempts to define European cinema in film theory. Cross-listed with EUR 026 and MCS 026.

CPLT 027. Food in Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Explores the representation of food, cooking, and restaurants in films from different national traditions. Includes gender roles; sensuality and sexuality; social class and the economics of food; excess and lack. Cross-listed with MCS 036.

CPLT 028. Justice, Law, Violence (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introduction to the concepts of justice, law, and violence through literary and philosophical texts. Raises fundamental questions of individual human existence within the social collective. Topics include natural right, freedom of will, sacrifice, revolution, gender, and power.

CPLT 029. The Arts: Approach, Comparison, and Culture (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introductory course on the arts, their meaning and interrelationship as well as their cultural contexts East and West. Focuses on several art forms within literary traditions. Cross-listed with MCS 036.

CPLT 063. Reading Southeast Asian Stories (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introduction to the modern short story in Southeast Asia, with a focus on literary- ness and the act of reading. Readings in translation; classes are conducted in English. Course is repeatable as content changes to a maximum of 8 units. Cross-listed with AST 063. Maier

Upper-Division Courses

CPLT 110. Literary Analysis and Criticism (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of different critical approaches to literature, through reading and discussion of literary texts and critical essays on those texts. Reading and discussions cover different genres and traditions as well as different critical approaches.

CPLT 110A. Vienna: Sensuality and Seduction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Cultural study of Vienna from fin de siecle to the present through literature, film, philosophy, and the visual arts. Topics include sexuality, visual desire, crisis of language, anti-Semitism, and the post-WWII culture with the Nazi period. All readings are in English; selected readings in German for German majors and minors. Cross-listed with EUR 110A, GER 110A, and WMST 110.

CPLT 110B. Berlin Metropolis in Literature, Film, Music, and Art (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the metropolis Berlin as gateway between the East and West. Explores topography of the city through film, art, music, and literary texts. A study of Berlin’s dramatic transformation as a microcosm of Germany and Europe’s troubled history in the twentieth century. Course is conducted in English. Cross-listed with AHS 120, EUR 110B, GER 110B, and MCS 178.

CPLT 112. Mythology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A comparative study of mythic traditions from several world cultures and religions viewed from a variety of theoretical perspectives. Includes material drawn from epics, religious texts, divine hymns, creation myths, heroic legends, and concepts of the afterlife as reflected in literary and nonliterary sources. Cross-listed with CLA 112 and RIST 117.

CPLT 114. The Classical Tradition (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the legacy of Greece and Rome in Western culture, from the Renaissance to the present. Topics include literature, art, architecture, and politics. Cross-listed with CLA 114.

CPLT 115. Modern German History through Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores twentieth-century German history through film. Includes World Wars I and II, inflation and polarization of classes, Nazi Germany, representations of the Holocaust, and a divided and reunited Germany. Cross-listed with GER 163, HSE 163, and MCS 115.

CPLT 120. Autobiography (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the genre of literary autobiography and its visual equivalents (self-portraits and autobiographical film). An examination of narrative structure and point of view; the boundaries between fiction and nonfiction; and concepts such as masks, sexuality, memory, and biculturalism. Focus may change from year to year. Course is repeatable as topics change.

CPLT 121. Crossing Borders: Immigration, Migration, and Exile in Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Proposes an international look at the phenomenon of migration through film. Film can be considered the foremost medium to do justice to this issue.

CPLT 125. Mutual Fascinations: French-Mexican Cultural Relations (4) Lecture, 3 hours; term paper, 2 hours; outside research, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores the mutual attraction between Mexican and French cultures. Readings include the works of Mexicans Reyes, Rivera, Fuente, and Toledo and Frenchmen Artaud, Breton, Peret, and Soutelle and demonstrate the long-lived attraction between Mexico and France. Examines how artists, writers, and intellectuals are transformed by their experiences in each country.

CPLT 126. From Novel to Screen: Film Adaptations of German Literature (4) Lecture, 3 hours; screening, 2 hours; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to classic works of German literature and their film adaptations. Explores works by film directors such as Welles, Kubrick, Visconti, and Fassbinder. Studies the nexus between literature, film, and theatre. Course conducted in English. Cross-listed with GER 126 and MCS 126.

CPLT 131. Marx, Nietzsche, Freud (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Critical introduction to three central thinkers of modernity. Topics
include alienation, free will, revolution, the unconscious, sexual difference, political power, and the modern conception of truth. Readings and discussions are in English. Selected readings are in German for German majors and minors. Cross-listed with GER 131.

CPLT 132. Rousseau and Revolution (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory study of the French philosopher and novelist Jean-Jacques Rousseau and the age of revolution in France, Germany, and England. Topics include social inequality, slavery, gender, subjectivity, violence, and political rights. All readings are in English. Cross-listed with FREN 132 and GER 132.

CPLT 134. Cinematic War Memory (4) Lecture, 3 hours; screening, 2 hours, extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines cinematic confrontations involving World War II in Germany and Japan. Topics include desire between victims and perpetrators, representation of trauma, and ethical responsibility. All screenings have English subtitles. Cross-listed with GER 134, JPN 134, and MCS 114.

CPLT 135. Film Noir and Hollywood’s German Immigrants (4) Lecture, 3 hours, screening, 2 hours; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Analysis of the role of German immigrants in the emergence of film noir in 1940s’ Hollywood. Examines the revitalization of Weimar Expressionism in Hollywood cinema. Explores traumatic memory, cultural transfer, exile and displacement in films by German filmmaker refugees including Fritz Lang and Billy Wilder. Cross-listed with GER 135 and MCS 170.

CPLT 137. Passions, Apparitions, and Automata (4) Lecture, 3 hours, extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory study of German Romanticism from its origins in Goethe to its development in Hoffmann. Topics include madness, sexual desire, doppelganger, homicide, and automatism. All readings are in English. Selected readings are in German for German majors and minors. Cross-listed with EUR 137 and GER 137.

CPLT 138. From Expressionism to Epic Theatre: Benn, Brecht, Kafka, and the Bauhaus (4) Lecture, 3 hours; screening, 3 hours; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduction of the German avant-garde of the twentieth century. Explores expressionism, New Objectivity, the Bauhaus movement, the manifestation of an anti-art in dadaism, and Epic Theatre. Studies works of Franz Kafka in the context of his implicit criticism of the avant-gardist movements of his time. Course is conducted in English. Cross-listed with AHS 121, EUR 138, GER 138, and MCS 182.

CPLT 140. Italian Renaissance Texts and Contexts (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores changes in notions of space, time, religion, economics, history, politics, art, gender, and sexuality through an interdisciplinary consideration of verbal and visual texts. Readings are of Petrarch, Boccaccio, Veronica Franco, Gaspara Stampa, Machiavelli, Castiglione, Ariosto, Benvenuto Cellini, Marco Polo, Cristoforo Colombo. Presents slides of relevant architecture and visual images. Cross-listed with ITAL 140.

CPLT 141. Introduction to East-West Comparative Studies (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of the basic issues in comparative literature studies of non-Western literatures and cultures. From Renaissance travelogue literature to postmodern mythologies of the Orient, critical and theoretical perspectives are discussed in the light of the dynamic interactions between the East and the West.

CPLT 142 (E-Z). Women’s Writing in Modern Asia and Asian America (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers comparative histories of feminist literary movements, gender and immigration, autobiography, translation, and subjectivity. Asian literature will be circulated in the original language to students with reading ability (not required). E. Chinese and Chinese American Writing; J. Japanese and Japanese American Writing; K. Korean and Korean American Writing; V. Vietnamese and Vietnamese American Writing. Cross-listed with WMST 142 (E-Z).

CPLT 143. France and Asia in Literature and the Arts (4) Lecture, 3 hours; screening, 20 hours per quarter; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores French portrayals of Asia in literature, cinema, the other arts, and popular culture. Topics include colonialism, orientalism, gender, race, and language. Cross-listed with FREN 143.

CPLT 144. Buddhist Literature (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): RLST 005 or RLST 005H or RLST 101 or RLST 105 or RLST 106 or consent of instructor. Readings in canonical Buddhist narratives and examination of the themes of emptiness and impermanence in Buddhist-inspired literature. Examples are drawn from classical and modern Asian prose and poetry as well as from the work of contemporary American authors. Cross-listed with RLST 144.

CPLT 145. Modern Japanese Thought (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Survey of modern Japanese thought from a theoretical and intellectual historical perspective. Topics include philosophical discussions of modernization, “Westernization,” “nationalization,” “dualism,” and imperialism, “comfort women,” Japanese war crimes in continental Asia, the American bombing of Hiroshima and Nagasaki, post-World War II memory and denial. All readings are in English. Cross-listed with JPN 145.

CPLT 146. Comedy and Satire (4) Lecture, 3 hours; outside reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigates the origins and historical development of contemporary Western culture’s most popular genres. Although the focus is on literary texts ranging from Aristophanes to the present, the course also considers the many other cultural media through which the comic and the satirical find expression—among them, caricature drawing, photography, comic books, film, and television. Attention is given to debates about the related functions of irony, laughter, violence, and sexuality.

CPLT 147 (E-Z). The Novel (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigation of the novel as a preeminent register of cultural values and common literary themes, derived from the various national literatures and literary epochs. The novel form is examined in terms of selected, related works by some of its greatest practitioners. E. The Existential Novel; F. The Carnavalesque. Credit is awarded for only one of CPLT 147F or HNPG 307.

CPLT 148. Short Narrative (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis and interpretation of short narrative texts from the linked perspectives of universal themes and shared literary concerns. The finest short prose, including the anecdote, short story, tale, and novella, by some of the world’s greatest writers is explored in depth.

CPLT 149. The Development of Classical Modern Drama (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Consisting of readings, discussions, and lectures, treats plays and theories from the German, Scandinavian, Russian, and French repertoire among others. Covers Naturalism to Expressionism (1880-1918).

CPLT 151. Palestine/Algeria (4) Lecture, 3 hours; extra reading, 24 hours per quarter; screening, 6 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. Considers two distinct and related literary and historical moments—Palestine and Algeria. Topics include the relations between language and context; literature and literary historiography; genre and idiom; violence and the body; and the state and institutional practices of reading. Cross-listed with ARLC 151.

CPLT 152. Modern Arabic Poetry in a Multilingual Frame (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers selected writings of Adonis (’Ali Ahmed Sa’id), Mahmoud Darwish, Abdelatif La’abbi, and Etel Adnan, published originally in Arabic, French, and English. Topics include language (idiom, statement, utterance, translation, repetition, rhythm) and history (loss, violence, mourning, inheritance, future, legacy). Course is taught in English. Cross-listed with ARLC 152.

CPLT 153. Literature, Language, Relation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers the rapport among language, relation, and literature. Focuses upon the relations among context and modes of address (the Qur’an, Levitas, Austin, Derrida); the name and the positing force of language (Darwin, Plato, Nietzsche); and language, violence, and poetic statement (Ibn Arabi, Heidegger, Benjamin).

CPLT 160 (E-Z). Comparative Cultural Studies: From the Middle Ages to Postmodernism (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Each segment deals with a significant cultural “event” whose implications (historical, political, literary) cross national and cultural boundaries. In order to present a diversity of national and linguistic views, segments are where feasible team taught. F. The French Revolution and Napoleon; G. The Holocaust; M. Millenium and Apocalypse.

CPLT 163. Nationalism and the Novel (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the novel and its role within nationalism as a representative summary or mirror of the nation. Cross-listed with AST 163.

CPLT 166. Vietnam and the Philippines (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the comparative national histories of Vietnam and the Philippines by way of great literary works in various genres: poetry, short fiction, and novels. All materials are read in English. Cross-listed with AST 166 and VNM 166.
CPLT 167. Postcolonial Literature and Criticism in Southeast Asia and South Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores how the theoretical concepts of postcolonial criticism inform and challenge the literature of Southeast Asia and South Asia, as the literature itself pushes the limits of the criticism. Addresses themes of nation, identity, space, gender, home, diaspora, alterity, history, sexuality, transnationalism, neocolonialism, tourism, and education. Cross-listed with AST 167.

WRLT 170. Third World Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of some major works associated with Third World literature and film. Emphasis on African, Latin American, Caribbean, African-American, and Chicano literature. Cross-listed with ETST 170.

CPLT 171 (E-Z). Auteurs and Auteur Theory (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Critical studies on a director or group of directors that deal with a substantial portion of their filmography. Fassbinder, Fellini, T. Truffaut. Cross-listed with MCS 121 (E-Z).

CPLT 173 (E-Z). International Cinemas (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): MCS 120 or upper-division standing or consent of instructor. Considers non-Hollywood cinemas in the national, historical, political, and cultural contexts which produced them. E. Experimental and Avant-Garde Film; F. French New Wave; G. New German Cinema; I. Italian Neorealism; T. Third World Cinema; V. Global Perspectives on the Vietnam War. Cross-listed with MCS 173 (E-Z).

CPLT 174 (E-Z). Comparative Studies in Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers film in the context of the other arts. Compares the treatment of various themes or problems in film and other media. E. Film and Literature in the Avant-Garde. Cross-listed with MCS 174 (E-Z).

CPLT 178. Religious Biography (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the construction and continuing appropriation of biographical images (textual and visual narratives) in selected religious traditions. Special attention is given to problems of intertextuality and the medium of presentation in the communication of "religious" meaning. Cross-listed with RLST 178.

CPLT 180 (E-Z). Literature and Related Fields (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical survey of the theories and methodologies involved in the comparative study of literature and nonliterary fields. E. Literature and History; I. Literature and Institutions; L. Prelaw Readings in Literature; M. Literature and Music; P. Literature and Psychopathology; S. Literature and Science; V. Literature and the Visual Arts; X. Literature and Marxism; Z. Literature and Fiction/Fantasy.

CPLT 181. Existentialism in Literature, Film, and Culture (4) Lecture, 3 hours; screening, 2 hours; outside research, 5 hours; term paper, 5 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the Existentialist movement in literature, film, and culture. Texts range from essays, plays, and novels to documentary and fiction film. Topics include choice, subjectivity, and alienation. Cross-listed with FREN 181 and MCS 181.

CPLT 187. Metafiction (4) Lecture, 3 hours; creative writing, take-home midterm, or term paper, 30 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. Covers postmodernism, metaphiction, and the new novel in Europe and America. Creative writers submit fiction in lieu of a term paper or midterm. Cross-listed with CRWT 187.

CPLT 190. Special Studies (1-5) To be taken with the consent of the chair of the Department as a means of meeting special curricular requirements. Course isrepeatable.

CPLT 195H. Senior Thesis (1-2) Open by invitation to students in the Honors Program in Comparative Literature. Grade is deferred until the end of the second or third quarter. To be taken for two or three consecutive quarters; total credit may not exceed 6 units.

Graduate Courses

CPLT 200. Topics in Southeast Asian Studies (4) Seminar, 3 hours; written work, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An introduction to the world of Southeast Asia and the scholarly discussions about it; with an emphasis on cultural aspects, embedded in the historical context. Materials are in English. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with SEAS 200.

CPLT 205. Literature of Southeast Asia (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores themes and theories related to understanding literature and literary culture in Southeast Asia, insisting that the space of literature reaches beyond the text to include all disciplines. Students critically read, engage in, and question discourses of nationhood, identity, loss, mourn ing, history, and memory. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with SEAS 205.

CPLT 210. Canons in Comparative Literature (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Studies the concept of the canon and literary texts included in and excluded from it. Considers the distinction between "mainstream" and "marginal" works. Examines how the canon of texts changes over time. Course is repeatable as topics change.

CPLT 212. Introduction to Graduate Studies in Comparative Literature (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Surveys the history of comparative literature and introduces the beginning graduate student to the various methodologies, aesthetic theories, and critical approaches which have come to dominate its field of inquiry. In addition to class discussion, examinations, and a term paper, students are also involved in a number of practical activities designed to sharpen their critical acumen, enlarge academic vocabulary, and encourage mastery of scholarship procedures.

CPLT 213. Rhetoric and Argument in Ancient China and Greece (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Surveys the history of comparative literature and introduces the beginning graduate student to the various methodologies, aesthetic theories, and critical approaches which have come to dominate its field of inquiry. In addition to class discussion, examinations, and a term paper, students are also involved in a number of practical activities designed to sharpen their critical acumen, enlarge academic vocabulary, and encourage mastery of scholarship procedures.

CPLT 214. History of Criticism (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing; seniors may be admitted by consent of instructor. A survey of critical theories from Plato to modern time through reading and group discussion. Emphasis is on fundamental theoretical issues that recur in the history of literary criticism and are relevant to modern concerns.

CPLT 215A. Contemporary Critical Theory (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Considers representative critical works and movements in contemporary theory. Includes the study of formalism, structuralism, semiotics, psychoanalytic and feminist theory, and deconstruction.

CPLT 215B. Issues in Contemporary Theory (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Focuses on a specific problem or movement in contemporary theory. Course is repeatable as content changes.

CPLT 216. Semiotics: Literature and Culture (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Traces the impact of semiotics through West European, particularly French, structuralist and post-structuralist thought. Considers the very different applications of semiotics in the work of Claude Levi-Strauss, Roland Barthes, Julia Kristeva, Tzvetan Todorov, Jacques Lacan, and Jacques Derrida, among others. Course is repeatable as content changes.

CPLT 217A. Masterworks of World Literature (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Treats literature, including the ancient epics of Greece and Rome, from its origins through the seventeenth century.

CPLT 217B. Masterworks of World Literature (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Examines works from the seventeenth century through the nineteenth century.

CPLT 217C. Masterworks of World Literature (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Treats works of the modern period.

CPLT 218. Narrative Universals (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Analysis of narrative in concrete literary works. Explores basic considerations and oppositions, including metaphor and metonymy, space and time relations, mimesis and diegesis, monologue and dialogue, literal and figurative representation, within the context of specific representative texts.

CPLT 219. Dante and Italian Cinema (4) Seminar, 3 hours; screening, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the poetical goals and strategies of each of the three sections of Dante's Commedia—Inferno, Purgatorio, and Paradiso—with the innovative cinematic languages of leading post-World War II Italian filmmakers, including Rossellini, Pasolini, Fellini, Antonioni, Caveni, Wertmuller, Nichetti, and Moretti. Integrates theoretical discussions of representation, desire, knowledge, gender, sexuality, and subjectivity with close textual analysis of poetry and film.

CPLT 220 (E-Z). German Aesthetic Theory (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to individual figures in the history of German aesthetic theory and their legacy in critical discourse. Topics include philhellenism, the beautiful, the sublime, the ugly, fascist chic, mimesis, ornament, the "thing."
mechanical reproduction, sudden, synaesthesia, and technomedia. All readings are in English. E. Kant; F. Benjamin. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Each segment is repeatable as its topics change.

CPLT 222. Problems in the Pedagogy of Comparative Literature (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Addresses the theories of literary pedagogy and emerging discussions about the teaching of comparative literature.

CPLT 224. Film Theory (4) Seminar, 3 hours; screening, 3 hours; individual study, 3 hours. Prerequisite(s): standing or consent of instructor. Advanced introduction to classic texts of early and contemporary film theory. Discusses theoretical claims of relevant films. Major concepts include realistic film theory, cinema of attractions, apparatus theory, theory of film practice, feminist film theory, and notions of gender, race, and class. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CPLT 243. France and Asia: Orientalism and Beyond (4) Seminar, 3 hours; screening, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the phenomenon and concept of Orientalism as well as alternative paradigms for East-West aesthetic and cultural relations through theory, literature, and film. Geographical areas and periods of focus may vary. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CPLT 252. Topics in Tourism, Cultural Authenticity, and the Question of Nostalgia (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces theoretical literature concerning the intertwined notions of tourism, cultural authenticity, and nostalgia. Encourages students to approach written texts and other media from a critical perspective, considering the context of both cultural production and consumption. Valuable to students working on issues such as orientalism, modernity studies, diasporic literature, and postcolonial literature. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes.

CPLT 267. Colonialisms and Postcolonial Criticism (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers the historical development of postcolonial criticism and how its theoretical concepts inform and challenge the study of literature and culture. Addresses themes of nation, identity, space, gender, home, diaspora, alterity, history, sexuality, transnationalism, neocolonialism, domestic colonialism, tourism, and education. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes.

CPLT 271. Narratology and Comparative Stylistics (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Considers the development of a modern "narrative" of narrative, examining the basic forms or aspects and how they function, both in different narrative contexts (i.e., novel, drama) and in different national and cultural modes.

CPLT 272. The Origins and Promise of Science Fiction (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): standing or consent of instructor. Studies the literary, scientific, and social origins of the science fiction genre and how it generates new themes, narrative structures, and perspectives on the human condition.

CPLT 273. Genre and Method in Science Fiction Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to the critical debate within the field of science fiction and to some of the early and fundamental concepts of what science fiction is and what it does. Examines the development of science fiction from its origins through its influence on critical theory in twentieth- and twenty-first century texts.

CPLT 274. Representation of Science in Literature (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Examines the interrelations between scientific activity and literary and cultural expression through a study of "scientific" and "literary" narratives. Span a period of Western culture from Greek science to today's East-West fusion of science and religious cosmology.

CPLT 275. Science Fiction Authors (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the work of one of the core authors of science fiction and the reception of that work in either the initial formation or later development of the genre. Course is repeatable as content changes to a maximum of 12 units.

CPLT 276. Science Meets the Fiction (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines how changing scientific views of the world impact the science fiction genre. Studies the evolution of travel narratives and the historical novel into new adaptations of scientific visions of space and time. More broadly, examines how the genre reflects changing social and scientific concepts.

CPLT 277. Seminar in Comparative Literature (4) Seminar, 3 hours; consultation, 1 hour. Special topics in comparative literature. Subject may vary from quarter to quarter depending on instructor. Course may be given by visiting faculty. May be repeated.

CPLT 286. Interdisciplinary Studies (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Examines the idea of academic "disciplinary." Studies the relations between literature and other fields, and how diverse disciplinary methods may be brought to bear on literature taken in the broadest multinational and multicultural context. Course is repeatable as content changes.

CPLT 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CPLT 290 (E-Z). Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and department chair. To be taken as a means of meeting special curricular needs in literature. E. English; F. French; G. German; H. Greek; I. Italian; J. Japanese; K. Chinese; L. Latin; M. Latin American; R. Russian; S. Spanish; T. Scandinavian; U. American; V. Slavic. Segments are repeatable.

CPLT 291. Individual Studies in Coordinated Areas (1-6) A directed program of study designed to advise and assist candidates who are preparing for examinations. Open to M.A. and Ph.D. candidates. Does not count toward the unit requirement for the M.A. Graded Satisfactory (S) or No Credit (NC). May be repeated quarterly until the qualifying examinations are completed.

CPLT 292. Concurrent Analytical Studies (2) Research, 6 hours. Prerequisite(s): consent of instructor; current enrollment in CPLT 100-series course. To be taken on an individual basis. Student will complete a graduate paper based on research related to the CPLT 100-series course. May be repeated with different topic.

CPLT 299. Research for Thesis or Dissertation (1-12) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

CPLT 301. Teaching of Foreign Language at the College Level (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing, or senior standing with consent of instructor. Covers first and second language acquisition; general models of L2 learning; learning different types of grammar; learning other components of language: acquisition of pronunciation, vocabulary, and discourse; multilingual societies and the goals of language teaching; and implications of second language acquisition research for the foreign language classroom. Graded Satisfactory (S) or No Credit (NC).

CPLT 302. Teaching Practicum (1-4) Practicum, 3-12 hours. Prerequisite(s): CPLT 301 or equivalent; graduate standing; employment as a teaching assistant or associate in. Supervised teaching in lower-division courses. Required of all teaching assistants in Comparative Literature. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Related Courses


ITAL 139. The Divine Comedy. (4) Description under Italian.

RLST 120. The Bible, from Egypt to Exile. (4) Description under Religious Studies.


French

Subject abbreviation: FREN

Committee in Charge

Theda Shapiro, Ph.D., Chair, French/Comparative Literature
Michelle E. Bloom, Ph.D. Comparative Literature/French
Heidi Brevik-Zender, Ph.D. French/Comparative Literature
Christine Duverge, Ph.D. French
Stephanie B. Hammer, Ph.D. Comparative Literature/Germanic Studies
Jennifer Ramos, M.A. French
Cheryl Tarantino, M.A. French/Italian
Kelle Truby, Ph.D. French
Stephen E. Cullenberg, Ph.D. French
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major

The department offers the B.A. program in French civilization, literature, and language. The core of the major is the study of French...
culture, literature, or language. Students work in consultation with their advisors, developing their interests in relation to French literature, civilization, or language. Students can take the major with either a Literature option or a Civilization option.

Students are encouraged to consider opportunities for study through the Education Abroad Program (EAP). This is an excellent opportunity to become deeply familiar with another country and its culture while earning academic units towards graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Foreign Language Placement Examination A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placementtest.ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

French Literature Option
1. Language proficiency — 16 upper-division units of work in the French language distributed as follows:
   a) FREN 101A, FREN 101B, FREN 101C
   b) FREN 100
2. Literature concentration
   a) CLA 027A, CLA 027B
   b) A minimum of 36 units distributed as follows
      (1) CPLT 110
      (2) FREN 109A, FREN 109B, FREN 109C, FREN 109D
      (3) Sixteen (16) units of electives in French literature chosen from courses numbered 145 and above

French Civilization Option
1. Language proficiency: FREN 101A, FREN 101B, FREN 101C or equivalents
2. Civilization concentration (44 units)
   a) Sixteen (16) units of upper-division courses dealing with topics in French culture chosen with the approval of the student’s faculty advisor
   b) Eight (8) units of work in French literature
   c) FREN 100
   d) Sixteen (16) units of electives, either in French civilization and French literature, or, with approval of the student’s advisor, in courses outside the French program relating to French civilization (Related history courses are strongly recommended.)

Minor
The department offers a 24-unit disciplinary minor in French.
Requirements for the minor are as follows:
1. FREN 101A, FREN 101B, FREN 101C
2. FREN 100

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Honors Program
Students who wish to undertake a special program of honors study in upper-division courses should apply to the department.

Graduate Programs
Master’s Degree
The master’s program in French is not currently accepting new students.

Doctoral Degree
Ph.D. studies in French are available through the Ph.D. program in Comparative Literature.

Lower-Division Courses
FREN 001. Elementary French (4) F, W, S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): Student must take the French placement examination or obtain the consent of the instructor. An introduction to the sound system and grammar of French, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in French. Audio-lingual and computer-based learning materials available in language laboratory.

FREN 002. Elementary French (4) F, W, S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): FREN 001 with a grade of “C-” or better or equivalent. An introduction to the sound system and grammar of French, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in French. Audio-lingual and computer-based learning materials available in language laboratory.

FREN 003. Elementary French (4) F, W, S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): FREN 002 with a grade of “C-” or better or equivalent. An introduction to the sound system and grammar of French, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in French. Audio-lingual and computer-based learning materials available in language laboratory.

FREN 004. Intermediate French (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): FREN 003 with a grade of “C-” or better or equivalent. Continued study of the grammatical structures of French; vocabulary building; development of reading and compositional skills. Classes conducted in French.

FREN 009A. French for Reading Knowledge (4) Lecture, 3 hours. A specialized course developing the skill to translate from French into English. No previous knowledge of French is required.

FREN 009B. French for Reading Knowledge (4) Lecture, 3 hours. Prerequisite(s): FREN 009A. A specialized course developing the skill to translate from French into English. No previous knowledge of French is required.

FREN 015A. Intermediate Conversation and Composition (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): FREN 004 or consent of instructor. Development of speaking, understanding, composition, and reading at the intermediate level. Review of basic grammar with an aim to active oral and written command. Classes conducted in French.

FREN 015B. Intermediate Conversation and Composition (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): FREN 015A. Development of speaking, understanding, composition, and reading at the intermediate level. Review of basic grammar with an aim to active oral and written command. Classes conducted in French.

FREN 045. French Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Covers masterpieces of French cinema. Examines the historical evolution of French cinema as an art form, with emphasis on major themes and directors. Cross-listed with MCS 045.

FREN 090. Special Studies (1-3) To be taken with the consent of the Chair of the Department as a means of meeting special curricular problems. Course is repeatable.

Upper-Division Courses
FREN 100. Advanced Conversation (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): FREN 015B or equivalent. Practice in the development of oral proficiency and fluency of expression. Only 4 units to apply toward the major. Course is repeatable.

FREN 101A. Advanced Grammar and Stylistics (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): FREN 015B or equivalent. Focuses on analytical writing. Writing techniques for introductions, paragraph development, and conclusions are presented and practiced. Students also write essays on literary texts.

FREN 101B. Advanced Grammar and Stylistics (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): FREN 015B or equivalent. An in-depth review of grammar and composition and an introduction to French syntax. At times grammar is presented through a notational approach: how to express cause, goal, consequence, concession, and restriction.

FREN 101C. Advanced Grammar and Stylistics (4) F, W, S Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): FREN 101B. Designed to make students aware of the differences between English and
French through translation. Topics include tense use, prepositions, word use, and syntax.

**FREN 109A. Main Currents in French Literature: Middle Ages and Renaissance (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): comprehension of written and spoken French. A study of the principal movements in French literature, based on the reading of representative works in their entirety.

**FREN 109B. Main Currents in French Literature: Seventeenth and Eighteenth Centuries (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): comprehension of written and spoken French. A study of the principal movements in French literature, based on the reading of representative works in their entirety.

**FREN 109C. Main Currents in French Literature: Nineteenth Century (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): comprehension of written and spoken French. A study of the principal movements in French literature, based on the reading of representative works in their entirety.

**FREN 109D. Main Currents in French Literature: Twentieth Century (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): comprehension of written and spoken French. A study of the principal movements in French literature, based on the reading of representative works in their entirety.

**FREN 112. Mythology in French Literature, Film, and the Visual Arts (4)** Lecture, 3 hours; field, 1 hour; outside research, 1 hour, term paper, 1 hour. Prerequisite(s): FREN 101A or FREN 101B or FREN 101C or consent of instructor. Studies myths and mythological figures in 17th- through 20th-century French texts. Focuses on literature (theatre, short stories, and novels), and film, painting, and popular culture. Myths include Pygmalion, Venus, Orpheus, Narcissus and Echo, and Icarus. Course is conducted in French.

**FREN 124 (E-Z). Gender in French Studies (4)** Lecture, 3 hours; extra reading, 2 hours; screening, 1 hour. Prerequisite(s): FREN 101A or FREN 101B or FREN 101C or consent of instructor. Studies in the study of French philosopher and novelist Jean-Jacques Rousseau and the age of revolution in France, Germany, and England. Topics include depictions of women, writing by male and female authors, and women in relation to power. Instruction is in French. G. Gender, Race, and Identity Politics; P. Portrayals of Women in Literature and Film.

**FREN 132. Rousseau and Revolution (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory study of the French philosopher and novelist Jean-Jacques Rousseau and the age of revolution in France, Germany, and England. Topics include social inequality, slavery, gender, subjectivity, violence, and political rights. All readings are in English. Cross-listed with CPLT 132 and GER 132.

**FREN 143. France and Asia in Literature and the Arts (4)** Lecture, 3 hours; screening, 20 hours per quarter; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores French portrayals of Asia in literature, cinema, the other arts, and popular culture. Topics include colonialism, orientalism, gender, race, and language. Cross-listed with CPLT 143.

**FREN 148 (E-Z). French Literature of the City (4)** Lecture, 3 hours; screening, 1 hour; extra reading, 2 hours. Prerequisite(s): FREN 101A or FREN 101B or FREN 101C or consent of instructor. Explores aspects of French literature dealing with city life. Examines visual and cultural material in conjunction with literary works read and discussed. Instruction and reading is in French. S. The Culture of the Paris Suburbs.

**FREN 150 (E-Z). Francophone Studies (4)** Lecture, 3 hours; screening, 1 hour; term paper, 1 hour; outside research, 1 hour. Prerequisite(s): FREN 101A or consent of instructor. Explores the literature, film, and culture of French-speaking countries and regions outside of metropolitan France. Courses taught in French. E. Auto-biographies by West African Women; F. Island Literature; W. Writing by and about Women.

**FREN 152. Food and French Literature (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): FREN 101A or consent of instructor. Explores the role of food in French literature. Discusses descriptions of food and concepts such as eating as consuming; food, desire, and sex; gendering of food; cooking, food preparation, recipes, and menus; and food and social class (poverty and wealth). Taught in French.

**FREN 177 (E-Z). Studies in Nineteenth Century French Literature (4)** Lecture, 3 hours; extra reading, 2 hours. Prerequisite(s): comprehension of written and spoken French. Study of selected topics in nineteenth-century French literature. N. Nineteenth Century Novel; R. Romanticism; S. Symbolism.

**FREN 181. Existentialism in Literature, Film, and Culture (4)** Lecture, 3 hours; screening, 2 hours; outside research, .5 hours; term paper, .5 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the Existentialist movement in literature, film, and culture. Texts range from essays, plays, and novels to documentary and fiction film. Topics include choice, subjectivity, and alienation. Cross-listed with CPLT 181 and MCS 181.

**FREN 185 (E-Z). Studies in French and Francophone Cinema (4)** Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the cinema of France and other Francophone countries. Focus is on specific themes in relation to French-language film. Knowledge of French is not required. F. Literature, Cinema, and Culture of the Francophone World; W. Women Directors. Cross-listed with MCS 183 (E-Z).

**FREN 187. Theatre of the Twentieth Century (4)** Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): comprehension of written and spoken French. A study of major representative playwrights of the twentieth century, with emphasis on the traditional and/or avant garde theater.

**FREN 190. Special Studies (1-5)** To be taken with the consent of the department chair as a means of meeting special curricular problems. Course is repeatable.

**FREN 199SH. Senior Honor Thesis (1-4)** Consultation, 1 hour; individual study, 3-9 hours. Prerequisite(s): invitation by faculty member. Open to M.A. candidates who are preparing for examinations. Open to M.A. candidates. Does not count toward the unit requirement for the M.A. May be repeated quarterly until the qualifying examinations are completed. Graded Satisfactory (S) or No Credit (NC).

**FREN 292. Concurrent Analytical Studies in French (2)** Outside research, 6 hours. Prerequisite(s): consent of instructor; concurrent enrollment in a French 100-series course. To be taken on an individual basis. Student completes a graduate paper based on research related to the French 100-series course. Course is repeatable as topics change. FREN 100 and the FREN 101A, FREN 101B, and FREN 101C sequence may not be used for FREN 292.

**FREN 299. Research for Thesis or Dissertation (1-12)** Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

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### Professional Courses

**CPLT 301. Teaching of Foreign Language at the College Level (4)** Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing, or senior standing with consent of instructor. Covers first and second language acquisition; general models of L2 learning; learning different types of grammar; learning other components of language: acquisition of pronunciation, vocabulary, and discourse; multilingual societies and the goals of language teaching; and implications of second language acquisition research for the foreign language classroom. Graded Satisfactory (S) or No Credit (NC).

**FREN 302. Teaching Practicum (1-4) Practicum, 3-12 hours.** Prerequisite(s): CPLT 301 or equivalent; graduate standing; employment as a teaching assistant or associate in. Supervised teaching in lower-division courses. Required of all teaching assistants in French. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

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### Germanic Studies

**Subject abbreviation: GER**

#### Committee in Charge
Sabine Doran, Ph.D., Chair, Comparative Literature/Germanic Studies
Reinhold Grimm, Ph.D. (Ementius) Comparative Literature/Germanic Studies
Stephanie B. Hammer, Ph.D. Comparative Literature/Germanic Studies
John M. Kim, Ph.D. Comparative Literature
Sabine Thuerwaechter, Ph.D. German/Comparative Literature
Heidi Waltz, Ph.D. Linguistics/Germanic Studies
Stephen E. Cullenberg, Ph.D. Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Department of Comparative Literature and Languages offers a B.A. major and a minor in Germanic Studies.

Whether one thinks of philosophy, music, art, religion, or political and social history, Germanic culture has exercised a profound and often decisive influence on Europe. To aid students’ appreciation of these achievements, knowledge of German is a valuable asset.

In light of the role that Germany and all other German-speaking countries play within the European Union and worldwide, anyone interested in the study of art, literature, philosophy, history, and the sciences would profit from the...
Germanic Studies program. Apart from acquiring a reading, speaking, and writing knowledge of the German language, students of this program become familiarized with the great contributions of German poets and thinkers as they manifest themselves in the Germanic literatures and scientific research and are exposed to a wide range of customs in Germany, Austria, and Switzerland.

The Germanic Studies major and minor offer a diverse curriculum ranging from beginning language classes to advanced study of sophisticated literary and cultural topics.

The minor naturally complements liberal arts degrees in many areas, including History, Art History, Philosophy, Music, English, Business, and any area studies involving European aspects.

Students are encouraged to consider opportunities for study through the Education Abroad Program (EAP). This is an excellent opportunity to become deeply familiar with another country and its culture while earning academic units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Foreign Language Placement Examination A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placementtest.ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Major
1. Lower-division requirements (16 units)
   GER 001, GER 002, GER 003, GER 004, or equivalents
2. Upper-division requirements (44 units)
   a) Sixteen (16) units from the following: GER 100, GER 101, GER 103A, GER 103B, GER 108
   b) Twenty-eight (28) units as follows:
      (1) Sixteen (16) upper-division units in German literature beyond the language proficiency requirement
      (2) Four (4) units from GER 118 (E-Z)/MCS 118 (E-Z)
      (3) LING 111
      (4) Four (4) units outside the Germanic Studies program but related to the major from the following: PHIL 121S, PHIL 1220, PHIL 122N, HISE 141, HISE 142, HISE 145, HISE 146, HISE 162 (or any other course related to the major, with approval of the student’s advisor)

Minor
1. Lower-division requirements (16 units)
   GER 001, GER 002, GER 003, GER 004, or equivalents
2. Upper-division requirements (28 units)
   a) Sixteen (16) units from the following: GER 100, GER 101, GER 103A, GER 103B, GER 108
   b) Twelve (12) upper-division elective units in German literature, film, or courses related to Germanic Studies, with approval of the student’s advisor.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Honors Program
Students who wish to undertake a special program of honors study in the upper division should apply at the beginning of the junior year. Acceptance for honors study is based on students’ previous grade records and the recommendations of their instructors. Candidates for honors must demonstrate superior capacity for independent study and during the senior year are required write an individually directed senior thesis.

Graduate Programs
Master’s Degree
The master’s program in Germanic Studies is not currently accepting new students.

Doctoral Degree
Ph.D. studies in Germanic Studies are available through the Ph.D. program in Comparative Literature.

Upper-Division Courses
GER 100. Introduction to German Literature (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): GER 004; consent of instructor. Involves reading and analysis of literary texts within a literary-historical frame-
work. Seeks to familiarize the beginning student of literature with the main currents, representatives, and genres of modern German literature. Language of instruction is German. Ochs

GER 101. German Conversation (4) Lecture, 4 hours. Prerequisite(s): GER 004 or equivalent. Involves development of active control of the language with discussion and presentation of assigned topics. Supervised work in German phonetics.

GER 103A. Advanced Composition and Conversation (4) Lecture, 4 hours. Prerequisite(s): GER 004 or consent of instructor. Emphasis is on the mastery of the subtleties of the German language, including conversation, reading, listening, and writing. Reinforces oral and written skills through exposure to and analysis of a broad range of texts, essay writing, and oral presentations. Ochs

GER 103B. Advanced Composition and Conversation (4) Lecture, 4 hours. Prerequisite(s): GER 004 or consent of instructor. Improves oral and written proficiency of the German language. Emphasis is on reading increasingly difficult material, conversational use of German, vocabulary building, and study of idioms. Materials include newspaper articles and television programs that explain the German educational system, the arts, history, and politics.

GER 108. The Art of Translation (4) Lecture, 1 hour; discussion, 3 hours. Prerequisite(s): GER 101 or GER 103A or GER 103B or consent of instructor. Examines translations of the great literary masterworks of Germanic languages required. With permission of the instructor. A study of representative works of significance. Topic varies from quarter to quarter. No knowledge of German is required. Cross-listed with CPLT 110A, EUR 110A, and WMST 110.

GER 110A. Viennese Sensuality and Seduction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Cultural study of Vienna from fin de siècle to the present through literature, film, philosophy, and the visual arts. Topics include sexuality, visual desire, crisis of language, anti-Semitism, and the post-World War II confrontation with the Nazi period. All readings are in English; selected readings in German for German majors and minors. Cross-listed with CPLT 110A, EUR 110A, and WMST 110.

GER 110B. Berlin Metropolis in Literature, Film, Music, and Art (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the metropolis Berlin as gateway between the East and West. Explores topography of the city through film, art, music, and literary texts. A study of Berlin’s dramatic transformations as a microcosm of Germany and Europe’s troubled history in the twentieth century. Course is conducted in English. Cross-listed with AHS 120, CPLT 110B, EUR 110B, and MCS 178.

GER 118 (E-Z). Topics in German Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of selected films, directors, and movements in German film. Films are in German with English subtitles. No knowledge of German is required. Cross-listed with MCS 118 (E-Z).

GER 121 (E-Z). Germanic Literature in Translation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of representative works of significance. Topic varies from quarter to quarter. No knowledge of Germanic languages required. With permission of the advisor, may be taken for credit toward the German major if readings are done in German.

GER 124. Nordic Mythology, Folklore, and Fairytales (4) Seminar, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces the representation of animals, plants, and other appearances of the natural world such as sunrise and sunset in European creation and destruction mythology, fairytales, and folklore. Cross-listed with EUR 124.

GER 126. From Novel to Screen: Film Adaptations of German Literature (4) Lecture, 3 hours; screening, 2 hours; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to classic works of German literature and their film adaptations. Explores adaptations by film directors such as Welles, Kubrick, Visconti, and Fassbinder. Studies the nexus between literature, film, and theatre. Course conducted in English. Cross-listed with CPLT 126 and MCS 126.

GER 131. Marx, Nietzsche, Freud (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Critical introduction to three central thinkers of modernity. Topics include alienation, free will, revolution, the unconscious, sexual difference, political power, and the modern conception of truth. Readings and discussions are in English. Selected readings are in German for German majors and minors. Cross-listed with CPLT 131.

GER 132. Rousseau and Revolution (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory study of the French philosopher and novelist Jean-Jacques Rousseau and the age of revolution in France, Germany, and England. Topics include social inequality, slavery, gender, subjectivity, violence, and political rights. All readings are in English. Cross-listed with CPTL 132 and FREN 132.

GER 134. Cinematic War Memory (4) Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines cinematic confrontations involving World War I and the writing of war. Topics include desire between victims and perpetrators, representation of trauma, and ethical responsibility. All screenings have English subtitles. Cross-listed with CPLT 134, JPN 134, and MCS 114.

GER 135. Film Noir and Hollywood’s German Immigrants (4) Lecture, 3 hours; screening, 2 hours; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines cinematic confrontations involving World War II and Hollywood filmmakers from Germany and Japan. Topics include desire between victims and perpetrators, representation of trauma, and ethical responsibility. All screenings have English subtitles. Cross-listed with CPLT 134, JPN 134, and MCS 114.

GER 137. Passions, Apparitions, and Automata (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory study of German Romanticism from its origins in Goethe to its development in Hoffmann. Topics include madness, sexual desire, doppelganger, homicide, and automata. All readings are in English; selected readings are in German for German majors and minors. Cross-listed with CPLT 137 and EUR 137.

GER 138. From Expressionism to Epic Theatre: Benn, Brecht, Kafka, and the Bauhaus (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction of the German avant-garde of the twentieth century. Explores expressionism, New Objectivity, the Bauhaus movement, the manifestation of an anti-art in dadaism, and Epic Theatre. Studies works of Franz Kafka in the context of his implicit criticism of the avant-gardist movements of his time. Course is conducted in English. Cross-listed with AHS 121, CPLT 138, EUR 138, and MCS 182.

GER 163. Modern German History through Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores twentieth-century German history through film. Includes World Wars I and II, inflation and polarization of classes, Nazi Germany, representations of the Holocaust, and a divided and reunited Germany. Cross-listed with CPLT 115, HISE 163, and MCS 115.

GER 173. The Age of Goethe (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the mature work of Goethe against the dual backdrops of Klassik and Romantik. Considers works by Schiller, Kleist, Holderlin, the Schlegels, and E.T.A. Hoffmann in analysis of early nineteenth-century literary currents in Germany. Cross-listed with CPLT 173.

GER 185. Currents in Modern German Literature (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Analysis and interpretation of such major modern writers as Brecht, Mann, and Kafka.

GER 190. Special Studies (1-5) Tutorial, 1-4 hours. To be taken with the consent of the department chair as a means of meeting special curricular problems. Course is repeatable.

GER 191. Seminar in German Literature (4) Seminar, 3 hours. Prerequisite(s): upper-division standing. The topic varies from quarter to quarter. Course is repeatable to a maximum of 12 units.

Graduate Courses

GER 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

GER 291. Individual Studies in Coordinated Areas (1-6) A program of studies designed to advise and assist candidates who are preparing for examinations. Open to M.A. and Ph.D. candidates. Does not count toward the unit requirement for the M.A. Graded Satisfactory (S) or No Credit (NC). May be repeated quarterly until the qualifying examinations are completed.

GER 292. Concurrent Analytical Studies (2) Outside research, 6 hours. Prerequisite(s): consent of instructor; concurrent enrollment in German 100-series course. To be taken on an individual basis. Student will complete a graduate paper based on research related to the German 100-series course. Course is repeatable with different topic.

GER 299. Research for Thesis or Dissertation (1-12) Repeatable with different topic.

Professional Courses

CPLT 301. Teaching of Foreign Language at the College Level (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing, or senior standing with consent of instructor. Covers first and second language acquisition; general models of L2 learning;
learning different types of grammar; learning other components of language: acquisition of pronunciation, vocabulary, and discourse; multilingual societies and the goals of language teaching; and implications of second language acquisition research for the foreign language classroom. Graded Satisfactory (S) or No Credit (NC).

GER 302. Teaching Practicum (1-4). Practicum, 3-12 hours. Prerequisite(s): CPLT 301 or equivalent; graduate standing; employment as a teaching assistant or associate in. Supervised teaching in lower-division courses. Required of all teaching assistants in German. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Italian Studies

Subject abbreviation: ITAL

Committee in Charge
Theda Shapiro, Ph.D., Chair
Nicoleta Tinozzi Mehrmand, Ph.D., Italian
Marina Pianca, Ph.D., Hispanic Studies
Marguerite Waller, Ph.D., Comparative Literature/Women’s Studies
Stephen C. Cullenberg, Ph.D., Dean, College of Humanities, Arts, and Social Sciences, ex officio

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See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Minor

The Italian Studies minor offers students the opportunity to attain an advanced level of proficiency in Italian language while taking a number of discipline-based courses that concentrate on Italian themes. The minor complements liberal arts degrees in many aspects of Western or European studies, including art history, history, philosophy, political science, and religious studies.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog.

Requirements for the minor consist of 20 units, distributed as follows:

1. Eight (8) units of ITAL 101A and ITAL 101B
2. Eight (8) units chosen from among the following:

ITAL 119 (E-Z), ITAL 139, ITAL 162, ITAL 185
3. Four (4) units from among the following:
   a) AHS 161, AHS 162, or AHS 172, MGS 173/ICPLT 173-1, HISE 131
   b) Music: relevant courses with consent of advisor

With the consent of the advisor, another course may be substituted for this requirement as long as its content and the student’s work have a suitable concentration on Italian themes.

Foreign Language Placement Examination
A placement examination is required of all freshmen entering the College of Humanities, Arts, and Social Sciences who wish to meet the foreign language requirement with the same language taken in high school. Consult the quarterly Schedule of Classes and placement test .ucr.edu for date and time. Transfer students who have taken a college-level language course may not take the placement examination and should consult with their advisors. No college-level credit may be duplicated. See college placement examination policy.

Lower-Division Courses

ITAL 001. Elementary Italian (4) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour. Prerequisite(s): none. An introduction to the sound system and grammar of Italian, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in Italian insofar as possible. Audio-lingual and media-based learning materials available in the Media Library.

ITAL 002. Elementary Italian (4) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour. Prerequisite(s): ITAL 001 with a grade of “C” or better or equivalent. An introduction to the sound system and grammar of Italian, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in Italian insofar as possible. Audio-lingual and media-based learning materials available in the Media Library.

ITAL 003. Elementary Italian (4) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour. Prerequisite(s): ITAL 002 with a grade of “C” or better or equivalent. An introduction to the sound system and grammar of Italian, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in Italian insofar as possible. Audio-lingual and media-based learning materials available in the Media Library.

ITAL 004. Intermediate Italian (4) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour. Prerequisite(s): ITAL 003 with a grade of “C” or better or equivalent. Continued study of the basic grammatical structures of Italian, with emphasis on competency in reading, writing, and speaking. Involves reading varied materials, both literary and journalistic, dealing with contemporary Italy.

ITAL 043. Italian Cuisine and Literature through the Centuries (4) Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Analysis of the relationship between food and literature in Italian culture through the study of gastronomic and literary texts from the Roman to present times. Films are used to enrich this theme.

ITAL 045. Italian Cinema (4) Lecture, 1.5 hours; discussion, 1.5 hours; screening, 3 hours. Prerequisite(s): none. Covers major works of the Italian cinema from Neo-Realism to the present, with emphasis on their historical evolution and representation of major elements of Italian culture. Knowledge of Italian not required. Cross-listed with MCS 044.

ITAL 047. Italian Americans: Voices and Visions (4) Lecture, 1.5 hours; discussion, 1.5 hours; screening, 2 hours; written work, 1 hour. Prerequisite(s): none. A study of the Italian American experience as seen through major works of both Italian American and Italian writers and filmmakers from the 1950s to the present. No knowledge of Italian is required.

ITAL 090. Special Studies (1-3) To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable.

Upper-Division Courses

ITAL 101A. Advanced Italian (4) Lecture, 3 hours; laboratory, 1 hour; individual study, 3 hours. Prerequisite(s): ITAL 004 with a grade of “C” or better or equivalent. Advanced Italian grammar and conversation. Emphasizes mastery of the subtleties of the language in conversation, reading, and writing.

ITAL 101B. Advanced Italian (4) Lecture, 3 hours; laboratory, 1 hour; individual study, 3 hours. Prerequisite(s): ITAL 101A. Advanced Italian grammar and conversation. Emphasis is on mastery of the subtleties of the language in conversation, reading, and writing.

ITAL 101C. Advanced Italian (4) Lecture, 3 hours; laboratory, 1 hour; individual study, 2 hours. Prerequisite(s): ITAL 101B or equivalent. Advanced Italian grammar and conversation. Emphasis is on mastery of the subtleties of the language in conversa- tion, reading, and writing.

ITAL 139. The Divine Comedy (4) Lecture, 3 hours; consultation, 1 hour. A close reading of Dante’s Divine Comedy using a bilingual edition. Attention is paid to conceptual and aesthetic questions. Although the work is read in English, students without previous knowledge of Italian are given some instruction in it to enable them to understand parts of the original.

ITAL 140. Italian Renaissance Texts and Contexts (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores changes in notions of space, time, religion, economics, history, politics, art, gender, and sexuality through an interdisciplinary consideration of verbal and visual texts. Readings are of Petrarch, Boccaccio, Veronica Franco, Gaspara Stampa, Machiavelli, Castiglione, Ariosto, Benvenuto Cellini, Marco Polo, Cristoforo Colombo. Presents slides of relevant architecture and visual images. Cross-listed with CPLT 140.

ITAL 150. Italian Theatre (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the development of Italian theatre from the commedia dell’arte to our time. Discusses works by Ruzante, Machiavelli, Metastasio, Galdoni, Alfieri, Verga, Pirandello, Fo, and Rame and includes videos of plays, melodramas, and operas. No knowledge of Italian is required.

ITAL 158. Italian Literature in the Period of Unification (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of nineteenth-century Italian
Russian Studies

Subject abbreviation: RUSN

Committee in Charge
David K. Danow, Ph.D. Russian/Comparative Literature
Ekaterina Yudina, Ph.D. Russian
Stephen E. Cullenberg, Ph.D. Dean, College of Humanities, Arts, and Social Sciences, ex officio

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See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Programs in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Major

The Russian Studies B.A. has been developed for students who are interested in Russian language and literature, Russian history and civilization. Individual major programs are dependent upon the students’ particular interests. In consultation with the advisor, each student plans a coherent program of courses to meet the requirements for the major. Normally, students’ programs are submitted for approval no later than the beginning of their junior year.

1. Lower-division requirement: CPLT 015
2. Upper-division requirements
   a) Language requirement: 12 units from RUSN 101 (E-Z), RUSN 102 (E-Z), RUSN 120 (E-Z), RUSN 103
   b) Literature requirement: 12 units from RUSN 109A, RUSN 109B, RUSN 109C
3. Civilization requirements: 12 units from EUR 111A, EUR 111B, EUR 111C

In addition, 24 units are selected from approved courses in other programs, including linguistics, comparative literature, Russian history, economics, and political science chosen in consultation with a faculty advisor. Total units: 60.

Minor

The department offers a 24-unit disciplinary minor in Russian Studies.

The requirements for the minor are as follows:
1. Eight (8) units of RUSN 101 (E-Z), RUSN 102 (E-Z), RUSN 103
2. Sixteen (16) units of Russian Literature and Civilization courses chosen from the following:
   RUSN 109A, RUSN 109B, RUSN 109C, RUSN 120 (E-Z)
   EUR 111A, EUR 111B, EUR 111C

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Lower-Division Courses

RUSN 001. Elementary Russian (4) Lecture, 4 hours. Prerequisite(s): none. An introduction to the sound system and grammar of Russian, with attention to the development of the four skills of listening, speaking, reading, and writing.

RUSN 002. Elementary Russian (4) Lecture, 4 hours. Prerequisite(s): RUSN 001 with a grade of “C-” or better or consent of instructor. An introduction to the sound system and grammar of Russian, with attention to the development of the four skills of listening, speaking, reading, and writing.

RUSN 003. Elementary Russian (4) Lecture, 4 hours. Prerequisite(s): RUSN 002 with a grade of “C-” or better or consent of instructor. An introduction to the sound system and grammar of Russian, with attention to the development of the four skills of listening, speaking, reading, and writing.

RUSN 004. Intermediate Russian (4) Lecture, 4 hours. Prerequisite(s): RUSN 003 with a grade of “C-” or better or consent of instructor. A comprehensive review of the basic grammatical structures of Russian, as well as a study of idiomatic forms, vocabulary building, and development of conversation and composition skills.

RUSN 027. Russian Conversation (1) Discussion, 1 hour. Prerequisite(s): RUSN 001. Weekly discussion of topics of current interest, intended to develop and maintain basic conversational skills. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit for a total of 6 units.

RUSN 045. Soviet Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. A survey of the Soviet cinema, beginning with the film innovations of the 1920s and continuing with representative films from each of the ensuing periods of Soviet culture. All work done in English. Cross-listed with MCS 043.

RUSN 090. Special Studies (1-5) To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable.
Upper-Division Courses

RUSN 101 (E-Z). Advanced Russian (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): RUSN 004 or consent of instructor. Students read texts in literature and expository prose, with attention to usage, style, grammar, and interpretation. Emphasis on developing reading and translating skills for adult-level reading competence. G. Readings from Poetry; J. Readings from Soviet Literature; M. Readings from Drama; N. Readings in History; O. Readings in Social Science; Q. Readings in Newspapers and Popular Literature; R. Readings from Classics of Russian Literature.

RUSN 102 (E-Z). Advanced Russian: Grammar (2) Lecture, 2 hours. Prerequisite(s): RUSN 004 or consent of instructor. Each segment will deal with a specific topic in Russian grammar at an advanced level. Texts or materials vary from quarter to quarter. E. Nominal Declensions; F. Syntax I; G. Phonetics; I. Syntax II; J. Syntax III; K. Vocabulary Building; M. Verb Morphology.

RUSN 103. Advanced Russian Conversation and Composition (2) Lecture, 2 hours. Prerequisite(s): RUSN 004 or consent of instructor. Conversation and short compositions in Russian. Intended to develop and maintain basic conversational and writing skills. Course is repeatable to a maximum of 8 units.

RUSN 109A. Survey of Russian Literature in Translation (4) F Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to major literary figures and representative masterpieces of the Golden Age (1830-1880). Any course in the RUSN 109A, RUSN 109B, and RUSN 109C sequence may be taken independently.

RUSN 109B. Survey of Russian Literature in Translation (4) W Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to major literary figures and representative masterpieces of the late nineteenth century and prerevolutionary twentieth century (1880-1917). Any course in the RUSN 109A, RUSN 109B, and RUSN 109C sequence may be taken independently. Danow

RUSN 109C. Survey of Russian Literature in Translation (4) S Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to major literary figures and representative masterpieces of the late nineteenth century and prerevolutionary twentieth century (1880-1917). Any course in the RUSN 109A, RUSN 109B, and RUSN 109C sequence may be taken independently. Danow

CPLT 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CPLT 290 (E-Z). Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and department chair. To be taken as a means of meeting special curricular needs in literature. E. English; F. French; G. German; H. Greek; I. Italian; J. Japanese; K. Chinese; L. Latin; M. Latin American; R. Russian; S. Spanish; T. Scandinavian; U. American; V. Slavic. Segments are repeatable.

RUSN 292. Concurrent Analytical Studies (2) Outside research, 6 hours. Prerequisite(s): consent of instructor; concurrent enrollment in RUSN 100-series course. To be taken on an individual basis. Student will complete a graduate paper based on research related to the RUSN 100-series course. May be repeated with different topic. RUSN 103 may not be used for RUSN 292.

Professional Courses

CPLT 301. Teaching of Foreign Language at the College Level (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing, or senior standing with consent of instructor. Covers first and second language acquisition; general models of L2 learning; learning different types of grammar; learning other components of language: acquisition of pronunciation, vocabulary, and discourse; multilingual societies and the goals of language teaching; and implications of second language acquisition research for the foreign language classroom. Graded Satisfactory (S) or No Credit (NC).

CPLT 302. Teaching Practicum (1-4) Practicum, 3-12 hours. Prerequisite(s): CPLT 301 or equivalent; graduate standing; employment as a teaching assistant or associate in. Supervised teaching in lower-division courses. Required of all teaching assistants in Russian. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Language Major

Committee in Charge
- Thomas F. Scanlon, Ph.D., Chair Classics/Comparative Ancient Civilizations/Comparative Literature
- William W. Megenney, Ph.D. (Hispanic Studies)
- Heidi Waltz, Ph.D. Linguistics/Germanic Studies
- Yenna Wu, Ph.D. Chinese/Civilizations/Comparative Literature
- Stephen E. Cullenberg, Ph.D.
- Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major

The B.A. in Language allows a student to specialize in two or three foreign languages through a knowledge not only of the languages themselves but also of the bases of language (linguistics), examples of their creative use (literature), and the cultures which they reflect (civilization).

Students interested in a single language concentration should see individual language program listings in this catalog.

Two Foreign Languages Option

1. CPLT 015 and LING 020
2. Elementary and intermediate courses in languages one and two as required
3. Sixty-four (64) upper-division units distributed as follows:
   a) Language one — 28 units which must include the following minimums:
      (1) Sixteen (16) units in language
      (2) Twelve (12) units in literature and civilization
   b) Language two — 20 units which must include the following minimums:
      (1) Twelve (12) units in language
      (2) Eight (8) units in literature and civilization
   c) LING 111 — 4 units
d) One other course in Linguistics — 4 units
e) Eight (8) units of electives in any of the above-mentioned areas

Three Foreign Languages Option

1. CPLT 015 and LING 020
2. Elementary and intermediate courses in Language one, two, and three as required
3. Sixty-four (64) upper-division units distributed as follows:
   a) Language one — 20 units which must include the following minimums:
      (1) Twelve (12) units in language
      (2) Eight (8) units in literature and civilization
   b) Language two — 20 units which must include the following minimums:
      (1) Twelve (12) units in language
      (2) Eight (8) units in literature and civilization
   c) Language three — 12 units in language
d) LING 111 — 4 units
e) One other course in Linguistics — 4 units
f) Four (4) units in electives from any of the above-mentioned areas

Literatures and Languages

Subject abbreviation: LTLG

Graduate Course

LTLG 250. Colloquium in Literatures and Languages (1-2) Seminar, 1 hour. Lectures and discussions by staff, visiting scholars and students on current research topics. Students delivering lectures may take the course for 2 units, students attending lecture and discussions may take the course for 1 unit. May not count towards minimum unit requirement for the
degree. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Professional Course

CPLT 301. Teaching of Foreign Language at the College Level (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing; or senior standing with consent of instructor. Covers first and second language acquisition; general models of L2 learning; learning different types of grammar; learning other components of language: acquisition of pronunciation, vocabulary, and discourse; multilingual societies and the goals of language teaching; and implications of second language acquisition research for the foreign language classroom. Graded Satisfactory (S) or No Credit (NC).

Linguistics

Subject abbreviation: LING

Committee in Charge

David Kronenfeld, Ph.D., Chair (Anthropology)
Adalberto Aguirre, Ph.D. (Sociology)
Eugene Anderson, Ph.D. (Anthropology)
Curt Burgess, Ph.D. (Psychology)
Tenebc (T.S.) Harvey, Ph.D. (Anthropology)
William Megenney, Ph.D. (Hispanic Studies)
Lary Rosenblum, Ph.D. (Psychology)
Melanie Sperling, Ph.D. (School of Education)
Stanley Stewart, Ph.D. (English)
Howard Wettstein, Ph.D. (Philosophy)
Stephen E. Cullenberg, Ph.D.

Dean, College of Humanities, Arts, and Social Sciences, ex officio

Linguistics is the science of language. It seeks to discover the psychological and motor mechanisms of human speech, the similarities and differences among languages, how languages change, and the way in which language is acquired. Because linguistics is largely independent of fields with which the student is likely to be familiar, no special background is required for students entering the major.

Linguistics interacts with a wide variety of fields, such as articulatory phonetics (biology), acoustic phonetics (physics), field methods (anthropology), language and culture (anthropology), sociolinguistics, psycholinguistics, neurolinguistics, logic, the philosophy of language, and the study of particular languages (including their history). This interaction provides opportunities for students with varied interests and can give new perspectives to those in related disciplines.

Major

Upon electing the linguistics major, and certainly no later than the middle of the sophomore year, a student should see the Director of the Linguistics Committee for advising.

The director can help students find a suitable advisor to file the necessary forms. In consultation with an advisor, a student plans a coherent program of specific courses to meet the requirements below. The student and the advisor must then submit a copy of the program to the full Committee on Linguistics for approval.

Students interested in the linguistics major should request from the committee director information concerning the many possible course programs. Many of them permit double majors, thus providing strong preparation for further study in two fields.

Students may add variety and depth to their UCR linguistics major by attending a Summer Program in Linguistics (held in various places) or by participating in the Education Abroad Program (EAP). This is an excellent opportunity to become deeply familiar with another country and its culture while earning academic units towards graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Requirements for the major are as follows:

1. LING 020

2. Twenty-four (24) upper-division units distributed as follows:
   a) LING 111, LING 121, LING 131, LING 141
   b) ANTH 123
   c) PHIL 132 or PSYC 135

3. At least 12 additional upper-division units of linguistic electives, to be chosen in consultation with the advisor and with the approval of the Linguistics Program director. (The additional courses may be in linguistics or in related fields. They may relate either to a particular field or specialization or to general linguistics.)

4. Foreign language proficiency equivalent to six quarters (24 units) of study, including at least fourth-quarter proficiency in one language. (Students may arrange with the director to satisfy this requirement by examination.)

Honors Program in Linguistics

1. Linguistics requirement: LING 020, LING 111, LING 121, LING 141, LING 190, LING 191

2. Related courses requirement:
   a) ANTH 120, ANTH 123
   b) ENGL 112
   c) CS 008, CS 010, CS 012
   d) MATH 144
   e) PHIL 008 or PHIL 008H
   f) Additional courses as may be required by the Linguistics Committee

3. Language Requirement — study in at least two language areas:
   a) Primary language: 24 units of foreign language instruction in a single language (this may include any courses taught in that language) plus courses in the structure, phonetics and history of the primary language, if available
   b) Secondary language: 16 units of a single language or at least 8 units in each of two languages (none of which may be members of the same subfamily of Indo-European as the primary language) plus at least 8 units in the structure, phonetics, or history of the language(s) chosen for the secondary area

In fulfilling the language requirement, students interested in earning a degree beyond the B.A. should take into account the foreign language requirements of the graduate schools to which they may apply.

Students must have at least a 3.00 GPA in courses required for the Honors Program.

Lower-Division Courses

LING 020. Language and Linguistics (4) Lecture, 3 hours. An introduction to modern linguistics. The nature of language; language structure; grammars; the languages of the world; historical and comparative linguistics; interdisciplinary approaches, including anthropological and psycholinguistics. Megenney, Waltz

LING 021. Grammar (4) Lecture, 3 hours; consultation, 1 hour. Fundamental concepts of grammatical structure: parts of speech, paradigms, word families, agreement and government, the grammar of sentences and longer units of discourse; style.

Upper-Division Courses

LING 111. Phonetics (4) Lecture, 3 hours; laboratory, 1 hour; outside research, 1 hour; extra reading, 1 hour. Prerequisite(s): LING 020. Practice in pronouncing and recognizing sounds from many languages. Covers methods of transcribing and analyzing these sounds.

LING 121. Syntax (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): LING 020. Survey of various approaches to syntax, including transformational. Syntactic structures of English and other languages are examined. Applications: English, foreign languages, philosophy, mathematics. Kronenfeld, Waltz

LING 131. Morphology (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): LING 020, LING 111 or LING 121. Studies word structure, the lexical component of language, allomorphy, types of morphemes, and inflectional and derivational morphology. Examines various theories of lexical/morphological organization in the brain. Examples are taken from English and other Indo-European languages.

LING 141. Phonology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): LING 111. Introduction to the study of functional sound units in speech, including phonotactics, morphophonemics. Various theories are examined, including generative. Applications: speech correction, speech analysis, English, foreign languages. Levin

LING 160 (E-2). Topics in Dynamic and Comparative Linguistics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): LING 111, LING 121 or LING 141.
Comparative analyses of language groups such as Spanish and Portuguese, Slavic languages, and Native American languages. E. Historical Linguistics; F. Dialectology; G. Language Change; I. Sociolinguistics.

LING 167. Structural/Descriptive Linguistics (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): LING 020 or consent of instructor. An overview, from the original sources, of the contribution of major figures and schools in linguistics from Saussure through early Chomsky. Cross-listed with ANTH 167. Kronenfeld

LING 190. Special Studies (1-5) To be taken with the consent of the chair of the Committee as a means of meeting special curricular problems. Course is repeatable.

LING 191. Seminar in Linguistics (4) Seminar, 3 hours; consultation, 1 hour. Selected topics in language and linguistics. Course is repeatable to a maximum of 12 units.

LING 192. Tutorial Activities (1-2) Prerequisite(s): junior or senior standing and nomination by faculty. Enlarging understanding of linguistics through conducting tutorial sessions in introductory courses, under the supervision of faculty members responsible for the courses involved. Graded Satisfactory (S) or No Credit (NC). May be repeated for a maximum of three quarters.

LING 195. Senior Thesis (2-4) Thesis, 6-12 hours. Prerequisite(s): senior standing or consent of instructor. Independent research and preparation of a thesis completed under the supervision of a faculty member. Course is repeatable to a maximum of 12 units.

LING 195H. Senior Honors Thesis (2-4) Thesis, 6-12 hours. Prerequisite(s): invitation by faculty to pursue honors work in Linguistics; senior standing or consent of instructor. Intensive study, research, and preparation of a thesis in consultation with a faculty member. Grades are deferred until presentation of the thesis at the end of the final quarter. Satisfactory (S) or No Credit (NC) grading is not available. To be taken during two or three successive quarters; course is repeatable to a maximum of 12 units.

Related Courses

Refer to departmental listings for course descriptions.

Anthropology
ANTH 120 (Language and Culture)
ANTH 123 (Linguistic Anthropology)
ANTH 165 (Cognitive Anthropology)
ANTH 259 (Anthropological Linguistics)

Education
EDUC 172 (Reading and Language Development)
EDUC 177A (Language Development in Content Areas)
EDUC 177B (Language Development in Content Areas)
EDUC 201A (Theories and Processes of Reading)

English
ENGL 112 (History of the English Language)

French (Comparative Literature and Foreign Languages)
FREN 104 (Phonetics)

Mathematics
MATH 144 (Introduction to Set Theory)

Philosophy
PHIL 125 (Intermediate Logic)
PHIL 126 (Advanced Logic)
PHIL 132 (Philosophy of Language)

Psychology
PSYC 110 (The Brain and Behavior)
PSYC 134 (Cognitive Processes)
PSYC 135 (Psycholinguistics)
PSYC 163 (Cognitive Development)

Spanish
SPN 105 (Phonology of the Spanish Language)
SPN 106A, SPN 106B (Structure of the Spanish Language)
SPN 207 (History of the Spanish Language)

Computer Engineering

The Marian and Rosemary Bourns College of Engineering

Thomas Payne, Ph.D., Co-Chair
Xiang-Dong "Sheldon" Tan, Ph.D., Co-Chair
Advising Office, A159 Bourns Hall (951) 827-ENGR (3647); www.engr.ucr.edu/studentaffairs

Committee in Charge
Thomas Payne, Ph.D. (Computer Science and Engineering)
Xiang-Dong "Sheldon" Tan, Ph.D. (Electrical Engineering)
Reza Abbasschian, Ph.D.
Dean, The Marian and Rosemary Bourns College of Engineering, ex officio

Major
The Computer Engineering major stresses the study of core computer science and electrical engineering topics. It prepares students for careers in the design of complex systems involving computer hardware, computer software, electronics and electrical signals for communications, networking, desktop computing, and embedded computing.

The major is offered jointly by the departments of Computer Science and Engineering, and Electrical Engineering.

The objective of the Computer Engineering program is to produce graduates who:
- have a mastery of the fundamental areas required for designing and using computers and engineered systems that contain computers
- have an ability to apply principles of engineering, mathematics, science, and statistics to the use, design, and interfacing of computers
- are able to apply modern design methodologies and state-of-the-art tools to design problems common to modern computer engineering practice
- have had extensive, relevant laboratory and hands-on experience to strengthen their understanding of scientific, logical, statistical, and engineering principles
- have a well-rounded and balanced education through required studies in elected areas of the humanities and social sciences
- are adept at both oral and written communication
- possess the high-quality undergraduate education necessary to progress to the M.S. and Ph.D. level or succeed in a career in industry
- understand the social, cultural, ethical, and environmental context of their work

The Computer Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700. For more details, visit www1.cs.ucr.edu.

The Intersegmental General Education Transfer Curriculum (IGETC) does not meet transfer requirements for Engineering.

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www.engr.ucr.edu/studentaffairs for details.

University Requirements
See Undergraduate Studies section.

College Requirements
See The Marian and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Computer Engineering major follows the following major requirements toward the satisfaction of some of the college’s Natural Science and Mathematics breadth requirements.

1. MATH 008B or MATH 009A
2. PHYS 040A, PHYS 040B, PHYS 040C

Major Requirements
1. Lower-division requirements (68 units):
   a) ENGR 001G
   b) CS 010, CS 012 or CS 013, CS 014, CS 061
   c) CS 011/MATH 011
   d) EE 001A, EE 011A, EE 001B
   e) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 046
   f) PHYS 040A, PHYS 040B, PHYS 040C
   g) One course of 4 or more units in Chemistry to be selected in consultation with a faculty advisor.

2. Upper-division requirements (80 units minimum)
   a) CS 141, CS 161, CS 161L; one course from CS 153 or CS 160
   b) CS 120A/EE 120A, CS 120B/EE 120B; one course from CS 122A or EE 128
   c) CS 111/MATH 111
   d) EE 100A, EE 100B, EE 110A, EE 110B
   e) ENGR 180
f) MATH 113

g) EE 114 or STAT 155

h) Five courses (at least 20 units) as technical electives from the following set of Computer Science and Engineering, and Electrical Engineering upper-division courses

- CS 100, CS 122A, CS 122B, CS 130, CS 133, CS 150, CS 152, CS 153, CS 160, CS 162, CS 164, CS 165, CS 166, CS 168, CS 170, CS 177, CS 179 (E-Z), CS 180, CS 181, CS 183, CS 193

- EE 105, EE 115, EE 128, EE 132, EE 140, EE 141, EE 144, EE 146, EE 150, EE 151, EE 152, EE 175A, EE 175B

The technical electives selected from h) must include either CS 179 (E-Z) or both EE 175A and EE 175B. The selection of the remaining technical electives must be planned, in consultation with a faculty advisor, to include at least one coherent sequence of two classes from either Computer Science and Engineering or Electrical Engineering. The technical electives must be distinct from those used to satisfy the upper-division requirements specified in items a) and b) above.

Students may petition for exceptions to the above degree requirements. Exceptions to Computer Science course requirements must be approved by the Computer Science and Engineering undergraduate advisor or chair, and exceptions to Electrical Engineering course requirements must be approved by the Electrical Engineering undergraduate advisor or chair. Exceptions to other requirements require the approval of the undergraduate advisors or chairs of both departments.

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Computer Science and Engineering

Subject abbreviation: CS
The Marlan and Rosemary Bourns
College of Engineering

Laxmi N. Bhuyan, Ph.D., Chair
Department Office,
351 Engineering Building II
(951) 827-5639; www1.cs.ucr.edu

Professors

Laxmi N. Bhuyan, Ph.D.
Marek Chrobak, Ph.D.
Gianfranco Ciardo, Ph.D.
Dimitros Gunopulos, Ph.D.
Rajiv Gupta, Ph.D.
Tao Jiang, Ph.D. President’s Chair
Mart L. Molle, Ph.D.
Walid Najjar, Ph.D.

Teodor C. Przymusinski, Ph.D.
Chinya Ravishankar, Ph.D.
Vassilis Tsotras, Ph.D.
Frank N. Vahid, Ph.D.

Professors Emeriti

Yang-Chang Hong, Ph.D.
Lawrence L. Larmore, Ph.D.

Associate Professors

Michalis Faloutsos, Ph.D.
Brett D. Fleisch, Ph.D.
Vassiliki Kalogeraki, Ph.D.
Eamonn Keogh, Ph.D.
Srikant Krishnamurthy, Ph.D.
Stefano Lonardi, Ph.D.
Thomas H. Payne, Ph.D.
Neal Young, Ph.D.

Assistant Professors

Harry Hsieh, Ph.D.
Iulian Neamtiu, Ph.D.
Christian Shelton, Ph.D.
Victor Zordan, Ph.D.

**

Adjunct Professor

Douglas Tolbert, Ph.D.

Adjunct Associate Professor

Halina Przymunisinska, Ph.D.

Cooperating Faculty

Alexander Balandin, Ph.D. (Electrical Engineering)
Matthew J. Barth, Ph.D. (Electrical Engineering)
Bir Bhanu, Ph.D. (Electrical Engineering)
Illya Dumer, Ph.D. (Electrical Engineering)
Lawrence H. Harper, Ph.D. (Mathematics)
Roger Lake, Ph.D. (Electrical Engineering)
Michel L. Lapidus, Ph.D. (Mathematics)
Erik Rolland, Ph.D. (Accounting and Information Systems)
Amit Roy Chowdhury, Ph.D. (Mechanical Engineering)
Thomas Stahovich, Ph.D. (Mechanical Engineering)
Xiang-Dong “Sheldon” Tan, Ph.D. (Electrical Engineering)
Sundararajan Venkatadriagaram (Mechanical Engineering)
Zhengyuan “Daniel” Xu, Ph.D. (Electrical Engineering)

Business Informatics

Neal A. Young, Ph.D., Chair
Advising Office, A159 Bourns Hall
(951) 827-3647; www1.cs.ucr.edu

Committee in Charge

Marek Chrobak, Ph.D. (Computer Science and Engineering)
Mart Molle, Ph.D. (Computer Science and Engineering)
Thomas H. Payne, Ph.D. (Computer Science and Engineering)
Chinya Ravishankar, Ph.D. (Computer Science and Engineering)
Waymond Rodgers, Ph.D. (Accounting and Business Informatics)
Erik Rolland, Ph.D. (Accounting and Business Informatics)
David W. Stewart, Ph.D.
Dean, The A. Gary Anderson Graduate School of Management, ex officio
Reza Abbaspochian, Ph.D.
Dean, The Marlan and Rosemary Bourns College of Engineering, ex officio

Major

The Department of Computer Science and Engineering offers three majors at the undergraduate level. UCR’s offerings of all three majors are unique compared to many schools in the emphasis on theoretical foundations and practical applications.

The Computer Science major stresses the study of core and advanced computer science topics. It prepares students for a large variety of careers in computing, including software engineering, networks, databases, graphs, algorithms, security, system analysis, and embedded systems.

The Computer Engineering major stresses the study of core computer science and electrical engineering topics. It prepares students for careers in the design of complex systems involving computer hardware, computer software, electronics and electrical signals for communication, networking, desktop computing, and embedded computing. The major is offered jointly by the Departments of Computer Science and Engineering, and Electrical Engineering. See Computer Engineering in this catalog.

The objective of the B.S. degree program in Computer Science is to prepare graduates for professional practice in both the private and public sectors and for life-long learning, including the option for graduate degrees, by providing them with:

- Background: the necessary technical competencies, including knowledge of scientific principles and skill at rigorous analysis and creative design
- Breadth: a broad education that includes knowledge of current issues and trends in society and technology
- Professionalism: professional attitudes and ethics and skills for clear communication and responsible teamwork
- Learning environment: a learning environment that is rigorous, challenging, open, and supportive

The Business Informatics major covers the core of computer science and basic business and management topics. It prepares students for careers in design and management of computer and information systems, system and network administration, and e-commerce. It is also useful for careers that apply information technology to support business processes.

The objective of the B.S. degree program in Business Informatics is to prepare graduates for professional practice in both the private and public sectors and for life-long learning, including the option for graduate degrees, by providing them with:

- Background: the necessary technical competencies, including knowledge of scientific principles and skill at rigorous analysis and creative design
• Breadth: a broad education that includes knowledge of current issues and trends in society and technology
• Professionalism: professional attitudes and ethics and skills for clear communication and responsible teamwork
• Learning environment: a learning environment that is rigorous, challenging, open, and supportive

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www.engr.ucr.edu/studentaffairs for details.

University Requirements
See Undergraduate Studies section.

College Requirements
See The Marian and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Computer Science major uses the following major requirements toward the satisfaction of some of the college’s Natural Sciences and Mathematics breadth requirements and one of the college’s English Composition breadth requirements.

1. ENGL 01SC
2. MATH 008B or MATH 009A
3. PHYS 040A, PHYS 040B, PHYS 040C

The Business Informatics major uses the following major requirements toward the satisfaction of the college’s Social Sciences breadth requirements and one of the College’s Natural Science and Mathematics breadth requirements.

1. ECON 002, ECON 003
2. MATH 008B or MATH 009A
3. SOC 150

Major Requirements

Computer Science Major

1. Lower-division requirements (60 units)
   a) ENGR 001I
   b) CS 010, CS 012 or CS 013, CS 014, CS 061
   c) CS 011/MATH 011
   d) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A
   e) PHYS 040A, PHYS 040B, PHYS 040C
   f) One course of 4 or more units in an engineering discipline outside the field of computer science to be selected in consultation with a faculty advisor. (Either a lower-division or an upper-division course may be used to satisfy this requirement.)
   g) ENGL 01SC

2. Upper-division requirements (85 units minimum)
   a) ENGR 101I
   b) CS 141, CS 150, CS 152, CS 153, CS 161, CS 161L, CS 179 (E-Z)
   c) CS 120A/EE 120A, CS 120B/EE 120B
   d) CS 111/MATH 111
   e) ENGR 180
   f) MATH 113
   g) STAT 155
   h) Two courses from MATH 046, MATH 120, MATH 126, PHIL 124
   i) At least 24 units of technical electives to be chosen from an approved list of courses which currently includes CS 100, CS 122A, CS 122B, CS 130, CS 133, CS 134, CS 145, CS 151, CS 160, CS 162, CS 164, CS 165, CS 166, CS 168, CS 170, CS 177, CS 179 (E-Z) (4 units maximum), CS 180, CS 181, CS 183, CS 193 (4 units maximum), EE 140, MATH 120, MATH 135A, MATH 135B. The technical electives selected must be distinct from those used to satisfy the requirements specified in 2.a–g above.

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Business Informatics Major

1. Lower-division requirements (51 units)
   a) ENGR 001M
   b) BUS 020
   c) CS 010, CS 012 or CS 013, CS 014, CS 061
   d) CS 011/MATH 011
   e) ECON 002, ECON 003
   f) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A

2. Upper-division requirements (97 units)
   a) ENGR 101M
   b) BUS 101, BUS 103, BUS 104/STAT 104, BUS 106/ECON 134
   c) CS 100, CS 141, CS 153, CS 164, CS 165, CS 166, CS 180
   d) CS 111/MATH 111
   e) ENGR 180
   f) MATH 113
   g) SOC 150
   h) STAT 155
   i) Twelve (12) units of upper-division Computer Science technical electives, which must be distinct from the above major requirements. These 12 units may be chosen from those courses listed as upper-division requirements or technical electives for the Computer Science major. At least two courses must be in the Department of Computer Science and Engineering.
   j) Twenty (20) units of Business Administration technical electives, including at least 8 units of management information systems courses. These 20 units must be distinct from the above major requirements and may be chosen from any of the available Business Administration courses.

Students may petition for exceptions to the above degree requirements. Exceptions to Computer Science course requirements must be approved by the Computer Science and Engineering undergraduate advisor or chair, and exceptions to the Business Administration course requirements must be approved by the Graduate School of Management dean. Exceptions to other requirements require the approval of both the Department of Computer Science and Engineering and the Graduate School of Management.

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Minor in Computer Science

The minor in Computer Science is designed to enhance majors with limited computational theory or practice. As such, students with majors in Computer Engineering, Computer Science, Business Informatics, and Mathematics (Computational Mathematics option) are not eligible.

Requirements for the minor in Computer Science are:

1. Prerequisite courses: CS 010, CS 012 or CS 013, CS 014, CS 061, CS 011/MATH 011, MATH 008B or MATH 009A, MATH 009B, MATH 009C
2. Core courses: CS 111/MATH 111, CS 141
3. Three elective courses, each of four or more units, such that:
   a) Each is an upper-division requirement or a listed technical elective for the Computer Science major, excluding courses numbered 190–199
   b) No course may be an upper-division requirement of the student’s major
   c) At least two courses must be in the Department of Computer Science and Engineering
4. All courses for the minor must be taken for a letter grade.

Note: Students with a minor in Computer Science must obtain approval from the undergraduate advisor in Computer Science and Engineering for a specific program of electives consistent with their career goals.

Graduate Program

The Department of Computer Science and Engineering offers the M.S. and Ph.D. degrees in Computer Science. General requirements are listed in the Graduate Studies section of this catalog. Specific requirements for each degree are described below.
Students enrolled prior to Fall 2008 can still follow the old Graduate Program.

**Combined B.S. + M.S. Five-Year Program** The college offers a combined B.S. + M.S. program in Computer Science designed to lead to a Bachelor of Science degree as well as a Master of Science degree in five years. Applicants for this program must have a high school GPA above 3.6, a combined SAT Reasoning score above 1950 (or ACT plus Writing equivalent), complete the Entry Level Writing Requirement before matriculation, and have sufficient mathematics preparation to enroll in calculus in their first quarter as freshmen.

Interested students who are entering their junior year should consult with their academic advisor for information on eligibility and other details.

**Admission** All applicants must supply GRE General Test scores. The GRE subject test in Computer Science is recommended but not required. Applicants should have at least an undergraduate degree in computer science or a closely related field, but applicants who fail to meet this criterion may sometimes be admitted with deficiencies.

**Prerequisite Material** Competence in the areas defined by the following UCR courses is essential to graduate study in computer science:

- **CS 150**, **CS 152**, **CS 153**, **CS 161/CS 161L**

A student who is deficient in any of these competency areas may be asked to complete the corresponding UCR course with a letter grade of at least B or, to pass a challenge examination based on the course's final exam with a grade of at least B or, to complete the Entry Level Writing Requirement before matriculation, and have sufficient mathematics preparation to enroll in calculus in their first quarter as freshmen.

**Core Areas** Students have considerable flexibility in selecting specialty area(s) within the program. However, the following core areas introduce fundamental concepts and tools of general interest to all students.

1. **Hardware design principles**: CS 203A or CS 220.

2. **Theoretical foundations**: CS 215 or CS 218.

3. **Software and systems**: CS 201 or CS 202.

**Major Specialty Areas** The department has active research programs in the following major specialty areas. A list of related graduate coursework is provided for each area. Courses that qualify for the M.S. Breadth Requirement are marked with an asterisk (*).

- **A. Algorithms, Bioinformatics, and Theory of Computation**: CS 215*, CS 218*, CS 234, CS 238
- **C. Databases, Data Mining, and Machine Learning**: CS 205*, CS 235*, CS 229, CS 236*, CS 272
- **D. Operating Systems and Distributed Systems**: CS 202*, CS 253, CS 255*, CS 237
- **E. Computer Networks**: CS 204*, CS 237, CS 239*, CS 240, CS 257, CS 255*
- **F. Programming Languages, Compilers, and Software Engineering**: CS 201*, CS 245*, CS 246*
- **G. Computer Graphics and Human-Computer Interaction**: CS 230*, CS 231*, ME 230, ME 231

**Master's Degree**

The Department of Computer Science and Engineering offers the M.S. degree in Computer Science, after completion of the following degree requirements.

**Satisfactory completion** of CS 287 (Colloquium in Computer Science) each quarter of enrollment.

**Course Requirements** 48 quarter units of graduate or upper-division undergraduate courses are required. Students who have completed similar coursework elsewhere may petition for a waiver of a required course or substitution of an alternative course. For students interested in interdisciplinary research, individual student programs can be approved.

1. **Core Requirement (8 units)**. Choose one course from two of the three Core Areas listed above, with no grade lower than B-.

2. **Breadth Requirement (8 units)**. Two approved breadth courses chosen in such a way that together the core and breadth courses cover four different Major Specialty Areas (A to G).

3. **Electives (32 units)**

   a. **Project Option**. A student pursuing the M.S. degree, non-thesis option, may include up to 4 units of Directed Studies (CS 290) towards the elective requirement. Of the remaining 28 units, at least 12 units must be approved graduate lecture courses. The remaining 16 units may include additional approved graduate lecture courses, up to 8 units of graduate seminars in CS 260–269, and up to 12 units of approved undergraduate technical electives.

   b. **Thesis Option**. A student pursuing the M.S. degree, thesis option, may include up to 12 units of graduate research (CS 297 or CS 299) towards the elective unit requirement. Of the remaining 20 units, at least 4 units must be approved graduate lecture courses. The remaining 16 units may include additional approved graduate lecture courses, up to 8 units of graduate seminars in CS 260–269, and up to 8 units of approved undergraduate technical electives.

**Capstone Experience** All students must complete a capstone experience that synthesizes and integrates the knowledge and skills obtained throughout the master's program, according to one of the following options. It is the responsibility of the student to find a faculty member willing to supervise the master's project or thesis, to form the faculty examining committee, and to schedule the oral examination.

a. **Project Option** Students must complete a research project under the guidance of a faculty member. This project will require a written report and will be presented to a committee of at least two faculty members in an oral examination. (A copy of the report must be submitted to the Graduate Division.)

b. **Thesis Option** Students must submit a master's thesis in accordance with the general requirements of the university. The thesis is original research work, and it should demonstrate the student's ability to study a research area, identify an open problem and make a research contribution. The thesis must be presented to and approved by a committee of at least three faculty members.

The normative time for the completion of a M.S. in Computer Science is 2 years.

**Doctoral Degree**

The Department of Computer Science and Engineering offers the Ph.D. degree in Computer Science, after completion of the following degree requirements. It provides a research-oriented education in preparation for a career in research, industry, or academia and exploring both the fundamental aspects of computer science and engineering as well as their applications.

**Satisfactory completion** of CS 287 (Colloquium in Computer Science) each quarter of enrollment.

**Course Work** The course requirements for the Ph.D. degree ensure that Ph.D. students are exposed to fundamental concepts and tools (core requirement), a deep up-to-date view of their research specialty area (depth requirement), and an advanced, up-to-date view of the same topics outside their area (breadth requirement). Students are expected to complete all of these course requirements in the first two years of the program. These requirements consist of 48 quarter units of approved graduate or upper-division undergraduate courses, satisfying all four of the following course work categories. All of these courses must be for a letter grade, and no course can be counted towards more than one category. Students who have completed similar courses elsewhere may petition for a waiver of a required course or substitution of an alternative course.

Units obtained in CS 270, CS 287, CS 290, CS 297, CS 298, CS 299, CS 301, and CS 302 cannot be counted in any course work category.

1. **Core Requirement (12 units)**. Choose three courses from at least two of the three Core Areas described above, with no grade lower than B- and an overall core course GPA of at least 3.2.
2. Depth Requirement (12 units). Choose three courses listed above under the same Major Area (A to G). This requirement ensures that Ph.D. students, early on in their careers, acquire some depth of knowledge in a particular research area.

3. Breadth Requirement (12 units). Choose three courses from at least two different Major Areas (A to G) outside the student’s depth area. No course that is listed in the student’s depth area can be used to fulfill the breadth requirement, even if it is cross-listed in another area. Students, with the consent of the major professor, may petition for a non-CSE course to be counted towards the breadth requirement.

4. Electives (12 units). The remaining courses can be selected from additional CS graduate lecture courses, up to 8 units of graduate seminars in CS 260, CS 261, CS 262, CS 263, CS 267, CS 269, and up to 8 units of approved undergraduate technical electives. Students, with the consent of the major professor, may petition for a non-CSE course to be counted as an elective.

Milestones The Department has established three milestones to mark progress towards the Ph.D. degree in Computer Science: advancement to candidacy, presentation of the dissertation proposal, and final oral examination. A Ph.D. student must also satisfy all applicable Graduate Division requirements for each milestone.

Milestone I: Advancement to Candidacy. A student advances to candidacy after he/she has completed all the Ph.D. course requirements described above, and passed both the written qualifying examination and oral qualifying examination described below. These two exams are intended to verify three components of the student’s preparation for Ph.D. research: (1) breadth of comprehension sufficient to enable Computer Science research in areas beyond the topic(s) of the research exam and dissertation proposal; (2) ability to perform critical study, analysis and writing in a focused area; and (3) demonstrated research experience or ability to do research.

The Written Qualifying Exam. The written qualifying examination consists of a high-quality paper, solely authored by the student. This can be either a research paper containing an original contribution or a focused critical survey paper. The paper should demonstrate that the student understands and can integrate and communicate ideas clearly and concisely and should be approximately 10 pages, single-spaced. The organization and writing style of the paper should be suitable for submission to a first-rate technical conference or journal. It must represent work that the student did as a graduate student at UCR. Any contributions that are not the student’s own, including those of the major professor, must be explicitly acknowledged in detail. The paper must be approved by the student’s major professor prior to submission and must have a cover page with the advisor’s signature, indicating approval. After submission, the paper is reviewed and must be approved by at least two other members of the faculty selected by the Department’s Graduate Committee. The normative time for taking the Written Exam is the first quarter of the second year of graduate studies at UCR. The student must complete this requirement in no more than two attempts.

Oral Qualifying Examination The student is expected to demonstrate research aptitude by undertaking a research study on some topic (typically a problem from student’s chosen research specialty that may be a promising area in which to conduct the dissertation research), under the guidance of his or her faculty major professor. The research must be presented orally to a Qualifying Committee, which is appointed by the Graduate Division based on nominations from the department. The committee evaluates the merits of the work and the student’s aptitude for research. The work must represent significant progress towards original and publishable research. A written report summarizing the oral presentation must be submitted to the Qualifying Committee at least a week before the exam. The student must complete this requirement in no more than two attempts. The normative time for taking the Oral Qualifying Exam is by the end of the second year.

Dissertation Committee After advancing to candidacy, the student must form a Doctoral Examination Committee chaired by her or his major professor. The committee must include at least three CSE department senate faculty members and at least one member from outside the CSE department.

Milestone II: Dissertation Proposal Examination After advancement to candidacy, the student prepares a dissertation proposal that describes the dissertation topic, summarizes the relevant background literature, and presents a comprehensive research plan for the doctoral dissertation. The Dissertation Proposal Examination evaluates appropriateness of the research topic and the feasibility of the research plan. It also establishes a realistic timeline for the completion of the Dissertation. The Dissertation Committee administers this exam. The normative time for the Dissertation Proposal Exam is by the end of the third year. The Dissertation Proposal exam must be taken at least six months prior to the Final Doctoral Examination.

Milestone III: Final Doctoral Examination The student is required to write a dissertation in accordance with the Graduate Division requirements and may be required to defend it in a public oral final doctoral examination to the Dissertation Committee. After a satisfactory performance on the final doctoral examination, the Dissertation Committee recommends granting the Ph.D. degree. The student’s research and the dissertation must both meet the highest standards of originality and scholarship. The normative time for the completion of a Ph.D. in CS is five years.

Lower-Division Courses

CS 005. Introduction to Computer Programming (4) Lecture, 3 hours; laboratory, 3 hours. An introduction to computer programming for nonengineering and nonscience majors and for students considering taking CS 010 but needing additional preparation. Topics include the history of computing, basic computer operation, the notion of an algorithm, and programming constructs such as variables, expressions, input/output, branches, loops, functions, parameters, arrays, and strings. Credit is not awarded for CS 005 if it has already been awarded for CS 010.

CS 006. Effective Use of the World Wide Web (4) Lecture, 3 hours; laboratory, 3 hours. A detailed, non-technical introduction to the Internet, covering Web tools, e-communities, e-commerce, power searching, and verification of information, privacy, and other legal and societal issues.

CS 008. Introduction to Computing (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): none. Includes operating system basics (Windows and Unix), word processing, spreadsheets, databases (e.g., Access), E-mail, the Internet, and the World Wide Web. Designed for students not majoring in computer science, engineering, mathematics, or science. Credit is not awarded for CS 008 if it has already been awarded for CS 010.

CS 010. Introduction to Computer Science for Science, Mathematics, and Engineering I (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): MATH 008B or MATH 009A (MATH 009B may be taken concurrently). Covers problem solving through structured programming of algorithms on computers using the C++ object-oriented language. Includes variables, expressions, input/output (I/O), branches, loops, functions, parameters, arrays, strings, file I/O, and classes. Also covers software design, testing, and debugging. Credit is not awarded for CS 010 if it has already been awarded for CS 030.

CS 011. Introduction to Discrete Structures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009A or MATH 09HA; CS 010 or MATH 009B or MATH 09HB. Introduction to basic concepts of discrete mathematics with emphasis on applications to computer science. Topics include propositional and predicate calculi, elementary set theory, functions, relations, proof techniques, elements of number theory, enumeration, and discrete probability. Cross-listed with MATH 011.

CS 012. Introduction to Computer Science for Science, Mathematics, and Engineering II (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 with a grade of “C-” or better; familiarity with C or C++ language. Covers structured and object-oriented programming in C++. Emphasizes good programming principles and development of substantial programs. Topics include recursion, pointers, linked lists, abstract data types, and libraries. Also covers software engineering principles. Credit is awarded for only one of CS 012 or CS 013.

CS 013. Introductory Computer Science for Engineering Majors (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 with a grade of “C-” or better; familiarity with C or C++ language. A course corre-
CS 049-I. C# (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Practical exploration of software development using C# in a laboratory setting. Focus is on syntax, concepts, standard library, and development tool-chain use. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 049J. Introductory Java (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Practical introduction to software development using Java in a laboratory setting. Focus is on syntax, concepts, standard library, and development tool-chain use. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 049M. Matlab (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Practical exploration of problem solving using Matlab in a laboratory setting. Focus is on syntax, concepts, and development tool-chain use. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 049N. Hardware Description (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Introduces hardware description languages (HDLs) used to design modern digital integrated circuits found in a wide variety of electronic devices. Topics include modeling of circuit structure, register transfers, high-level behavior, and testbenches; HDL simulation models; use of synthesis tools; and tradeoffs among HDLs. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 049Q. Peri (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Practical exploration of problem solving and software development using Perl in a laboratory setting. Focus is on syntax, concepts, and idiomatic use. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 049S. Bash (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Practical exploration of problem solving using Bash scripting in a laboratory setting. Focus is on syntax, concepts, and idiomatic use. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 049Y. Python (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 005 or CS 010 or knowledge of programming or consent of instructor. Practical exploration of problem solving and software development using Python in a laboratory setting. Focus is on syntax, concepts, standard library, and development tool-chain use. Graded Satisfactory (S) or No Credit (NC). Segment is repeatable as topics change to a maximum of 12 units.

CS 061. Machine Organization and Assembly Language Programming (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 with a grade of “C-” or better. An introduction to computer organization. Topics include number representation, combinational and sequential logic, computer instructions, memory organization, addressing modes, interrupt, input/output (I/O), assembly language programming, assemblers, and linkers.

CS 100. Software Construction (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141. Development and construction of software products. Topics include design, coding layout, and style; implementation strategies; quality attributes; prototyping, reuse, and components; debugging, testing, and performance; integration and maintenance; document control; standards, analysis, and selection of tools and environment; and personal software processes.

CS 111. Discrete Structures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010; CS 011/MATH 011; MATH 009C or MATH 113. Study of discrete mathematical structures with emphasis on applications to computer science. Topics include asymptotic notation, generating functions, recurrence equations, elements of graph theory, trees, algebraic structures, and number theory. Cross-listed with MATH 111.

CS 120A. Logic Design (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 061 with a grade of “C-” or better. Covers the design of digital systems. Topics include Boolean algebra, combinational and sequential logic design; design and use of arithmetic/logic units, carry-lookahead adders, multiplexers, decoders, comparators, multipliers, flip-flops, registers, and simple memories; state-machine design; and basic register-transfer level design. Interdisciplinary laboratories involve use of hardware description languages, synthesis tools, programmable logic, and significant hardware prototyping. Cross-listed with EE 120A.

CS 120B. Introduction to Embedded Systems (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 120A/EE 120A. Introduction to hardware and software design of digital computing systems embedded in electronic devices (such as digital cameras or portable video games). Topics include embedded processor programming, custom processor design, standard peripherals, memories, interfacing, and hardware/software tradeoffs. Interdisciplinary laboratory involves use of synthesis tools, programmable logic, and microcontrollers and development of working embedded systems. Cross-listed with EE 120B.

CS 122A. Intermediate Embedded and Real-Time Systems (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 012 or CS 013; CS 120B/EE 120B. Combines software and hardware design of embedded computing systems. Topics include hardware and software codesign, advanced programming paradigms (including state machines and concurrent processes), real-time programming and operating systems, basic control systems, and modern chip and design technologies. Laboratories involve use of microcontrollers, embedded microprocessors, programmable logic and advanced simulation, and debug environments.

CS 122B. Advanced Embedded and Real-Time Systems (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 122A. Explores state-of-the-art aspects of building embedded computer systems. Topics include real-time programming, synthesis of coprocessor cores, application-specific processors, hardware and software cosimulation and codesign, low-power design, reconfigurable computing, core-based design, and platform-based methodology.

CS 130. Computer Graphics (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141. MATH 113 (MATH 113 may be taken concurrently); or consent of instructor. A study of the fundamentals of computer graphics necessary to design and build graphics applications. Examines raster graphics algorithms.
including scan-converting graphics primitives, antialiasing, and clipping. Also covers geometric transformations, viewing, solid modeling techniques, hidden-surface removal algorithms, color models, illumination, and shading. Individual and group projects are assigned.

CS 133. Computational Geometry (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141, MATH 113, or equivalents. Introduction to the design of geometry algorithms. Covers the basic computational geometry concepts and techniques used in graphics, robotics, and engineering design. Topics include polygons and polytopes, convex hulls, and voronoi diagrams.

CS 134. Video Game Creation and Design (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 130. Covers academic, theoretical, and practical aspects of video games by exploring common algorithms, data structures, and software design for different genres. Topics include game interface, character movement, intelligent behaviors, and networked or multiplayer games. Requires in-depth, applied programming and a term project, including the design, implementation, and analysis of a computer game.

CS 141. Intermediate Data Structures and Algorithms (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 014 with a grade of "C-" or better, CS 111/MATH 111, MATH 009C or MATH 09HC; proficiency in C++. Explores basic algorithm analysis using asymptotic notations, summation and recurrence relations, and algorithms and data structures for discrete structures including trees, strings, and graphs. Also covers general algorithm design techniques including "divide-and-conquer," the greedy method, and dynamic programming. Homework and programming assignments integrate knowledge of data structures, algorithms, and programming.

CS 143. Multimedia Technologies and Programming (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 or knowledge of an object-oriented or fourth-generation (scripting) programming language, for example C++, HyperTalk, SuperTalk, Lingo, OpenScript, ScriptX. Introduces multimedia technologies and programming techniques, multimedia hardware devices, authoring languages and environments, temporal and non-temporal media (interactivity in text, graphics, audio, video, and animation), applications, and trends. A term project is required. Cross-listed with EE 143.

CS 145. Combinatorial Optimization Algorithms (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 141; MATH 113 or MATH 151. The study of efficient algorithm design techniques for combinatorial optimization problems. Topics include shortest paths, minimum spanning trees, network flows, maximum matchings, stable matchings, linear programming, duality, two-person games, algorithmic techniques for inexact programming problems, NP-completeness, and approximation algorithms.

CS 150. The Theory of Automata and Formal Languages (4) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): CS 014; CS 111/MATH 111; MATH 009C or MATH 09HC. A study of formal languages, including regular and context-free languages; computational models for generating these languages such as finite-state automata, pushdown automata, regular expressions, and context-free grammars; mathematical properties of languages and models; equivalence between the models, and an introduction to Turing machines and decidability.

CS 151. Introduction to Theory of Computation (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 141, CS 150. The study of fundamental questions about the nature of computing. Topics include Turing machines, computability, reductions, complexity theory, complexity classes P and NP, the P=NP problem, NP-completeness, and other time and space complexity classes.

CS 152. Compiler Design (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 061, CS 141. Covers the fundamentals of compiler design, including lexical analysis, parsing, semantic analysis, compile-time memory organization, run-time memory organization, code generation, and compiler portability issues. Laboratory work involves exercises covering various aspects of compilers.

CS 153. Design of Operating Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 061, CS 141 with a grade of "C-" or better, C++ programming proficiency. Covers the principles and practice of operating system design, including concurrency, memory management, file systems, protection, security, command languages, scheduling, and system performance. Laboratory work involves exercises about various aspects of operating systems.

CS 160. Concurrent Programming and Parallel Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 061. Study of concurrent and parallel systems which include modular structure and design, interprocess communication, synchronization, failures and persistence, concurrency control, atomic transactions, recovery, language support, distributed interprocess communication, and implementation mechanisms. Provides preparation for the study of operating systems, databases, and computer networking.

CS 161. Design and Architecture of Computer Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 120B/EE 120B, concurrent enrollment in CS 161L. A study of the fundamentals of computer design. Topics include the performance evaluation of microprocessors, instruction set design and measurements of use, microprocessor implementation techniques including multicore and pipelined implementations, computer arithmetic, memory hierarchy, and input/output (I/O) systems.

CS 161L. Laboratory in Design and Architecture of Computer Systems (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CS 120B/EE 120B, concurrent enrollment in CS 161. Students design and simulate a complete computer system, using hardware description language and simulator. Topics include instruction set architecture design, assemblers, datapath and control unit design, arithmetic and logic unit, memory and input/output (I/O) systems, and integration of all parts into a working computer system.

CS 162. Computer Architecture (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 161 and CS 161L with grades of "C-" or better. The study of advanced processor design. Topics include CPU pipelining, data and control hazards, instruction-level parallelism, branch prediction, and dynamic scheduling of instructions. Also covers Very Long Instruction Word (VLIW) processing, multimedia support, design of network and embedded processors, basic multiprocessor design, shared memory and message passing, and network topologies.

CS 164. Computer Networks (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141, CS 153. Covers the fundamentals of computer networks. Topics include layered network architecture, communication protocols, local area networks, UNIX network programming, verification, network security, and performance studies.

CS 165. Computer Security (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141, CS 153. Examines the ways in which information systems are vulnerable to security breaches. Topics include attacks; security policies, and vulnerabilities; authentication and encryption techniques; networks; digital signatures, certificates, and passwords; privacy issues, firewalls, and spoofing; Trojan horses and computer viruses; CERT Coordination Center; and electronic commerce.

CS 166. Database Management Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141. Topics include database management systems; relational, network, and hierarchical models; distributed database concepts; query languages; implementation issues; and privacy and security of the database.

CS 168. Introduction to Very Large Scale Integration (VLSI) Design (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 120A/EE 120A or consent of instructor. Basic electrical properties of metal-oxide-semiconductor (MOS) circuits. MOS circuit design processes. Basic circuit and computer-aided design layout. Aspects of system design. Memory, registers, and aspects of systems timing. Very large scale integration design.

CS 170. Introduction to Artificial Intelligence (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141. Introduction to fundamental problems underlying the design of intelligent systems and to one of the languages of artificial intelligence such as Prolog or LISP. Topics include brute force and heuristic search, problem solving, knowledge representation, predicate logic and logical inference, frames, semantic nets, natural language processing, and expert systems.

CS 171. Introduction to Expert Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 170 or equivalent. Introduction to methodology of design and implementation of expert systems. Rule-based and frame-based expert systems. Knowledge acquisition and knowledge engineering. Design of expert system shells. Use of expert system shells to construct knowledge-based systems.

CS 177. Modeling and Simulation (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141, C++ programming proficiency. Topics include validation of random number sequences; concepts in modeling and systems analysis; and conceptual models and their mathematical and computer realizations. Examines simulation modeling techniques including object-oriented modeling and discrete-event modeling. Emphasis is on the use of simulation libraries used with programming languages such as C++. Requires a term project consisting of the development, computer implementation, and analysis of a model.

CS 179 (E-Z). Project in Computer Science (4) For hours and prerequisites, see segment descriptions. Under the direction of a faculty member, student teams propose, design, build, test, and document software and/or hardware devices or systems. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 179E. Compilers (4) Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): CS 141 and CS 152 with grades of "C-" or better, ENGR 180, 8 additional upper-division units in Computer Science. Student teams design, plan, implement, test, and document a Compiler-related system using techniques from previ-
ous related courses. Requires a written report and an oral presentation. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 179E. Operating Systems (4) Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): CS 153 with a grade of "C-" or better; ENGR 180; 8 additional upper-division units in Computer Science. CS 160 is recommended. Student teams plan, design, implement, test, and document an Operating Systems-related system using techniques from previous related courses. Requires a written report and an oral presentation. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 179G. Database Systems (4) Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): CS 141 and CS 166 with grades of "C-" or better; ENGR 180; 8 additional upper-division units in Computer Science. Student teams plan, design, implement, test, and document a Database-related system using techniques from previous related courses. Requires a written report and an oral presentation. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 179H. Computer Architecture and Embedded Systems (4) Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): CS 122A, CS 141, and CS 161 with grades of "C-" or better or consent of instructor; ENGR 180; 3 additional upper-division units in Computer Science. Student teams plan, design, implement, test, and document an Embedded Systems-related system using techniques from previous related courses. Requires a written report and an oral presentation. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 179K. Software Engineering (4) Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): CS 141 with a grade of "C-" or better; CS 170 with grades of "C-" or better; ENGR 180; 8 additional upper-division units in Computer Science. Student teams plan, design, implement, test, and document a Software Engineering-related system using techniques from previous related courses. Requires a written report and an oral presentation. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 179M. Artificial Intelligence (4) Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): CS 130 with a grade of "C-" or better; CS 141; ENGR 180; 8 additional upper-division units in Computer Science. Student teams plan, design, implement, test, and document a graphics- or electronic game-related system using techniques from previous related courses. Requires a written report and an oral presentation. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

CS 180. Introduction to Software Engineering (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141. A study of software engineering techniques for the development, maintenance, and evolution of large software systems. Topics include requirements and specification; system design and implementation; debugging, testing, and quality assurance; reengineering; project management; software process; tools; and environments.

CS 181. Principles of Programming Languages (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 60; CS 141 (CS 141 may be taken concurrently); CS 150. Principles of programming language design. Study and comparison of several programming languages, their features, and their implementations.

CS 183. UNIX System Administration (4) Seminar, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 141. Technical aspects of system administration on a Unix system including advanced Unix, managing system devices, operating system installation, communications, and networking.

CS 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): consent of instructor and department chair. Individual study to meet special curricular needs. Course is repeatable to a maximum of 9 units.

CS 193. Design Project (1-4) Laboratory, 1-6 hours; scheduled research, 1-3 hours; individual study, 1-3 hours. Prerequisite(s): CS 141; consent of instructor. Individual hardware or software design project to include establishment of objectives and criteria, synthesis, analysis, implementation, testing, and documentation. Course is repeatable to a maximum of 8 units.

CS 194. Independent Reading (1-4) Prerequisite(s): consent of instructor. Independent reading in material not covered in course work. Normally taken in senior year. Total credit for CS 194 may not exceed 8 units.

CS 198-I. Individual Internship in Computer Science (1-4) Internship, 3-12 hours. Prerequisite(s): upper-division standing; at least 12 units in Computer Science courses. An academic internship to provide the student with career experience as a computer scientist in a governmental, industrial, or research unit under the joint supervision of an instructor and a faculty member in Computer Science. Each individual program must have the prior approval of both supervisors and the Department chair. A final written report is required. Course is repeatable to a maximum of 8 units.

Graduate Courses

CS 201. Compiler Construction (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 152. Covers theory of parsing and translation. Also addresses compiler construction, including lexical analysis, syntax analysis, code generation, and optimization. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 202. Advanced Operating Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 153. Examines recent developments in operating systems. Also covers multiprogramming, parallel programming, time sharing, scheduling and resource allocation, and selected topics. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 203A. Advanced Computer Architecture (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): CS 161. Covers contemporary computer systems architecture, including stack computers, parallel computers, pipeline processing, database machines, and multiprocessor architecture. Includes evaluation of computer performance. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 203B. Advanced Computer Architecture (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): CS 203A with a grade of "B" or better. Covers advanced topics in general-purpose computer architecture including instruction-level parallel architectures, as well as very-long-instruction-word, explicitly parallel instruction computing, and multithreaded architectures. Also covers dataflow machines and vector and single instruction multiple data architectures, including multimedia extensions. Also discusses network processors, multimedia processors, and advanced embedded processors. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 204. Advanced Computer Networks (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): CS 014, CS 164. Covers advanced topics in computer networks, layering, Integrated Services Digital Networks (ISDN), and high-speed networks. Also covers performance models and analysis, distributed systems and databases, and case studies. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 205. Artificial Intelligence (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 170 or equivalent. Examines knowledge representation and automated reasoning and their use in capturing common sense and expert knowledge. Also addresses predicate and nonmonotonic logics, resolution and term rewriting, reasoning under uncertainty, theorem provers, planning systems, and belief networks. Includes special topics in natural language processing, perception, logic programming, expert systems, and deductive databases. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 213. Parallel Processing Architectures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 161 or CS 203A. A study of parallel processing. Covers static and dynamic interconnection networks; shared memory multiprocessors; and cache coherence and synchronization. Also examines pre-fetching; memory management; message-passing architectures; workstation clusters; scheduling and mapping algorithms; and load balancing in Web servers. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 215. Theory of Computation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 150. Covers phrase structure grammars and languages; Turing machines; relation of languages to automata; soluble and unsolvable problems; and theoretical limitations of computers. Also examines algorithmic complexity theory; polynomial reducibility; the classes P...
and NP, and correctness proofs. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 218. Design and Analysis of Algorithms (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 141, CS 161. A study of efficient data structures and algorithms for solving problems in a variety of areas such as sorting, searching, selection, linear algebra, graph theory, and computational geometry. Also covers worst-case and average-case analysis using recurrence relations, generating functions, upper and lower bounds, and other methods. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 220. Synthesis of Digital Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 141; CS 161. Covers the synthesis and simulation of digital systems. Topics include synthesis at the system, behavioral, register-transfer, and logic levels; application-specific processors; simulation; and emerging system-on-a-chip design methodologies. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 223. Reconfigurable Computing (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): CS 202 or CS 203A; consent of instructor. Covers reconfigurable computing, a novel computational model that is fast becoming part of the mainstream in high-performance computing. Addresses architectures, software tools and compilers, programming models, and applications. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CS 230. Computer Graphics (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 141 or CS 218; MATH 113 or MATH 131; graduate standing or consent of instructor. Covers advanced topics related to graphics and necessary fundamentals. Includes geometry representations; affine and perspective transforms; rendering with global illumination and other light models; shading and texture mapping; ray tracing and anti-aliasing techniques; and hierarchical and keyframe animation. Also includes projects and/or in-depth programming assignments. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 231. Computer Animation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 130 or CS 230. Covers topics in computer animation, including motion capture; inverse kinematics; and dynamic simulation. Also examines deformable systems and other natural phenomena; facial animation; high-level behavior control; creature evolution; and procedural techniques. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 234. Computational Methods for Biomolecular Data (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 111/MATH 111; CS 141 or CS 218; STAT 155 or STAT 160A. A study of computational and statistical methods aimed at automatically analyzing, clustering, and classifying biomolecular data. Includes combinatorial algorithms for pattern discovery, hidden Markov models for sequence analysis; analysis of expression data; and prediction of the three-dimensional structure of RNA and proteins. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 235. Data Mining Techniques (4) Lecture, 3 hours; term paper, 1.5 hours; project, 1.5 hours. Prerequisite(s): CS 141, CS 166; CS 170 is recommended. Provides students with a broad background in the design and use of data mining algorithms and tools. Includes clustering, classification, association rules mining, time series clustering, and Web mining. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 236. Database Management Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 141; CS 153 or equivalent; CS 166; or consent of instructor. Covers principles of file systems; architecture of database management systems; data models; and relational databases. Also examines logical and physical design of databases; hardware and software implementation of database systems; and distributed databases (e.g., query processing, concurrences, recovery). May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 237. Advanced Topics in Modeling and Simulation (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): CS 177. Covers formal computer simulation models, such as Discrete Event Specified Models and differential equation models. Examines current developments in simulation languages. Also addresses integrated model development and its applications to complex, large-scale problems. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 238. Algorithmic Techniques in Computational Biology (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): CS 141 or CS 218; MATH 112. A study of fundamental algorithms for solving combinatorial or computational problems in molecular biology and genomics. Includes sequence alignment and multiple alignment; bio-database search; gene and regulatory signal recognition; DNA sequence assembly; physical mapping; and reconstruction of evolutionary trees. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 239. Performance Evaluation of Computer Networks (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 164. Offers models and analytical techniques for evaluating the performance of computer networks. Covers basic and intermediate queuing theory and queuing networks and their application to practical systems. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 240. Network Routing (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 141 or CS 204; CS 164. An in-depth study of routing in computer networks. Examines general principles and specific routing protocols and technologies. Topics include Internet, Asynchronous Transfer Mode (ATM), optical, wireless, and ad hoc networks. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 245. Software Evolution (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): CS 180 or equivalent; graduate standing. Covers the principles, tools, and techniques for disciplined software evolution. Includes migration strategies, change patterns, software maintenance, legacy system reengineering, reverse engineering for program understanding, middleware, source code analysis, software visualization, and program transformation tools. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 246. Advanced Verification Techniques in Software Engineering (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 111/MATH 111, CS 141, CS 150, or equivalents or consent of instructor. A study of advanced techniques to specify and examine the correctness of complex systems and software. Focuses on concurrent and distributed behavior, formal description languages, temporal logics, model checking and symbolic model checking, partial order reduction, and the use of verification tools. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 253. Distributed Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 153. Integrates the theory and practice of distributed systems with a focus on recent developments in distributed systems. Includes middleware architectures; distributed process management and real-time scheduling; dependability; and group communication protocols. Also covers distributed process management; replication; large-scale parallel systems; Internet content delivery; and Web caching. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 255. Computer Security (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 153 or CS 164 or CS 165. Discusses the theoretical and practical issues arising in the context of computer systems security and the principles underlying the design of secure computing environments. Topics include cryptography, security models, authentication protocols, network security, intrusion detection, attacks and their countermeasures, and secure systems design. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 257. Wireless Networks and Mobile Computing (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): CS 141; CS 164 or CS 204. Introduces basic and advanced concepts of wireless networks and mobile computing. Covers both wireless cellular and ad hoc networks. Includes protocols for medium access control, resource allocation, and routing, as well as transport layer optimizations for the wireless environment. Also covers standards, Bluetooth, and the IEEE 802.11 for wireless local area networks. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 260. Seminar in Computer Science (1-4) Seminar, 1-4 hours. Prerequisite(s): consent of department. Seminar on current research topics in Computer Science. Course is repeatable.

CS 261. Seminar in Artificial Intelligence and the Design of Expert Systems (4) Seminar, 4 hours. Prerequisite(s): graduate standing or consent of instructor. A review of recent research topics in the fields of artificial intelligence and logic programming with a particular emphasis on expert systems, automated reasoning, and knowledge representation.

CS 262. Algorithms and Data Structures (4) Seminar, 4 hours. Prerequisite(s): CS 218, CS 215A; or consent of instructor. Selected topics in theoretical computer science. Course is repeatable.

CS 263. Seminar in Distributed Systems (4) Seminar, 4 hours. Prerequisite(s): graduate standing or consent of instructor. A project-oriented course that introduces students to the fundamental topics in distributed computer systems and provides practical experience. Topics include distributed file systems, replicated data, load management, and distributed shared memory.

CS 267. Seminar in Databases (4) Seminar, 4 hours. Prerequisite(s): CS 236 or consent of instructor. Focuses on recent research and development issues in the database area such as object-oriented databases, heterogeneous databases, parallel databases, benchmarks, transaction processing, query optimization, and performance evaluation.
CS 269. Software and Hardware Engineering of Embedded Systems (4) Seminar, 4 hours. Prerequisite(s): CS 120A/ECE 120A; consent of instructor. Presents state-of-the-art software and hardware design techniques for embedded computing systems. Topics include specification models, languages, simulation, partitioning algorithms, estimation methods, model refinement, and design methodology.

CS 270. Special Topics in Advanced Computer Science (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Involves presentations and discussions by faculty and students that focus on new research in computer science. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CS 272. Probabilistic Models for Artificial Intelligence (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): CS 141, STAT 160A. Covers methods for representing and reasoning about probability distributions in complex domains. Focuses on graphical models and their extensions such as Bayesian networks, Markov networks, hidden Markov models, and dynamic Bayesian networks. Topics include algorithms for probabilistic inference, learning models from data, and decision making. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D.

CS 287. Colloquium in Computer Science (1) Colloquium, 1 hour. Prerequisite(s): graduate standing. Lectures on current research topics in computer science presented by faculty members and visiting scientists. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CS 290. Directed Studies (1-6) Seminar, 1-6 hours. Prerequisite(s): consent of instructor. Research and special studies in computer science. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CS 297. Directed Research (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing. Directed research on selected problems in computer science under the sponsorship of specific faculty members. Graded Satisfactory (S) or No Credit (NC).

CS 298-L. Individual Internship (1-12) Written work, 1-12 hours; internship, 2-24 hours. Prerequisite(s): graduate standing; consent of instructor. Individual apprenticeship in computer science. Includes fieldwork with an approved professional individual or organization, and academic work under the direction of a faculty member. A final written report is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

CS 299. Research for Thesis or Dissertation (1-12) Individual study, 3-36 hours. Prerequisite(s): graduate standing and consent of instructor. Research in computer science under the direction of a faculty member. This research is to be included as part of the thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

CS 301. Teaching Computer Science at the College Level (1) Seminar, 1 hour. Prerequisite(s): graduate standing. A program of weekly meetings and individual formative evaluation required of new Computer Science Teaching Assistants. Covers instructional methods and classroom interactions most suitable for teaching Computer Science. Conducted by departmental faculty. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CS 302. Apprentice Teaching (1-4) Seminar, 1-4 hours. Prerequisite(s): enrollment limited to teaching assistants and associates in Computer Science. Supervised teaching in upper- and lower-division Computer Science courses. Required each quarter of all Computer Science teaching assistants and associates. The course is intended to aid in the learning of effective teaching methods such as the handling of Computer Science discussion sections, preparation and grading of examinations, and student relations. Graded Satisfactory (S) or No Credit (NC).

Conservation Biology

Subject abbreviation: BL CN

College of Natural and Agricultural Sciences

Program Office, 1223 Pierce Hall
(951) 827-4186; ccb.ucr.edu

The major in Conservation Biology is not currently accepting new students. Students who are interested in this field should see the Conservation Biology track, in the Biological Sciences section of this catalog. For more information, contact the CNAS Undergraduate Office, (951) 827-4186.

Upper-Division Courses

BL CN 190. Special Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): consent of instructor and Program Chair. To be taken as a means of meeting special curricular needs. Course content, style, requirements, and grading basis is selected in consultation with the instructor and Program Chair. Course is repeatable to a maximum of 12 units.

BL CN 197. Research for Undergraduates (1-2) Outside research, 3-6 hours. Prerequisite(s): sophomore, junior, or senior standing in Conservation Biology; consent of instructor and Program Chair. An introduction to research providing the opportunity, through reading and preliminary laboratory work, to develop a research project suitable for BL CN 199. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 4 units.

BL CN 198-L. Individual Internship in Conservation Biology (2-4) Internship, 6-12 hours; consultation, 1 hour; outside reading, 2-4 hours. Prerequisite(s): upper-division standing in Conservation Biology. An off-campus practical experience in the public or private sector related to conservation biology that is conducted under the joint supervision of an off-campus sponsor and a faculty mentor from the Conservation Biology Program. A written report on the internship is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

BL CN 199. Senior Research (1-4) Laboratory, 3-12 hours. Prerequisite(s): junior or senior standing in Conservation Biology; consent of instructor and Program Chair. BL CN 197 is recommended. Research in conservation biology performed under the supervision of a faculty member in the Conservation Biology Program. A written research report is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Creative Writing

Subject abbreviation: CRWT

College of Humanities, Arts, and Social Sciences

D. Charles Whitney, Ph.D., Chair
Department Office, 4146 CHASS INTS
(951) 827-3615; creativewriting.ucr.edu

Professors

Christopher Abani, Ph.D.
Christopher Buckley, M.F.A.
Mike Davis, C.Phil.
Stephanie Hammer, Ph.D.
Juan Felipe Herrera, M.F.A.
Tom Lutz, Ph.D.
Maurya Simon, M.F.A.
Susan C. Straight, M.F.A.
D. Charles Whitney, Ph.D. (Creative Writing/Media and Cultural Studies)

Assistant Professors

Reza Aslan, M.F.A.
Claire Hoffman, M.A., M.S.J.
Michael Jayme, M.F.A.
Laila Lalami, Ph.D.
Andrew Winer, M.F.A.

Visiting Assistant Professor

Goldberry Long, M.F.A.

Lecturers

Judy Z. Kronenfeld, Ph.D.
Dwight Yates, Ph.D.

Major

The Creative Writing major offers a series of workshop courses in poetry, fiction, playwriting, screenwriting, and nonfiction as well as reading courses in poetry and fiction presented from a writer’s point of view. They are taught for the most part by poets, fiction writers, and playwrights.

The writing courses are taught as workshops, so that the subject matter (the students’ stories, poems, and plays) is different each time the course is offered. Incoming freshmen and transfer students can apply for a Chancellor’s Performance Award, for up to $4,500. Contact the department office for more information.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements

The major requirements for the B.A. degree in Creative Writing are as follows:

Prerequisite courses: CRWT 056 or equivalent, and ENGL 001A or equivalent.
1. Lower-division requirements (20 units; five courses)
Two Creative Writing survey courses from CRWT 046A, CRWT 046B, or CRWT 046C and
Two Creative Writing introductory courses from CRWT 057A, CRWT 057B, or CRWT 057C and
One literature survey course from CRWT 057C or CRWT 057A, CRWT 057B, or
Two Creative Writing introductory courses
f) One upper-division course in Art, Art History, Music, Dance, or Theatre (must be a 4-unit course)
g) Four (4) units of CRWT 195 or CRWT 195H (Senior Honors Thesis) or approved course from list available in department
h) Four upper-division courses of concentration in another discipline or set of disciplines approved by advisor

Minor

1. Lower-division requirements (9 units)
a) One introductory writing workshop: CRWT 046
b) One introductory reading course: CRWT 040/MCS 039, CRWT 043, CRWT 045, ENGL 014, ENGL 015, ENGL 017

c) One introductory workshop course: CRWT 057, CRWT 057B, CRWT 057C.

2. Upper-division requirements (20 units)

a) Four (4) units from
(1) CRWT 176 (E-Z)
(2) Any upper-division course in English, Comparative Literature and Foreign Languages, or Theatre (except ENGL 101, ENGL 103; FREN 100, FREN 101A, FREN 101B, FREN 101C; GER 101, GER 103A, GER 103B; RUSN 103; SPN 101A, SPN 101B, SPN 101C, SPN 105, SPN 106A, SPN 106B)
*These workshops may be repeated; however, only 4 units total can be applied to the major.

b) Sixteen (16) units in one of the following emphases:

Nonfiction Emphasis
(1) CRWT 130, CRWT 132, CRWT 134

(2) Four (4) units from CRWT 150, CRWT 152, CRWT 164A/THEA 164A, CRWT 164B/THEA 164B, the CRWT 166A/MCS 166A/THEA 166A, CRWT 166B/MCS 166B/THEA 166B, CRWT 166C/MCS 166C/THEA 166C series, CRWT 170*, CRWT 172*
*These workshops may be repeated; however, only 4 units total can be applied to the major.

c) One workshop in second genre: CRWT 130, CRWT 132, CRWT 134, CRWT 150, CRWT 152, CRWT 160, CRWT 162*, CRWT 164A/THEA 164A, CRWT 164B/THEA 164B, the CRWT 166A/MCS 166A/THEA 166A, CRWT 166B/MCS 166B/THEA 166B, CRWT 166C/MCS 166C/THEA 166C series, CRWT 170*, CRWT 172*

Poetry Emphasis
(1) CRWT 150, CRWT 160, CRWT 170

(2) Four (4) units from CRWT 130, CRWT 152, CRWT 164A/THEA 164A, CRWT 165, CRWT 166A/MCS 166A/THEA 166A, CRWT 171, CRWT 187/CPLT 187

Fiction Emphasis
(1) CRWT 152, CRWT 162, CRWT 172

(2) Four (4) units from CRWT 130, CRWT 150, CRWT 164A/THEA 164A, CRWT 165, CRWT 166A/MCS 166A/ THEA 166A, CRWT 166B/MCS 166B/ THEA 166B, CRWT 166C/MCS 166C/ THEA 166C, CRWT 187/CPLT 187

Introduction
CRWT 012. The Writer in Writing (4) Lecture, 2 hours; outside research, 1 hour.

Prerequisite(s): none. Targeted at the fledgling creative writer and apprentice literary critic; surveys the complex legacy surrounding the figure of the writer in world literature. Discussion and weekly writing exercises demonstrate the use of brainstorming in creating and critiquing literature. Cross-listed with CPLT 012.

CRWT 040. Fiction and Film (4) Lecture, 2 hours; practice writing, 1 hour.

Prerequisite(s): none. A study of twentieth-century fiction and film from a writer’s point of view, emphasizing narrative elements and literary techniques found in both. Explores how novels are translated into film. Cross-listed with MCS 039.

CRWT 041. Poetry and Fiction: A Reading Course for Writers (4) Lecture, 2 hours; practice writing, 1 hour.

Prerequisite(s): none. Active, analytical reading of contemporary poetry and fiction in order to broaden and deepen students’ understanding of the craft of writing. Students analyze and practice poetic and fictional techniques.

CRWT 042. Poetry and Drama: A Reading Course for Writers (4) Seminar, 2 hours; extra reading, 2 hours.

Prerequisite(s): none. Examines poetic and dramatic techniques in both poetry and drama, including narrative verse, verse novels, and verse drama. Students compose imitations and may also write analytical essays based on the models studied.

CRWT 043. Creative Writing and Ancestry (4) Lecture, 2 hours; outside writing, 3 hours.

Prerequisite(s): none. A study of creative writing that explores personal experience and ancestry. Genres studied may include nonfiction, autobiography, fiction, and visual media. Students are required to write in one or more of these genres.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors. See also Journalism minor.

Education Abroad Program

The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses that earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program

See Creative Writing and Writing for the Performing Arts in this catalog for information on the M.F.A. in this area.

Lower-Division Courses

CRWT 012. The Writer in Writing (4) Lecture, 2 hours; outside research, 1 hour.

Prerequisite(s): none. Targeted at the fledgling creative writer and apprentice literary critic; surveys the complex legacy surrounding the figure of the writer in world literature. Discussion and weekly writing exercises demonstrate the use of brainstorming in creating and critiquing literature. Cross-listed with CPLT 012.

CRWT 040. Fiction and Film (4) Lecture, 2 hours; practice writing, 1 hour.

Prerequisite(s): none. A study of twentieth-century fiction and film from a writer’s point of view, emphasizing narrative elements and literary techniques found in both. Explores how novels are translated into film. Cross-listed with MCS 039.

CRWT 041. Poetry and Fiction: A Reading Course for Writers (4) Lecture, 2 hours; practice writing, 1 hour.

Prerequisite(s): none. Active, analytical reading of contemporary poetry and fiction in order to broaden and deepen students’ understanding of the craft of writing. Students analyze and practice poetic and fictional techniques.

CRWT 042. Poetry and Drama: A Reading Course for Writers (4) Seminar, 2 hours; extra reading, 3 hours.

Prerequisite(s): none. Examines poetic and dramatic techniques in both poetry and drama, including narrative verse, verse novels, and verse drama. Students compose imitations and may also write analytical essays based on the models studied.

CRWT 043. Creative Writing and Ancestry (4) Lecture, 2 hours; outside writing, 3 hours.

Prerequisite(s): none. A study of creative writing that explores personal experience and ancestry. Genres studied may include nonfiction, autobiography, fiction, and visual media. Students are required to write in one or more of these genres.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors. See also Journalism minor.
CRWT 044. Ghosts, Gods, and Monsters: Children's Literature for Writers (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. A survey of children's literature, with emphasis on how the craft of tales and fables contributes to their meaning. Explores techniques the beginning writer can learn from children's literature.

CRWT 045. The Prose Poem and "Short-Short" Story (4) Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): none. Explores what distinguishes prose poems from "sudden" or "short-short" fiction. Investigates the use of narrative and figurative language and the tapping of the unconscious mind.

CRWT 046A. Craft of Writing: Survey in Contemporary Fiction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. A survey of selected works of contemporary fiction and related texts, with emphasis on the craft of fiction and how craft contributes to meaning. Course is repeatable as content changes to a maximum of 8 units.

CRWT 046B. Craft of Writing: Survey in Contemporary Poetry (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. A survey of selected works of contemporary poetry and related texts, with emphasis on the craft of poetry and how craft contributes to meaning. Course is repeatable as content changes to a maximum of 8 units.

CRWT 046C. Craft of Writing: Survey in Contemporary Nonfiction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. A survey of selected works of contemporary nonfiction and related texts, with emphasis on the craft of nonfiction and how craft contributes to meaning. Course is repeatable as content changes to a maximum of 8 units.

CRWT 056. Introduction to Creative Writing (4) Lecture, 3 hours; discussion, 1 hour. An introduction to the craft of creative writing. Focuses on the elements of a number of genres, including poetry, fiction, nonfiction, journalism, drama, and the graphic novel.

CRWT 057A. Introduction to Fiction (4) Workshop, 3 hours; written work, 3 hours. Prerequisite(s): CRWT 056, ENGL 001A. Introduction to the elements and the craft of fiction.

CRWT 057B. Introduction to Poetry (4) Workshop, 3 hours; written work, 3 hours. Prerequisite(s): CRWT 056, ENGL 001A. Introduction to the elements and craft of poetry.

CRWT 057C. Introduction to Creative Nonfiction (4) Workshop, 3 hours; written work, 3 hours. Prerequisite(s): CRWT 056, ENGL 001A. Introduction to the elements and craft of nonfiction.

CRWT 056. Screenwriting: How Movies Work (4) Lecture, 3 hours; discussion, 1 hour; screening, 2 hours. Prerequisite(s): none. An introduction to the craft of screenwriting. Discusses how screenwriting differs from other styles of writing. Examines the various techniques that writers use to create their "blueprints" for movies in a variety of genres. Cross-listed with MICS 066 and THEA 066.

CRWT 076. The Verbal Coliseum: Spoken Word Workshop (5) Workshop, 3 hours; discussion, 1 hour; written work, 1 hour; extra reading, 2 hours. Explores forms and issues in contemporary spoken word poetry, including performance and writing, multimedia and audience, community relations, media culture and power, music and art, and cultural production. Course is repeatable to a maximum of 8 units.

CRWT 097H. Freshman Honors Project: Poetry (4) Seminar, 3 hours; individual study, 1 hour; extra reading, 1 hour; creative projects, 2 hours. Prerequisite(s): Admission to the University Honors Program or consent of instructor. A course in poetry writing involving the reading of poetry and comments of poetry and critics on poetry in modern and contemporary modes. Designed to foster students' exploration of the diversity of poetic styles in an age with no dominant school, and their awareness of the aesthetic, cultural, and personal resonances of conscious and unconscious artistic choices. Satisfactory (S) or No Credit (NC) grading is not available.

Upper-Division Courses

CRWT 130. Beginning Creative Nonfiction (4) Workshop, 3 hours; extra reading, 3 hours. Prerequisite(s): two of the following courses: CRWT 057A, CRWT 057B, CRWT 057C. Introduction to creative nonfiction. Covers its history and strategies for writing and critically evaluating creative nonfiction essays. Focuses on writing creative nonfiction essays based on personal experience. Includes readings in current nonfiction. Course is repeatable to a maximum of 8 units.

CRWT 132. Intermediate Creative Nonfiction (4) Workshop, 3 hours; written work, 3 hours. Prerequisite(s): CRWT 056, CRWT 130, or consent of instructor. Reviews the essential strategies for writing and critically evaluating creative nonfiction essays. Focuses primarily on memoir, biography, history, and interview writing and how to work toward a sequence of longer work of nonfiction in that mode, as well as the "fact" or "immersion" essay. Course is repeatable to a maximum of 8 units.

CRWT 134. Advanced Creative Nonfiction (4) Workshop, 3 hours; written work, 3 hours. Prerequisite(s): CRWT 056, CRWT 130, CRWT 132; or consent of instructor. Explores strategies for writing and critical evaluating creative nonfiction essays. Focuses primarily on memoir, personal experience, and nature and science writing. Course is repeatable to a maximum of 8 units.

CRWT 136. Professional Creative Nonfiction Workshop (5) Workshop, 3 hours; outside research, 3 hours; extra reading, 3 hours; discussion, 1 hour. Prerequisite(s): CRWT 056, CRWT 130, CRWT 132, CRWT 194; or consent of instructor. A workshop in creative nonfiction writing for students who want to study creative nonfiction at the graduate and professional level. Focuses on producing and polishing work and discusses the professional aspect of writing, such as submitting and publishing.

CRWT 143. Generational Texts: A Survey of Immigration and Identity in Contemporary Literature (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): CRWT 043. Examines the influence of dominant cultures on twentieth-century literature. Topics include the experience of immigration and the notion of legitimacy and ethnic identity. Covers writers such as Ralph Ellison, Sherman Alexie, Jhumpa Lahiri, and Upton Sinclair. Course is repeatable as content changes to a maximum of 8 units.

CRWT 146 (E-Z). Special Topics: Fiction (4) Seminar, 3 hours; workshop, 3 hours; extra reading, 3 hours. Prerequisite(s): CRWT 056 or consent of instructor. Explores specific topics of style and craft in fiction. E: Minimalism: Hemingway to Carver and Beyond; F: Magical Realism and Surrealism, Past and Present; G: Genre Fiction and Styles: Potential for Legitimacy.

CRWT 150. Beginning Poetry Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): two of the following courses: CRWT 057A, CRWT 057B, CRWT 057C. Students write poetry which is analyzed by the class. Requires substantial original work and outside reading.

CRWT 151. Sports Journalism (4) Lecture, 3 hours; interviewing and writing, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on writing articles, features, and editorials and provides the student with the tools to interview sports figures. Provides a well-rounded view of the print media.

CRWT 152. Beginning Fiction Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): two of the following courses: CRWT 057A, CRWT 057B, CRWT 057C. Students discuss and analyze outside texts and original work from the class. Requires substantial original work.

CRWT 155. The Graphic Novel (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): CRWT 046A or CRWT 046B or CRWT 046C; CRWT 066; or consent of instructor. Explores the chronological development of the graphic novel. Focuses on theme, style, and artistic presentation. Course is repeatable as content changes to a maximum of 8 units.

CRWT 160. Intermediate Poetry Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): CRWT 056, CRWT 150; or consent of instructor. Students produce and bring to class for analysis and commentary, a large quantity of original work in poetry. Course is repeatable to a maximum of 8 units.

CRWT 162. Intermediate Fiction Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): CRWT 056, CRWT 152; or consent of instructor. Class work consists of intensive analysis of students' work. Course is repeatable to a maximum of 8 units.

CRWT 164A. Beginning Playwriting (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): THEA 100 or CRWT 056 or consent of instructor. Seminar in the practice of playwriting centering on the construction of a plot. Cross-listed with THEA 164A.

CRWT 164B. Intermediate Playwriting (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): CRWT 164A/THEA 164A. Seminar in the practice of playwriting. Revisions of works in progress with emphasis on character development and techniques for writing dialogue. Cross-listed with THEA 164B.

CRWT 164C. Advanced Playwriting (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): CRWT 164B/THEA 164B. Seminar in the practice of playwriting. Playwrights' participation in staged readings of their work. With consent of instructor, course is repeatable to a maximum of 8 units. Cross-listed with THEA 164C.

CRWT 165. Fundamentals and Concepts of Journalism (5) Lecture, 3 hours; laboratory, 2 hours; outside research, 3 hours; extra reading, 1 hour. Prerequisite(s): CRWT 056. Introduction to the journalistic writing process, including history, role in modern society, function and form, editing principles, ethics and legalities. Writing assignments will provide experience in interviewing, reporting, and writing, organization, format options and variations in style.

CRWT 166A. Screenwriting: Introduction (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 056 or consent of instructor. Explores the fundamentals of screenwriting. Includes study development, plotting, and characterization as they are used in creating a complete script for television or feature film. Cross-listed with MICS 166A and THEA 166A.
CRWT 166B. Screenwriting: Outline to First Draft (4)
Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 166A/MCS 166A/THEA 166A or consent of instructor. Explores the fundamentals of screenwriting. Includes story development, plotting, and characterization as they are used in creating a complete script for television or feature film. Cross-listed with MCS 166B and THEA 166B.

CRWT 166C. Screenwriting: Rewrites and Writing for Television (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 166B/MCS 166B/THEA 166B or consent of instructor. Explores the fundamentals of screenwriting. Includes story development, plotting, and characterization as they are used in creating a complete script for television or feature film. Course is repeatable. Cross-listed with MCS 166C and THEA 166C.

CRWT 167A. Plays in Production (4) Workshop, 8 hours. Prerequisite(s): CRWT 164A/THEA 164A or CRWT 166A/MCS 166A/THEA 166A or consent of instructor. Development and preproduction of half-hour or one-hour plays written specifically for stage, soundstage, radio, television, or Web-based broadcasting. Students learn the basics of sound and video production to enhance their writing and rewriting process. Course is repeatable to a maximum of 8 units. Cross-listed with THEA 165A.

CRWT 167B. Plays in Production (4) Workshop, 8 hours. Prerequisite(s): CRWT 167A/THEA 165A or consent of instructor. Advanced production and post-production of half-hour and one-hour drama (including comedy) for radio, video, or webcasting. Postproduction of previously taped shows. Course is repeatable to a maximum of 8 units. Cross-listed with THEA 165B.

CRWT 170. Advanced Poetry Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): CRWT 056, CRWT 150, CRWT 160; or consent of instructor. A workshop in poetry writing for students who wish to attempt, with criticism from class members, to fashion a collection of stories or a novel. Course is repeatable.

CRWT 171. Anatomy of Poetry (4) Lecture, 3 hours; creative writing, 3 hours. Prerequisite(s): CRWT 160 or consent of instructor. An introductory study of poetic language and forms. Students write in the various poetic forms studied.

CRWT 172. Advanced Fiction Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): CRWT 056, CRWT 152, CRWT 162; or consent of instructor. A workshop in fiction writing for students who wish to attempt, with criticism from class members, to fashion a collection of stories or a novel. Course is repeatable.

CRWT 173. Prose Poem Workshop (4) Workshop, 3 hours; written work, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores contemporary prose poetry. Studies the history of contemporary essays that define the mechanics and parameters of the prose poem. Requires substantial writing and critiquing. Course is repeatable as content changes to a maximum of 8 units.

CRWT 174. Issues in Journalism (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores issues in contemporary news media, including credibility and bias, press freedom and responsibility, press-government relations, media coverage of politics, news media economics and influence on content, and race, gender, class, and news media. Course is repeatable to a maximum of 8 units.

CRWT 175. Advanced Writing for Journalists (5) Lecture, 3 hours; laboratory, 2 hours; outside research, 3 hours; extra reading, 1 hour. Prerequisite(s): CRWT 165 or consent of instructor. An examination of the techniques and styles representative of modern feature journalism. Writing assignments incorporate advanced reporting skills.

CRWT 176 (E-Z). The Craft of Writing (4) Lecture, 3 hours; extra reading, 1 hour; practice writing, 2-3 hours. Prerequisite(s): upper-division standing or consent of instructor. The formal study and practice of the craft of writing, its technical aspects and development through the contemporary period in the genres of poetry, fiction, playwriting, screenwriting, and journalism.

CRWT 180. Professional Poetry Workshop (5) Workshop, 3 hours; outside research, 3 hours; extra reading, 3 hours. Prerequisite(s): CRWT 056, CRWT 150, CRWT 160, CRWT 170; or consent of instructor. A workshop in poetry writing for students who want to study poetry at the graduate and professional level. Focuses on producing and polishing work, and discusses the professional aspect of writing, such as submitting and publishing.

CRWT 182. Professional Fiction Workshop (5) Workshop, 3 hours; outside research, 3 hours; extra reading, 3 hours. Prerequisite(s): CRWT 056, CRWT 152, CRWT 162, CRWT 172; or consent of instructor. A workshop in fiction writing for students who want to study fiction at the graduate and professional level. Focuses on producing and polishing work and discusses the professional aspect of writing, such as submitting and publishing.

CRWT 185 (E-Z). Special Topics in Nonfiction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the elements of press operation. Using traditional letterpresses, students learn hands-on typography, design, material and text selection, editing, proofing and binding skills, as well as the history of the book and book design.

CRWT 186A. Beginning Book Arts (4) Lecture, 1 hour; laboratory, 6 hours; consultation, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores style and craft in nonfiction. E. Literary Memoir. Each segment is repeatable as its content changes to a maximum of 8 units.

CRWT 186B. Intermediate Book Arts (4) Workshop, 1 hour; laboratory, 6 hours; consultation, 1 hour. Prerequisite(s): CRWT 186A; upper-division standing or consent of instructor. An expanded discussion of the techniques and styles in press operation. Students build on the techniques acquired in CRWT 186A and demonstrate finished projects.

CRWT 187. Metafiction (4) Lecture, 3 hours; creative writing, take-home midterm, or term paper, 30 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. Explores postmodernism, metafiction, and the new novel in Europe and America. Creative writers submit fiction in lieu of a term paper or midterm. Cross-listed with CPLET 187.

CRWT 190. Special Studies (1-5) To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable to a maximum of 16 units.

CRWT 191. Seminar in Creative Writing (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): consent of instructor; upper-division standing. Intense study of the work of a visiting writer and poet. Students prepare individual papers for discussion. Course is repeatable to a maximum of 8 units. Minot

CRWT 195. Senior Thesis (4) Consultation, 1 hour; thesis, 3 hours; outside research, 3 hours; extra reading, 3 hours. Prerequisite(s): consent of department chair. Creation of a significant piece of work under faculty supervision. Project composed in the genres of poetry, fiction, or nonfiction.

CRWT 195H. Senior Honors Thesis (4) Consultation, 1 hour; outside research, 4 hours; extra reading, 3 hours; thesis, 4 hours. Prerequisite(s): consent of Department Chair. The student works independently with a faculty member to prepare a project. For the Creative Writing major, the project may be a group of poems, a long poem, a group of short stories, a novel, or a part of a novel. For the Journalism minor, the project may be a news feature, an investigative article, or a similar story requiring significant endeavor in reporting and writing and demonstrating an understanding of sound journalistic technique.

CRWT 198-I. Individual Internship (1-12) field, 2 hours per unit. Prerequisite(s): consent of instructor; upper-division standing. Work with an appropriate professional individual or organization to gain experience and skills in any form of writing which meets with the approval of the Creative Writing Chair (e.g., journalism, radio journalism). Letter grading or Satisfactory/No Credit (NC). Course is repeatable to a maximum of 16 units.

Creative Writing and Writing for the Performing Arts

Subject Abbreviation: CRWT
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Professors
Christopher Abani, Ph.D. (Creative Writing)
D. Eric Barr, M.F.A. (Theatre)
Christopher Buckley, M.F.A. (Creative Writing)
Mike Davis, C.Phil. (Creative Writing)
Juan Felipe Herrera, M.F.A. (Creative Writing)
Richard Hornby, Ph.D. (Theatre)
Tom Lutz, Ph.D. (Creative Writing)
Maurya Simon, M.F.A. (Creative Writing)
Susan C. Straight, M.F.A. (Creative Writing)
D. Charles Whitney, Ph.D. (Creative Writing/ Media and Cultural Studies)

Assistant Professors
Reza Aslan, M.F.A. (Creative Writing)
Charles Evered, M.F.A. (Theatre)
Rickerby Hinds, M.F.A. (Theatre)
Claire Hoffman, M.A., M.S.J. (Creative Writing)
Erin Jaffe-Berg, Ph.D. (Theatre)
Michael Jayme, M.F.A. (Creative Writing)
Stuart Krieger, B.A. (Theatre)
Laila Lalami, Ph.D. (Creative Writing)
Robin Russin, M.F.A. (Theatre)
Andrew Winer, M.F.A. (Creative Writing)
Graduate Program

Master of Fine Arts
The Master of Fine Arts (M.F.A.) degree in Creative Writing and Writing for the Performing Arts offers writers the ability to move fluidly within various arenas of creative writing, including the genres of poetry, fiction, nonfiction, playwriting, and screenwriting, as well as in multimedia studies. The program integrates scholarly studies of narrative, style, voice, structure, and history of these writing disciplines with traditional workshop formats, forming writers who can actively direct the literature of the twenty-first century.

Financial assistance includes teaching assistantships and fellowships, as well as fellowships for community projects through the Gluck Fellows Program of the Arts, and positions with the student-run literary magazine Mosaic.

UCR Palm Desert Center (PDGC) An M.F.A. in Creative Writing and Writing for the Performing Arts is offered at UCR’s Palm Desert Graduate Center in Regular and Low Residency programs.

PDGC Regular Program Students enroll each quarter for a per unit fee. All requirements are the same as the full-time program at Riverside. Cross-enrollment between programs is not allowed.

PDGC Low Residency Program All requirements are the same as the full-time program at Riverside, but courses are modified to fit residency requirements. Low Residency MFA students come to the Graduate Center for two ten-day sessions in the Fall and Spring quarters that include lectures, seminars, and readings (please refer to website http://www.palmdesertmfa.ucr.edu for specific dates). During the rest of the academic year, students participate in online workshops and seminars and work individually with a mentor. Cross-enrollment between programs is not allowed. Students enroll for 28 units each year and pay a per unit fee.

Admission Applicants to the program should demonstrate significant professional skill by submitting in manuscript form one of the following: 10-15 pages of poetry, a maximum of 25 pages of fiction or nonfiction, or the first act or a maximum of 25 pages of a screen play or play. Applicants must have a B.A. or B.S. degree from an accredited institution and submit letters of recommendation, a self-statement, and a project proposal. Applications are accepted for the Fall quarter only.

Plan I (Thesis) Each of the three MFA programs (Main Campus, PDGC Regular, and PDGC Low Residency program) require completion of a thesis.

Main Campus and PDGC Regular Program Consists of workshops in chosen genres, culminating in a final project (the master’s thesis) which showcases the writer’s cultivated talents, in the form of a poetry collection, novel, memoir, screenplay, or full-length play. The M.F.A. requires students to write in two genres, allowing for creative movement within disciplines. Structure and focus in screenwriting and playwriting can also be applied to fiction and nonfiction, and lyricism and metaphor in poetry can also enhance description and dialogue in the other genres, for example. Students engage in course work in varied areas of directing and acting, in film history and literature, in literary criticism and translation, with supplemental courses selected from the departments of Comparative Literature and Foreign Languages, English, Hispanic Studies, and Media and Cultural Studies. Students can gain practical aspects of filmmaking from courses in Studio Art and Theatre.

Requirements consist of 48 units of course work (12 courses) and 8 units of master’s thesis project. The core curriculum includes the following:

1. Four workshop courses in genre of choice
2. Two workshop courses in a cross-genre
3. Two graduate-level literature courses from English or Comparative Literature. Requirement can be met with upper-division courses in these areas, along with the appropriate 292 course.
4. Three graduate-level seminars from Theatre and/or Creative Writing
5. One course in literature in translation (upper-division or graduate level) from Hispanic Studies or Comparative Literature or One additional cross-genre course
6. Thesis courses

In the areas of playwriting and screenwriting, the final written project is a full-length play of two or three acts (90–120 pages) or screenplay or teleplay (approximately 120 pages). In the areas of poetry, fiction, and nonfiction, the final written project is a poetry collection, novel, short story collection, or essay collection. Each student is paired with one or two faculty members who serve as the thesis advisor(s). Two faculty readers, in addition to the advisor(s), evaluate the thesis work.

Normative Time to Degree 6 quarters

Graduate Courses
See also graduate courses in the Theatre section of this catalog.

CRWT 201. The Writer’s Life: Literary Strategies and Structures (4) Seminar, 3 hours; extra reading, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Explores the artistic, practical, and professional aspects of life as a working novelist, poet, playwright, screenwriter, or essayist. Topics include publishing, literary journals, commercial magazines, the film industry, the theatre industry, agents, and overviews of genre and art. Cross-listed with THEA 201.

CRWT 230. Creative Nonfiction (4) Workshop, 3 hours; outside writing and reading, 6 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive formal study of contemporary creative nonfiction, with emphasis on style, structure, and form. Primary focus is on the production of original work. Course is repeatable to a maximum of 20 units.

CRWT 246. Special Topics in Fiction (4) Seminar, 3 hours; extra reading, 3 hours; term paper, 1 hour. Prerequisite(s): graduate standing. Explores various movements and themes in literature. Course is repeatable as content changes to a maximum of 8 units.

CRWT 250. Theory for Writers (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A survey of literary theory designed especially for creative writers. Focuses on aspects of various theories that might be useful for creative work. Includes a close reading of theoretical texts with a strong emphasis on issues of form.

CRWT 251. Hollywood and the Novel: The Transformation of Fiction into Film. (4) Lecture, 2 hours; screening, 1 hour; extra reading, 2 hours; outside research, 2 hours; written work, 1 hour. Prerequisite(s): graduate standing. Explores the transformation of novels into screenplays and films. Examines four novels and their corresponding screenplays and films. Focuses on differences in style, content, and format. Course is repeatable as content changes to a maximum of 8 units.
CRWT 252 (E-Z). Theory and Craft of Writing (4)
Seminar, 3 hours; outside research, 2 hours; extra reading, 1-2 hours. Prerequisite(s): graduate standing. Analyzes writing techniques, structures, and approaches to craft in traditional, contemporary, and avant garde literary works. E. Fiction; F. Poetry; G. Nonfiction; I. Playwriting; J. Screenwriting; K. First Person. Cross-listed with THEA 252 (E-Z).

CRWT 253. Stories as Collections (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing in Creative Writing. Analysis of the order, shape, and structure of story collections to aid in an appreciation of characters, conflicts, and themes. Course is repeatable as content changes to a maximum of 8 units.

CRWT 255. The Graphic Novel (4) Seminar, 2 hours; studio, 2 hours; extra reading, 1.5 hours; outside research, 1.5 hours. Prerequisite(s): graduate standing. An in-depth consideration of the historical development and craft of graphic novels. Examines the intellectual, literary, and artistic evolution of this narrative form.

CRWT 257. The Sufis (4) Seminar, 3 hours; term paper, 2 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to sufism through an in-depth reading of the great Sufi poets. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CRWT 262. Fiction (4) Workshop, 3 hours; extra writing and reading, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive formal study of contemporary fiction, with emphasis on style, structure, and form. Primary focus is on production of original work. Course is repeatable to a maximum of 20 units.

CRWT 263. Fiction Workshop (4) Workshop, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): graduate standing. A comprehensive introduction to the craft of fiction writing. Allows students to develop their abilities as fiction writers in addition to their critiquing skills of the genre. Intended for students whose primary emphasis is not fiction. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CRWT 270. Poetry Workshop (4) Consultation, 1 hour; workshop, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive formal study of contemporary poetry with emphasis on style, structure, and form. Primary focus is on production of original work. Course is repeatable.

CRWT 275. Modern American Poetry (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): graduate standing. Focuses on various modern poets. Explores their contributions to the evolution of an American poetic tradition and aesthetic. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes to a maximum of 8 units. Simon

CRWT 276. Poetry and Translation (4) Workshop, 3 hours; extra reading, 1.5 hours; outside research, 1.5 hours. Prerequisite(s): graduate standing; reading proficiency in Spanish. Discusses the efficacy and difficulty of translating poetry from the Spanish language into English. Students read twentieth- and twenty-first century major Spanish language poets. Provides a forum to render and compare translations. Cross-listed with SPN 277.

CRWT 277. Poetry and the Sacred (4) Seminar, 2 hours; extra reading, 2 hours; outside research, 2 hours; written work, 2 hours. Prerequisite(s): graduate standing. An in-depth introduction to sacred poetic texts from antiquity to the present. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CRWT 278. Contemporary American Poetry (4) Workshop, 3 hours; extra reading, 3 hours; written work, 1 hour. Prerequisite(s): graduate standing. Focuses on influential contemporary American poets. Discusses their styles and the evolution of poetry over the last fifty years. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes to a maximum of 8 units.

CRWT 279. Poetry of Witness (4) Seminar, 3 hours; extra reading, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): graduate standing. Examines the poetry of crises and witness written by poets in the twentieth and twenty-first centuries from America and around the world. Topics may include war, genocide, religious, ethnic, and political persecution, exile, imprisonment, ecological degradation, and domestic and urban violence in the United States.

CRWT 280. Writers’ Colloquium (1) Seminar, 1 hour. Prerequisite(s): graduate standing. Colloquia featuring writers in fiction, nonfiction, poetry, playwriting, and screenwriting. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 6 units. Cross-listed with THEA 280.

CRWT 281. Intensive Workshop (1-2) Workshop, 10-12 hours per quarter; discussion, 10-12 hours per quarter. Prerequisite(s): graduate standing or consent of instructor. Designed to both expose students to the work of contemporary writers and provide an opportunity for those same writers to respond to the students’ work. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 8 units.

CRWT 283. Multigenre Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A peer review workshop for students with ongoing projects in any and all genres. Focuses on student work that can profit from exposure to readings by people working in a number of different genres. Course is repeatable to a maximum of 16 units.

CRWT 285. The Literary Memoir (4) Workshop, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. An in-depth survey of the literary memoir. Explores how memoirists employ craft and memoir to create meaning. Asks what obligation memoirists have to drama and to real lives and places. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

CRWT 288. Thesis Workshop (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Designed for M.F.A. students working on their thesis, usually in the last two quarters of the program. Open to any and all genres. Focuses on student work, with emphasis on bringing thesis projects to conclusion.

CRWT 290. Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Literature studies, directed by a faculty member, on special topics. Course is repeatable.

CRWT 292. Concurrent Analytical Studies in Creative Writing (1-4) Outside research, 3-12 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Taken concurrently with a 100-series course but on an individual basis. Devoted to research, criticism, and written work related to the 100-series course. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.


**Professional Courses**

CRWT 301. Directed Studies in the Teaching of Creative Writing and Writing for the Performing Arts (4) Lecture, 2 hours; practicum, 1 hour; outside research, 2 hours; written work, 3 hours. Prerequisite(s): enrollment in the M.F.A. program. Prepares students for teaching introductory under-graduate Creative Writing courses by offering a flexible curriculum of meetings and conferences on effective pedagogical methodology. Students create syllabi and lesson plans and discuss a range of practical teaching issues. Required of all TAs for at least one quarter. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 8 units.

CRWT 302. Teaching Practicum (1-4) Practicum, 2-8 hours; consultation, 1-4 hours. Prerequisite(s): graduate standing. Supervised teaching in undergraduate Creative Writing courses. Credit is not applicable to graduate unit requirements. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

CRWT 303. Directed Studies in...
Dance

Subject abbreviation: DNCE
College of Humanities, Arts, and Social Sciences

Wendy L. Rogers, M.A., Chair
Department Office, 121 Arts
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Anthea Kraut, Ph.D.
Anna B. Scott, Ph.D.
Priya Srinivasan, Ph.D.

Lecturer
Kelli King, M.F.A.

Cooperating Faculty
Erika Suderburg, M.F.A.

Major

The Dance major is distinctive for its outstanding faculty of nationally recognized scholars and artists who draw from a variety of academic and creative backgrounds, including choreography, history, literature, performance studies, and cultural studies.

The B.A. degree in Dance focuses on choreography and cultivation of cultural and historical perspectives on dance. Movement practices, dance composition, performance, pedagogies, cultural and historical studies, and digital or screen studies courses are required. Movement practice courses are offered in modern dance and other dance/movement forms as they are practiced in various cultures of the world. Dance majors must participate in at least one production season of “UCR is Dancing,” the department’s annual concert series featuring original choreography and performance projects by students. This concert series also includes historical dance reconstructions by department faculty as well as original repertory created by professional guest artists.

In addition, visiting professional dancers, choreographers, and scholars come to UCR frequently to give special workshops, master classes, and lectures. Opportunities to perform include “UCR is Dancing,” the Faculty Dance Concert, the Graduate Dance Concert, and the Gluck Fellows Arts Outreach Touring programs.

New majors are eligible to audition for the Chancellor’s Performance Award, a scholarship of up to $3,000. Student assistantships and other forms of financial aid are also available. Undergraduate majors may apply for research grants and stipends for summer dance studies. Selected students receive $1,000 Maxwell H. Gluck Fellowships.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements

The major requirements for the B.A. degree in Dance are as follows: A minimum of 90 units of course work in Dance, 58 of which are upper division.

1. Lower-division requirements (8 units):
   - DNCE 014, DNCE 019

2. Choreographies (12 units): DNCE 114A, DNCE 114B, DNCE 114C

3. Histories/Cultures (16 units):
   - DNCE 131/WMST 127, DNCE 132, DNCE 133, DNCE 134, DNCE 135

4. The Digital/Screen (8 units):
   - DNCE 171 (E-Z), DNCE 172 (E-Z), DNCE 173 (E-Z)

5. Pedagogies (4 units): DNCE 180R

6. Performance/Productions (18 units):
   - DNCE 167, DNCE 180G, two quarters of DNCE 180I, and DNCE 161/MCS 161 or DNCE 162/MCS 162

7. Movement Practice (up to 24 units)
   - Dance majors must enroll in at least one movement practice course per quarter. Up to 24 units may be counted towards the major as follows:
     a) 50% of the required movement practice units must be taken in DNCE 067A, DNCE 067B, DNCE 067C (Modern Technique)
     b) 50% of the required movement practice units must be taken in three different dance genres from DNCE 071A, DNCE 071B (Ballet)
        DNCE 072A, DNCE 072B, DNCE 072C (Tap)
        DNCE 073A/LNST 073A, DNCE 073B/ LNST 073B (Dance of Mexico)
        DNCE 075A, DNCE 075B (World Dance Forms)
        DNCE 081A, DNCE 081B, DNCE 081C (Dance Cultures, Culture in Dance)

Note
Because of additional movement practice requirements appropriate to the dance curriculum, Dance majors have been granted an exemption from the 80-unit limit on courses in the major so that 102 Dance units may be counted toward the B.A.

Minor

Students who minor in Dance receive an introduction to choreography, movement practice, and cultural and historical studies of dance that enable them to pursue upper-division courses germane to a particular focus in dance.

1. Lower-division preparation (14 units)
   a) DNCE 014, DNCE 019

   b) Six (6) units from movement practice courses:

2. Upper-division requirements (16 units):
   - 4 courses from DNCE 114A, DNCE 114B, DNCE 114C, DNCE 131/WMST 127, DNCE 132, DNCE 133, DNCE 134, DNCE 135, DNCE 161/MCS 161, DNCE 162/MCS 162, DNCE 171 (E-Z), DNCE 172 (E-Z), DNCE 173 (E-Z), DNCE 180 (E-Z)

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Graduate Program

The Department of Dance offers a Master of Arts (M.A.) in Dance History and Theory, a Master of Fine Arts (M.F.A.) in Dance, and a Ph.D. in Dance History and Theory.

Master’s Degrees

M.A. in Dance History and Theory

Admission
Students gaining admission to the Ph.D. program in Dance History and Theory may, after advisement and with the approval of the faculty committee, elect to pursue an M.A. degree in Dance History and Theory.

Plan I (Thesis)

Students must complete a minimum of 36 quarter units of graduate (100 series) and graduate (200 series) courses. At least 24 of these units must be in graduate courses and must include the following UCR courses:

- DNCE 254 (Political Approaches to Dance Studies)
- DNCE 255 (Historical Approaches to Dance Studies)
- DNCE 257 (Rhetorical Approaches to Dance Studies)
- DNCE 258 (Cultural Approaches to Dance Studies)

A maximum of 12 units of DNCE 299 (thesis research) can be counted towards the 36-unit minimum. Other courses (to fulfill the 36-unit requirement) should be selected, with the consent of the program graduate advisor, from relevant upper-division and graduate courses. Candidates for the degree must prepare and present an acceptable thesis to the Department of Dance.

M.F.A. in Dance

The Master of Fine Arts (M.F.A.) program in Dance constructs opportunities for highly motivated choreographers to conduct both research in dance and an assessment of contemporary issues in dance aesthetics, history, and culture. The focus of this program is the development
Admission

Applicants to the program should demonstrate significant professional experience as an active choreographer making and producing work, must have a B.A. or B.F.A. degree from an accredited institution. It is recommended that applicants take the GRE if their GPA is below 3.0. A video sample of choreography is required. Contact the department for specific details. The program is especially designed for the practicing artist who desires to return to an institutional context for advanced study.

The program seeks applicants who desire to contextualize their aesthetic inquiry through the study of historical, cultural, and political perspectives on dance. Students will be asked to examine their own artistic production from these various perspectives, as they produce new work. They will be involved in a rigorous investigation of contemporary aesthetic issues as formulated in their own research projects.

Course Work

Requirements consist of 40 units of course work (10 courses) and 12 units of independent research for a final project. The core curriculum, normally to be completed in the first two years of residency, shall comprise the following 16 units:

- **DNCE 240 (Improvising Choreography: Scores, Structures, and Strategies)**
- **DNCE 241 (Creating the Experiment: Identifying the New)**
- **DNCE 242 (Dancing Representation: Figures, Forms, and Frames)**
- **DNCE 243 (Collaborating in Dance Making: Materials, Methods, and Interactions)**

In addition, students must complete 16 units from the following dance history and theory courses:

- **DNCE 254 (Political Approaches to Dance Studies)**
- **DNCE 255 (Historical Approaches to Dance Studies)**
- **DNCE 257 (Rhetorical Approaches to Dance Studies)**
- **DNCE 258 (Cultural Approaches to Dance Studies)**

One 4-unit DNCE 200-level seminar course in history and theory, excluding DNCE 280 and DNCE 290 to DNCE 299.

Students must take 8 units of electives relevant to their specific research project. These courses may be offered within or outside of the department, or they may be fulfilled through the option of field study, an off-campus period of study integral to the student's successful completion of the master's project.

An additional 12 units are taken through DNCE 297 or DNCE 299 for work on phases of the final project. During the second year, students form a committee consisting of three faculty members, one of whom may be outside the department. The committee approves the project proposal and supervises the final project.

The student's progress through the program culminates in the final project, which reflects a serious investigation of a specific choreographic problem.

Foreign Language Requirement

None

Written and/or Oral Qualifying Examination

During the second year, the student writes a 5-15-page proposal for the final project to be approved by the committee.

Final Project

The final project could take the form of a concert of dances or some other performance event in which the student's research is made evident. Because of the experimental nature of the program, it is difficult to specify the exact form the project may take. For example, students may 1) undertake to create site-specific dances occurring in different locales over several months, 2) organize opportunities for interactive choreography with distinct groups of performers, or 3) choreograph a dance to be viewed on CD-ROM. Whatever its final form, the project must demonstrate a thorough investigation and committed execution of a defined aesthetic concern. The final project includes a written requirement to be completed within one quarter following the performance event. This document, 20-40 pages long, outlines the aesthetic focus of the student's research and provides a historical and philosophical contextualization for the project.

Normative Time to Degree

9 quarters

Doctoral Program

**Ph.D. in Dance History and Theory**

The Ph.D. program in Dance History and Theory provides an advanced interdisciplinary base for innovative research in the emerging field of cultural and historical studies of dance. The program of study embraces a theoretical consideration of all dimensions of the practice of dance. These dimensions include, but are not limited to, digital culture; body politics; media studies; mobilization and class; ethnicity, sexuality, and gender; and corporeal knowledges and choreography. In addition to theoretical and historical concerns, the program promotes the articulation of a variety of methodological approaches to the analysis of bodily performance. UCR faculty put into motion various modes of production, performance studies, technology, choreography, history, critical race theory, feminist studies or masculinities, Marxism or post-Marxism, ethnography and witnessing, and other specific area studies related to, for example, South Asia, the African Diaspora, Native America, the Asian Diaspora, and Asian America. The program provides a provocative environment for investigating unexplored strategies for original scholarly work in dance.

**Admission**

Students must meet the general requirements for admission to the Graduate Division as shown in the Graduate Studies section of this catalog. Students may submit a statement of background about experience in dance history and theory, a previously prepared research paper, or the equivalent, demonstrating analytical and interpretive skills, and GRE scores.

Prerequisites include the following:

1. A working knowledge of movement
2. An acquaintance with some system of movement observation and analysis
3. Preparation in general historical and cultural studies

Deficiencies may be corrected with appropriate course work.

**Course Work**

Core curriculum normally to be completed in the first two years of residency includes the following:

- **DNCE 254 (Political Approaches to Dance Studies)**
- **DNCE 255 (Historical Approaches to Dance Studies)**
- **DNCE 257 (Rhetorical Approaches to Dance Studies)**
- **DNCE 258 (Cultural Approaches to Dance Studies)**

Six additional graduate-level courses are required, four from Dance and two from disciplines related to the student's research interest.

**Language Requirement**

All students must show competence in at least one language other than English. Further requirements in specific forms of dance or music, notation or ancient or contemporary languages may be determined for each student in consultation with relevant faculty and the graduate advisor of the program.

**Written Qualifying Examination**

Students must prepare one field for examination with each of four members of the committee in whose courses the student has completed degree requirements. The committee is composed of two Dance faculty members, one of whom is chair, and two other members who may be Dance faculty or "outside members" (not a UCR Dance faculty member or cooperating faculty member). The written qualifying examination may be completed as a "take-home" format (seven-day, open-book) or a "sit-in" format (two-hour exam
Lower-Division Courses

DNCE 005. Introduction to Dance (4) Seminar, 3 hours; individual study, 1 hour; extra reading, 1 hour; several short essays. As a survey of approaches to dancing and dance making, this course introduces students to dance technique, performance, and composition as fundamental components in the art of dance. Students will cultivate the ability to enact and remember patterns of rhythm, effort, and visual design in movement and will become acquainted with various procedures for organizing movement. Especially designed for students with no experience in dance.

DNCE 007. Dance: Cultures and Contexts (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A survey of leading dances, dance companies, choreographers, and dancers of the Western world during the twentieth century through slides, films, demonstrations, and performances. Intended for nonmajors.

DNCE 014. Introduction to Choreography (4) Lecture, 4.5 hours; individual study, 1.5 hours. Prerequisite(s): a major or minor in Dance or consent of instructor. Analysis of basic problems and issues of choreography. Emphasis is on improvisational methods as an approach to the investigation of space, time, and energy in motion as the fundamental elements of a dance. Course is repeatable to a maximum of 8 units.

DNCE 019. Introduction to Dance Studies (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): none. Introduces major concepts, approaches, and issues in the study of dance as a cultural, historical, and artistic practice. Uses text, video, studio, demonstration, and performance to expose students to ways of writing, speaking, researching, and thinking clearly and critically about dance.

DNCE 067A. Beginning Modern Dance Technique (2) Studio, 3 hours; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): none. Modern dance technique at the beginning level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Recommended for nondancers and dancers. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 067B. Intermediate Modern Dance Technique (2) Studio, 4.5 hours; individual study, 1.5 hours. Prerequisite(s): DNCE 067A recommended. Modern dance technique at the intermediate level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 067C. Advanced Modern Dance Technique (2) Studio, 4.5 hours; individual study, 1.5 hours. Prerequisite(s): DNCE 067B recommended. Modern dance technique at the advanced level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 068. Somatic Techniques and Experiential Anatomy (2) Studio, 3 hours; extra reading, 1 hour; individual studio, 2 hours. Introduces physical practices and concepts from a variety of somatic techniques. Explores how the body functions through actions and interactions of its structures. Utilizes a possibilities-in-the-field approach to study and embody some of the varied interpretations that can arise from the same set of anatomical facts. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

DNCE 071A. Beginning Ballet Technique (2) Studio, 3 hours; screening, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): none. Ballet technique at the beginning level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Recommended for nondancers and dancers. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 071B. Intermediate Ballet Technique (2) Studio, 3 hours; screening, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): DNCE 071A recommended. Ballet technique at the intermediate level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 072A. Beginning Tap Dance Technique (2) Studio, 3 hours; screening, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): none. Tap technique at the beginning level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Recommended for nondancers and dancers. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 072B. Intermediate Tap Dance Technique (2) Studio, 3 hours; screening, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): DNCE 072A recommended. Tap technique at the intermediate level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 072C. Advanced Tap Dance Technique (2) Studio, 3 hours; screening, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): DNCE 072B recommended. Tap technique at the advanced level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

DNCE 073A. Dance of Mexico (2) Studio, 3 hours; extra reading, 1 hour; screening, 1 hour; individual study, 1 hour. Prerequisite(s): none. Traditional dances of Mexico at the beginning level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Recommended for nondancers and dancers. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examin-
DNCE 114A. Dance Composition I (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): DNCE 014 and two quarters of dance technique, or equivalent. The continuing analysis of dance as an art form with emphasis on space, time and energy in motion as elements in choreographic style. In 114A, this is done on the beginning level.

DNCE 114B. Dance Composition II (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): DNCE 114A. The continuing analysis of dance as an art form with emphasis on space, time and energy in motion as elements in choreographic style. In 114B, this is done on the intermediate level.

DNCE 114C. Dance Composition III (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): DNCE 114B. The continuing analysis of dance as an art form with emphasis on space, time and energy in motion as elements in choreographic style. In 114C, this is done on the advanced level.

DNCE 120. Introduction to Laban analysis (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 2 hours; observation and composition problems, 1 hour. Prerequisite(s): DNCE 014 and upper-division standing or consent of instructor. Introduction to the roles and genres of expressive culture in Southeast Asia, including dance, music, theater, film, and digital culture. Performance is discussed both as a time-honored and as a contemporary medium for cultural production, from the courts to everyday experience. Material will be drawn from the Philippines, Indonesia, Thailand, Laos, Cambodia, Vietnam, Burma, Singapore, and the Southeast Asian diaspora. Cross-listed with ANTH 126, AST 123, and MUS 123.

DNCE 127. Music Cultures of Southeast Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in the Philippines, Indonesia, Malaysia, Thailand, Myanmar (Burma), Laos, Cambodia, and Vietnam. Designed for the student interested in the performing arts and cultures of mainland and insular Southeast Asia. No Western music training is required. This course explores concepts and theories of the Laban analysis method of observing, recording, and analyzing human body movement. Special attention will be given to the paradigms and notation methods compromising Effort theory, Shape theory, and Space Harmony theory.

DNCE 128. Performing Arts of Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the roles and genres of expressive culture in Asia, including dance, music, theater, film, and digital culture. Performance is discussed both as a time-honored and as a contemporary medium for cultural production, from the courts to everyday experience. Material will be drawn from the Philippines, Indonesia, Malaysia, Thailand, Myanmar (Burma), Laos, Cambodia, Vietnam, Singapore, and the Southeast Asian diaspora. Cross-listed with ANTH 126, AST 123, and MUS 123.

DNCE 130. Cross-Cultural Perspectives on Dance (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. With a view to understanding dance from a global perspective, course will survey anthropological writings on dance traditions found around the world. Topics covered include dance as an expression of social organization and social change, dance as a religious experience, and dance as play/sport. Cross-listed with ANTH 130.

DNCE 131. Dance, Gender, Sexuality (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor.

DNCE 132. Dance, Citizenship, Location (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Explores interconnections between dancing bodies, their geographical, political, cultural locations, and the ways in which they negotiate inclusion or exclusion within state apparatuses of power such as citizenship.

DNCE 133. Dance, Space, Time (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Explores the flow among non-presentational and presentation dance forms, state productions and treaties, and design factors that are meant to enable our daily lives such as buildings, parks, and roadways. Students take advantage of video, books, field trips, guest lectures and studio lab time.

DNCE 134. Dance, Genre, Institutions (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor.

DNCE 135. Dance, Race, Property (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour, written work, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Explores intersections between dancing bodies, questions of race, and notions of cultural property. Investigates issues of embodied identity and racialization, cultural appropriation and cultural exchange, purity and hybridity, and ownership and copyright.

DNCE 141. History of Ballet (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): none. Art dance from the Italian Renaissance through the ballets of contemporary dance.

DNCE 142. History of Modern Dance (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): none. Art dance from Isadora Duncan to Martha Graham and descendants.

DNCE 155 (E-Z). Seminar in Dance and Music (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces relationships and representations between music and dance. Explores musical and choreographic form, compositional strategies, hybridization of style, cultural meanings and registers in which these were made, the agencies such representations enabled, interpretive communities, and cross-cultural interactions. Cross-listed with MUS 155 (E-Z).

DNCE 161. Choreographing the Screen (4) Lecture, 3 hours; screening, 2 hours; term paper, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Focuses on choreographing for the camera and the screen. Topics include video art, classic film choreography, music video, and digital dance technologies. Students prepare a choreographic piece for the camera as a final project. Cross-listed with MICS 161.
DNCE 162. Tool, Technology, Technique (4) Lecture, 1 hour; practicum, 3 hours; screening, 3 hours; laboratory, 3 hours. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Practicum in video and digital production, with an emphasis on capturing and editing the moving body. Students bring their own video or digital recording device. Editing equipment will be available. Cross-listed with MCS 162.

DNCE 167. Dance Production (2) Studio, 6 hours. Prerequisite(s): by audition. Study, production, and performance of dances. Course may be repeated for credit.

DNCE 168. Dance Touring Ensemble (4) Studio, 6 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Dance Touring Ensemble members work with the instructor to create a lecture-demonstration and create and learn repertory which is performed at various sites within the community. Course is repeatable to a maximum of 16 units.

DNCE 171 (E-Z). Filmic Bodies (4) for hours and prerequisites, see segment descriptions. Investigates a multiplicity of filmic genres through the portal of the dancing and/or mobilized body as raced, gendered, classed, and othered. Explores the politics of movement on film, the mechanics of making film work, and the political economy of dance on film. Dance experience is usually not required. Segments are repeatable.

DNCE 171F. Ethnographic Representation of Dance on Film: "... and then they danced" (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on the analysis of dance performance in film. Topics include dance and representation in everyday dance genres on film. Course may be repeated for credit.

DNCE 171G. Gender, Mechanization, and Shape (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines, primarily through film, video, and texts, the relationship between gender, mechanization, and shape during the twentieth century. Focuses on the performing arts, industrial and technological design, and visual culture’s relation to changing notions of gender. Course is repeatable.

DNCE 171H. Spectatorship (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on the nature of film studies through the eyes of the audience. Uses film, video, and texts, in addition to outside viewing of films in cinematic locales, to formulate how viewing film constructs the viewers subjectivity and the films cultural context. Course is repeatable.

DNCE 171K. Interventions as Narration: Fight Scenes, Dance Scenes, Dance Videos (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes the deconstruction and reconstruction of the narrative arc in selected films by the insertion of “live” performance practices, such as, but not limited to, live scenes and dance sequences. Includes in-class and out-of-class screenings. Course is repeatable.

DNCE 171M. Bollywood (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the vast corpus of films that constitute the genre called Bollywood, with special attention paid to its music and dance styles. Includes weekly film screenings, audio listening, and readings. No previous dance experience is required. Course is repeatable.

DNCE 172 (E-Z). Televisual Bodies (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines choreographic practices within television broadcast and marketing and their relationship to dance culture. Also examines situational or tactical use and misuse of satellite, cablecast, and broadcast television by unintentional audiences that subsequently reconstitute themselves as communities via the programming. Attention is given to video as an archival and/or choreographic tool. J. Corporations and Corporalities: Commercials, Culture, and Choreography. K. Television as Location: The Satellite Feed; M. Music Television (MTV) and Popular Culture. Segments are repeatable.

DNCE 173 (E-Z). Digitized Bodies (4) Lecture, 3 hours, screening, 2 hours; laboratory, 1 hour. Prerequisite(s): MCS 020; upper-division standing or consent of instructor. Provides a theoretical approach to digital subjectivities, bodies in motion, products, and realities. Addresses issues of liveness, new media, mediatized cultural identities, speed, transfer, telepresence, and coded and encoded sexuality within programming. Focuses primarily on the body-computer interface. J. Digital Games, Violence, and the Body; K. Virtual Subjectivity: Persona, Identity, and Body. Segments are repeatable.

DNCE 180 (E-Z). Dance Practicum (4) Studio, 8 hours. Prerequisite(s): upper-division courses in choreography or consent of instructor in unusual situations. An investigation of dance production theories and practices. Each practicum is directed experience in a limited topic, announced in advance of the quarter given, with the name of the guest instructor if it is not taught by the staff. E. Cine Dance; F. Folk Forms; G. Advanced Choreography; H. Intermedia Movement; I. Video Dance; J. Repertory; K. Reconstruction of Dances; L. Theory of Individual Choreographers; M. Dance for Children; N. Dance in Therapy; O. Improvisation; P. Role Preparation; Q. Dance Notation; R. Pedagogy; S-Z to be announced. Each segment is repeatable to a maximum of 12 units.

DNCE 187. Improvisation Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Presents the emergent field of improvisation studies, moving beyond traditional boundaries to explore improvisation as a cultural phenomenon and social practice. Draws from jazz studies, ethnomusicology, music theory, musicology, American studies, and the histories of dance, theatre, and the visual arts. Cross-listed with MUS 187.

DNCE 190. Special Studies (1-5) To be taken with the consent of the Chair of the Department of Dance to meet special curricular problems. Course is repeatable to a maximum of 12 units.

DNCE 198-I. Individual Internship in Dance (1-12) Prerequisite(s): 1) upper-division standing; 2) evidence of prior arrangement with the professional(s) involved; and 3) approval of the UCR dance faculty sponsor. Work with an appropriate professional individual or organization to gain experience and skill in the student’s chosen dance-related specialty. May be repeated to a total of 16 units.

Graduate Courses

DNCE 240. Improvising Choreography: Scores, Structures, and Strategies (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An evaluation of the use of the score or structure as a predetermining guide to the production of choreography. Students create choreography in ensemble, co-choreographing dances in the moment of performance and assessing immediately the efficacy of a given approach. Course is repeatable to a maximum of 8 units.

DNCE 241. Creating the Experiment: Identifying the New (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An inquiry into what constitutes an experiment in contemporary dance, critically examining how artists bring new dance into existence. Questions the working process in originating movement, sequencing, and images for dance and assesses this process with respect to larger historical and cultural frameworks. Course is repeatable to a maximum of 8 units.

DNCE 242. Dancing Representation: Figures, Forms, and Frames (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An examination of the systems of representation used to create choreographic meaning. Considers the bodily codes and the cultural associations attached to distinct qualities of movement and the conventions of space, time, and narrative through which a dance achieves its meaning. Course is repeatable to a maximum of 8 units.

DNCE 243. Collaborating in Dance Making: Materials, Methods, and Interactions (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Focuses primarily on the body-computer interface. J. Digital Games, Violence, and the Body; K. Virtual Subjectivity: Persona, Identity, and Body. Segments are repeatable.

DNCE 245. Political Approaches to Dance Studies (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): reading knowledge of a language other than English; working knowledge of notation; graduate standing or consent of instructor. The study of power relations reflected in and enacted by dance practice and performance. Topics include nation formation, imperialism, race, commodification, globalization, economic and class relations, gender, and political affiliation and resistance.

DNCE 255. Historical Approaches to Dance Studies (4) Seminar, 3 hours; studio, 2-3 hours. Prerequisite(s): reading knowledge of a language other than English; working knowledge of notation; graduate standing or consent of instructor. The study of dances past and how dance practices have changed over time. May include study of changing modes for production and reception of dance, shifting constructions of bodies and movement, theories of dance reconstruction, and conceptualizations of historical evidence.

DNCE 257. Rhetorical Approaches to Dance Studies (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): reading knowledge of a language other than English; graduate standing or consent of instructor. The study of dance and the structure of dance study. May include the analysis of narrative or representational structures in dance; narrative structures in dance writing; dance semiotics; dance philosophy; and the accuracy, reliability, and value of critical studies of dance.

DNCE 258. Cultural Approaches to Dance Studies (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): reading knowledge of a language other than English; graduate standing or consent of instructor. The study of dance in and across cultures including cross-cultural studies of dance; multicultural approaches to dance history; ethnological, ethno-graphic, and cultural studies approaches to dance analysis; and analysis of the different roles and functions dance plays in cultural systems.
DNCE 260 (E-Z). Seminar in Dance History (4)
Seminar, 3 hours; written work, 3 hours.
Prerequisite(s): graduate standing; consent of instructor. Studies in E. Periods; F. Styles; G. National Forms; H. Individual Artists; I. Choreographies; J. Aesthetics; K. Dance Literature; L. Notation. Each segment is repeatable as its content changes.

DNCE 264. Oral History (4)
Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Theory and practice of oral history as a research technique. Ethnographic, social history, and gender perspectives on oral history; methods for research preparation, interview procedures, transcription, editing, and legal responsibilities. Interview project and analytical paper required.

DNCE 267. Choreographies of Writing (4)
Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An analysis of the types of relationships that may exist between dance and text. Examines the methods and strategies for translating choreographed action into a written description of that action. Students' writing is a major focus of discussions.

DNCE 269. Laban Movement Analysis (4)
Seminar, 3 hours; outside research, 1 hour; consultation, 1 hour; individual study, 1 hour. Prerequisite(s): DNCE 120; graduate standing or consent of instructor. An advanced survey focusing on applied research concepts and theories of the Laban Movement Analysis method of observing, recording, and analyzing human body movement. Special attention is given to motif score writing, applying Effort, Shape, and Space Harmony paradigms. Course is repeatable to a maximum of 12 units.

DNCE 280. Colloquium in Current Topics in Dance Research (2)
Colloquium, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Colloquia on current research topics in dance by students, faculty, and visiting scholars. Students who attend all colloquium and discussion sessions, and who write weekly review papers and a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade.

DNCE 290. Directed Studies (1-6)
Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and Department Chair. To be taken to meet special curricular problems. Normally graded Satisfactory (S) or No Credit (NC) only, but students may petition the instructor for a letter grade for specialized topics pursued with close faculty supervision. Course is repeatable.

DNCE 291. Individual Study in Coordinated Areas (1-12)
Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor and Department Chair. To be taken concurrently with some 100-level or 200-level Dance courses. Must be taken at least once each quarter to clarify career objectives and meet special curricular problems. Normally graded Satisfactory (S) or No Credit (NC). Course is repeatable.

DNCE 297. Directed Research (1-6)
Outside research, 3-18 hours. Prerequisite(s): consent of instructor and graduate advisor. Individualized studies in specially selected topics in Dance under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

DNCE 298-I. Individual Internship (1-4)
Internship, 3-12 hours; term paper, 3 hours; written work, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Individual study or apprenticeship with an appropriate professional individual or organization to gain experience and skill in activities related to dance studies. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

DNCE 299. Research for the Thesis or Dissertation (1-12)
Outside research, 3-36 hours. Prerequisite(s): consent of thesis or dissertation director. Research for and preparation of the thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

DNCE 301. Directed Studies in the Teaching of Dance (4)
Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An assessment of the field of dance studies as preparation for organizing and teaching general education courses. Analyzes current anthologies and other dance publications. Students create course syllabi and lesson plans and discuss a range of practical teaching issues. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 8 units.

DNCE 302. Teaching Practicum (1-4)
Lecture, 1-4 hours. Prerequisite(s): graduate standing. Supervised teaching in upper-division Dance History and lower-division Dance courses. Must be taken at least once by all teaching assistants. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Earth Sciences

Subject abbreviation: GEO
College of Natural and Agricultural Sciences

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Thomas A. Scott, Ph.D.

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Marilyn A. Kooser, Ph.D.

MAJORS
The Department of Earth Sciences offers B.S. degrees in Geology and Geophysics, and a B.A. degree in Geoscience Education. These degree programs are designed for students with a strong interest in various aspects of the Earth Sciences, and for students interested in secondary teaching with a science emphasis. The B.S. programs place substantial emphasis on fieldwork with field courses, field trips in all appropriate courses, and excursions between quarters. The B.A. degree places emphasis on the fundamentals of geoscience, with additional coursework in education.

ACADEMIC ADVISING
Undergraduate advising in the Department of Earth Sciences is designed to allow close professional contact with faculty and staff. Counseling on graduation, departmental requirements and enrollment is handled by the major’s professional academic advisors housed in the CNAS Undergraduate Academic Advising Center and the faculty undergraduate advisor for each major.

Each student selects a faculty mentor who counsels the student on career goals and research opportunities. The department recommends that students meet with their faculty mentor at least once each quarter to clarify career objectives and revise the program of study so it is commensurate with the developing interests and objectives of the student.

TEACHING CREDENTIAL AND B.A. IN GEOSCIENCE EDUCATION
Teachers in the public schools in California must have a credential approved by the State Commission on Teacher Credentialing. The credential requires an undergraduate major, baccalaureate degree, and completion of a graduate credential program such as that offered by the Graduate School of Education at UCR.

Before admission and student teaching in a graduate credential program, the candidate must pass the California Basic Education Skills Test (CBEST) and demonstrate subject-matter proficiency by passing an examination. All candidates for a multiple subject credential to teach in the elementary grades must pass the Multiple Subjects, California Subject Exam for Teachers (CSET). Students are urged to start early, preferably as freshmen, selecting courses
most helpful for this career. Details and counseling on the Prepare to Teach Program, a program for the multiple subject credential, are available in the Office of Interdisciplinary Programs, 2417 Humanities and Social Sciences, (951) 827-2743. Details and counseling on other programs are available in the Department of Earth Sciences or the Graduate School of Education.

UCR does not yet have a state-approved subject matter undergraduate program for earth science majors who wish to teach at the secondary level. The Teaching Credential in Science, geoscience authorization, is required for teachers who want to teach earth science/geoscience in middle school and high school. Students who plan to get this credential must take the CSET exams in Geosciences and should make certain their academic program includes preparatory course work. The examination includes geosciences in depth and general science with introductory, college-level biology, chemistry, physics, and geoscience (geology, meteorology, oceanography, astronomy). CSET test guides are available at www.cset.nesinc.com.

Further information about courses, requirements, and examinations can be obtained in orientation meetings, the CalTEACH-SMI Office (1104 Pierce Hall) and the Graduate School of Education (1124 Sproul Hall).

Earth Science students interested in a secondary school science teaching career, who intend to obtain a Teaching Credential in Science, geoscience authorization, are encouraged to pursue the B.A. degree in Geoscience Education. This degree will best prepare such students for the state credentialing examinations, but is not intended for those students who wish to become professional geologists. Students who want to have the option to become either a professional geoscientist or to teach earth science in secondary schools should enroll in the B.S. in General Geology as well as the teaching credential from the Graduate School of Education. Students in CNAS who intend to pursue a teaching credential in California. The B.A. in Geoscience Education degree is designed for prospective secondary science teachers; it will not lead to a career as a professional geologist.

Students who want to have the option to become either a professional geoscientist or to teach earth science in secondary school should pursue both the B.S. in General Geology as well as the teaching credential from the Graduate School of Education.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college's breadth requirements. Consult with a department advisor for course planning.

Major Requirements
Geology Major
All courses in Geosciences that are prerequisites for other courses in the major must be passed with a grade of “C-” or better before proceeding in the sequence. For example, GEO 001 is a prerequisite for GEO 122.

The department offers four options to majors in Geology: General Geology, Geobiology, Geophysics, and Global Climate Change. All students majoring in Geology are normally required to take the core curriculum: General Geology, Geobiology, Geophysics, and Global Climate Change Options.

Core Requirements (77-79 units)
1. Lower-division requirements (58-59 units)
   a) GEO 001, GEO 002, GEO 003/BIOL 010
   b) BIOL 002 or both BIOL 005A and BIOL 05LA
   c) Either CHEM 001A and CHEM 011A or CHEM 01HA and CHEM 1HLA, either CHEM 001B and CHEM 011B or CHEM 01HB and CHEM 01HBL, either CHEM 001C and CHEM 01LC or CHEM 01HC and CHEM 1HLC
   d) MATH 008B or MATH 009A, MATH 009B, MATH 009C
   e) PHYS 040A, PHYS 040B, PHYS 040C

   The department offers four options to majors in Geology: General Geology, Geobiology, Geophysics, and Global Climate Change. All students majoring in Geology are normally required to take the core curriculum: General Geology, Geobiology, Geophysics, and Global Climate Change Options.
1. Lower-division requirements (20 units)
   a) GEO 100, GEO 115, GEO 122
   b) STAT 100A or STAT 155

Global Climate Change Option (59 units)
1. Lower-division requirements (20 units)
   a) BIOL 005B, BIOL 005C
   b) GEO 009, GEO 010 and GEO 011
2. Upper-division requirements (39 units)
   a) GEO 118, GEO 136 or GEO 137, GEO 152 or GEO 153, GEO 157, GEO 160, GEO 169
   b) Fourteen (14) units of related upper-division course approved by the undergraduate advisor

General Geology Option (58 units)
1. GEO 100, GEO 116, GEO 118, GEO 123
2. GEO 102A (14 units in one quarter), or GEO 102A and GEO 102B (14 units in two quarters), or GEO 102A, GEO 102B, and GEO 102C (14 units in three quarters).
3. One course from GEO 157, GEO 160, GEO 161, GEO 162, GEO 169
4. One course from GEO 124, GEO 132, GEO 136, GEO 137
5. One course from GEO 140, GEO 144, GEO 145, GEO 147.
6. GEO 151 or GEO 152/BIOL 152
7. Eight (8) additional units of related upper-division courses approved by the undergraduate advisor

Geobiology Option (58 units)
1. BIOL 005B, BIOL 005C
2. GEO 100, GEO 116, GEO 118, GEO 123
3. GEO 102A (14 units in one quarter), or GEO 102A and GEO 102B (14 units in two quarters), or GEO 102A, GEO 102B, and GEO 102C (14 units in three quarters).
4. Three courses from GEO 151. GEO 152/Biol 152.
5. Four (4) additional units of related upper-division courses approved by the undergraduate advisor

Geophysics Option (55 units)
1. MATH 046
2. PHYS 040D, PHYS 040E
3. GEO 116, GEO 118, GEO 132, GEO 140, GEO 144, and GEO 145 or GEO 147
4. Two additional 4-unit upper-division courses in Geosciences
5. Two upper-division physical science courses approved by the undergraduate advisor

Geophysics Major
The following are major requirements for the B.S. in Geophysics. All students majoring in Geophysics are normally required to take this core curriculum.

1. Lower-division requirements (71-72 units)
   a) Either CHEM 001A and CHEM 011A or CHEM 01HA and CHEM 1HLC, either CHEM 01B and CHEM 01LB or CHEM 01HB and CHEM 01HLC, either 001C and CHEM 01LC or CHEM 01HC and CHEM 1HLC
   b) GEO 001
   c) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   d) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E
   e) CS 010
2. Upper-division requirements (67-71)
   a) GEO 115, GEO 116, GEO 140, GEO 145, GEO 122
   b) Three of GEO 144, GEO 147, GEO 157, PHYS 177
   c) PHYS 130A, PHYS 130B, PHYS 135A, PHYS 135B, PHYS 136
   d) Twelve (12) units of upper-division physical science courses, which may include up to 4 units of Senior Thesis (GEO 195A, GEO 195B, GEO 195C) or up to 4 units of independent internship (GEO 198-I).

Geoscience Education Major
The following are major requirements for the B.A. in Geoscience Education. All students majoring in Geoscience Education are normally required to take this core curriculum.

1. Lower-division Geoscience requirements (20 units)
   a) GEO 001, GEO 002, GEO 003/BIOI 010, GEO 004, GEO 010
2. Upper-division Geoscience requirements (25-30 units)
   a) GEO 115, GEO 122
3. Mathematics requirements (12 units)
   a) MATH 009A, MATH 009B, MATH 009C
4. Natural Sciences requirements (28-31 units)
   a) BIOL 002, or BIOL 005A and BIOL 005LA
   b) CHEM 001A and CHEM 001LA, CHEM 001B and CHEM 001LB, CHEM 001C and CHEM 001LC
   c) PHYS 002A and PHYS 002B and PHYS 002C, or PHYS 040A and PHYS 040B and PHYS 040C
5. Humanities requirements (to count towards College requirement of 20 units for the B.A.)
   a) LING 020 or LING 021
6. Education requirements (41 units):
   a) EDUC 003, EDUC 004, EDUC 100B or equivalent, EDUC 104/MATH 104, EDUC 109, EDUC 110, EDUC 116, EDUC 139, EDUC 174, EDUC 177A

Minor
Students who wish to Minor in Geology, Geophysics or Global Climate Change must complete 20-28 units of organized upper division courses in Geosciences. A minimum of 16 of these units must be unique to the minor and cannot be used to satisfy major requirements. To satisfy prerequisites, additional preparatory coursework in Earth Sciences and other sciences (Biology, Chemistry, Mathematics, Physics) may be required.

Minor in Geology: GEO 001, GEO 115; plus 15-23 additional upper division Geosciences units.

Minor in Geophysics: GEO 001; GEO 140; plus 16-24 additional units taken from GEO 115, GEO 116, GEO 132, GEO 144, GEO 145, GEO 190, and GEO 199.

Minor in Global Climate Change: GEO 001 or GEO 002; GEO 011; GEO 160; plus 16-24 additional upper division Geoscience units.

Before submitting a petition for a Minor to the college, students interested in pursuing a Minor in Geology or Geophysics or Global Climate Change must consult with the undergraduate faculty advisor in Earth Sciences.

Graduate Programs
The department of Earth Sciences offers the M.S. and Ph.D. in Geological Sciences. Graduate education in the Geological Sciences emphasizes general geology combined with specialization in fields such as evolutionary paleobiology, invertebrate vertebrate paleontology, Quaternary geology, neotectonics, applied geophysics, geotectonics, crustal processes, geochemistry, groundwater, mineral deposits, stratigraphy, sedimentology, sedimentary geochemistry, basin analysis, landscape ecology, fire ecology, and natural resource conservation. Integrated field and laboratory studies are encouraged.

Admission An undergraduate degree in geology or geophysics is the normal preparation for graduate work; however, a degree from a related field of science or engineering is often appropriate. Applicants to graduate status must supply GRE General Test (verbal, quantitative, analytical) scores before admission.

Master's Degree
In addition to the general requirements listed under the Graduate Studies section of this catalog, the requirements for the M.S. degree in Geological Sciences, under the Plan 1 (Thesis), are as follows.

Admission Students must make up any deficiency in preparation. The background re-
quired is course preparation equivalent to the bachelor's degree in Geology or Geophysics at UCR. Courses taken to remedy background deficiencies are not applicable to the graduate degree. Such courses are designated in the letter of admission to the program sent by the dean of the Graduate Division to the student.

Biannual Reviews All students must undergo biannual reviews by the departmental Graduate Progress Committee. A student's progress is assessed in these reviews, and the committee may recommend changes in a student's plans after these reviews.

Course Work All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students must attend the weekly Hewett Club lecture series.

Students must complete a minimum of 36 units of course work in the major and related subjects and obtain advance approval of a coherent plan of study from the graduate advisor.

A maximum of 12 upper-division units beyond the requirements for the bachelor's degree may be applied to the 36-unit requirement.

Students must complete a minimum of 12 units of graduate courses, which must include at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor.

Subject to the approval of the graduate advisor, a limited number of upper-division courses in the major and related sciences, if not required for the bachelor's degree and not taken previously, may be accepted for graduate credit.

Thesis and Final Oral Examination Before the end of the third quarter of study and before embarking on research, the student must submit a written thesis proposal to the graduate progress committee. After approval of the proposal, the student must submit a thesis based on original work for approval by a thesis committee. A maximum of 12 units of thesis research may be counted toward the 36-unit minimum.

Students present an open research seminar as a final oral examination, which is advertised to all the students and faculty in the Earth Sciences Department.

Normative Time to Degree

Global Climate and Environmental Change (GCEC) The GCEC MS track is a field and laboratory-based multidisciplinary program focused on the evidence for and controls of past and present climate change. Candidates must complete the following:

Course Work Students must complete a minimum of 36 quarter units of graduate and upper-division undergraduate courses, and research credit from 1 and 2 below. Other upper-division undergraduate and graduate classes outside may be substituted with consent of the Graduate Advisor. 24 of 36 credits must be graduate level.

1) Required Core courses: GEO 224 upon entry into the program, Geo 260 and Geo 212.

2) At least two additional disciplinary courses: GEO 221, GEO 226, GEO 239, GEO 249, GEO 251, GEO 255, GEO 264, GEO 265, GEO 268, GEO 301, or ENSC 200, ENSC 218, ENSC 224, ENSC 225, ENSC 232.

Thesis Work Before the end of the third quarter students must nominate a faculty advisor and identify a thesis topic. Before embarking on research the student must submit a thesis proposal based on original work for approval by a thesis committee. A maximum of 8 units of research credit can be counted toward the 36 unit minimum. Students present an open research seminar as a final oral examination.

Doctoral Degree

The Department of Earth Sciences offers the Ph.D. in Geological Sciences. In addition to the general university requirements of the Graduate Division as found in the Graduate Studies section of this catalog, the Ph.D. in Geological Sciences normally requires the following:

Biannual Reviews All students meet with the Graduate Progress Committee during their first week at UCR to discuss general interests, goals, and plans. The committee recommends courses designed to prepare a student for research and to correct deficiencies in background. This committee also reviews a student's progress biannually and may recommend transfer to the master's program if normal progress is not maintained.

Course Work Students must complete at least four graduate-level instructional courses taught by four different faculty members as approved by the graduate advisor. Course work used in satisfaction of the M.S. degree may be accepted by the graduate advisor's approval. All students must enroll each quarter in the Graduate Seminar in Geosciences (GEO 250). Students are also required to attend the weekly Hewett Club lecture series.

Written and Oral Qualifying Examinations Students must write two research proposals. The proposal topics must be approved by an examination committee to ensure breadth. The committee reviews the proposals and, if acceptable, recommends proceeding to the oral qualifying examination. An oral examination committee appointed by the dean of the Graduate Division examines the adequacy of the student's preparation to conduct the proposed research. Advancement to candidacy in the Ph.D. program follows successful completion of the oral examination.

Dissertation and Final Oral Examination A dissertation normally evolves from one of the research proposals. The dissertation must present original scholarly work and be approved by a dissertation committee before the student may take the final oral examination. Students must have satisfactory performance on the final oral examination given by the dissertation committee.

Major emphasis in this examination is on the dissertation and related topics.

Normative Time to Degree from the B.S. 17 quarters

Lower-Division Courses

GEO 001. The Earth's Crust and Interior (4) Lecture, 3 hours; laboratory, 3 hours; one 1-day field trip. An introduction to the physical development of the Earth. Emphasis will be on Earth materials (rocks and minerals), processes (weathering, erosion, mountain building), structures (folds and faults), and current theories regarding the Earth's crust and interior.

GEO 002. Earth's Climate through Time (4) Lecture, 3 hours; laboratory, 3 hours; one 2-day field trip. Prerequisite(s): none. An introduction to the history of Earth's changing climate and its relationship to the evolution of life on human geologic time scales. Topics include the interrelationships among short- and long-term carbon cycling, plate tectonics, ocean and atmosphere circulation, and greenhouse gases through time.

GEO 003. Headlines in the History of Life (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): none. Evolution of life beginning with precellular life. Topics include the origin of sex, multicellularity, vertebrate classes, morphological specializations, adaptive radiations, extinction dynamics, and the biology of dinosaurs. Cross-listed with BIOL 010.

GEO 004. Natural Hazards and Disasters (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENGL 001A or equivalent (may be taken concurrently). Application of basic principles of climate and geology to recognition of natural hazards and their mitigation. Topics include fires, freezes, floods, winds, landslides, volcanic eruptions, earthquakes and tsunamis. Emphasis is on confronting hazards of concern to home-buyers, planners, and conservationists in the western United States, especially southern California.

GEO 005. Our Family of Planets (4) Lecture, 3 hours; discussion, 1 hour. An introduction to the comparative study of planets, moons and other solar system objects. Explores the physical, chemical and nuclear evolution of the cosmos, stars and solar systems. Addresses similarities and differences in appearances, orbital motions, compositions, conditions and histories of global change on planets and moons, including extra solar planets and life.

GEO 006. The Violent Universe (4) Lecture, 3 hours; discussion, 1 hour. An introduction to violent phenomena that power the universe, specifically phenomena that illustrate basic astrophysical principles. Topics include impacts in our planetary system: explosions of stars, bursts of star formation, galaxy collisions, black holes, quasars, cosmic jets, and the “Big Bang.” Cross-listed with PHYS 006.

GEO 007. Minerals and Human Health (4) Lecture, 2 hours; discussion, 1 hour; field, 30 hours per quarter. Prerequisite(s): none. An introductory overview of the role of minerals in human life and industrial activities. Discusses basic concepts of mineralogy and modern methods of mineral studies. Topics include the impact of minerals on human health, the role of minerals in modern biotechnologies, asbestos and silica problems, occupational diseases caused by inhalation of mineral dust, and environmental protection in California.

GEO 008. Earthquake Country (4) Lecture, 3 hours; discussion, 1 hour. An introduction to the study of earth-
quakes and the problems of living in earthquake country. Why earthquakes occur, how they are recorded, and what the effects are on man and his structures. The scientific and social consequences of earthquake prediction.

GEO 101. Field Geology (5)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A general introduction to the geological, physical, chemical, and biologic processes related to the characteristics and evolution of the ocean system. Students gain an understanding of the important role oceans play in regulating climate and the cycling of elements on the Earth's surface and how the ocean system has been, and continues to be, one of the most important influences on life.

GEO 010. Earth Resources and Sustainability (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the occurrence, availability, marketing, and usage of metals, minerals, fossil fuels, nuclear fuels and other geologic resources, including both historic and recent trends. Addresses conflicts between modern society's need for increasingly scarce resources and mounting environmental problems. Also covers achieving sustainability through conservation, recycling, and substitution.

GEO 011. Global Climate Change (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Application of the scientific method to critical issues of the global climate change debate. Provides an understanding of Earth's climate system and the feedback systems that regulate the climate “over long- and short-term” time scales. Includes general oceanic and atmospheric circulation patterns, the major reservoirs and mechanisms of exchange of the global carbon cycle, and the influence and origin of greenhouse gases.

GEO 050. Survey of Geoscience for Science Teachers (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001A and CHEM 01LA or both CHEM 01HA and CHEM 1HLA; PHYS 002A or PHYS 040A. Prepares teachers of comprehensive courses in general science to integrate the geoscience component. Reviews fundamental concepts of geology, oceanography, and meteorology at the foundational level of the California Subject Examinations for Teachers in physical science. Emphasizes commonalities between related sciences.

Upper-Division Courses

GEO 100. Igneous and Metamorphic Petrology (5)
Lecture, 3 hours; laboratory, 6 hours; four field trips. Prerequisite(s): GEO 115 and GEO 123 with grades of “C-” or better. An introduction to the nomenclature and classification of igneous and metamorphic rocks. Includes identification of the major rock-forming minerals and common rocks in hand samples and thin sections, as well as interpretation of rock fabrics and textures. Explores tectonic setting and the origins of major rock types.

GEO 101. Field Geology (5)
Lecture, 2 hours; weekly 1-day field trips. Prerequisite(s): GEO 115 with a grade of “C-” or better or consent of instructor for concurrent enrollment. Introductory course in field geology. Covers methods of mapping igneous, metamorphic, and sedimentary rocks. Includes construction of planimetric and topographic maps, use of aerial photographs, and instruction in basic surveying techniques.

GEO 102A. Summer Field Geology (1-14) field, 30-420 hours per quarter. Prerequisite(s): GEO 100 and GEO 118 with grades of “C-” or better or consent of instructor. Covers geological mapping and interpretation, as well as writing of geological reports. May be undertaken as a one-, two-, or three-quarter course (GEO 102A, GEO 102B, GEO 102C). Total credit awarded for GEO 102A plus GEO 102B plus GEO 102C may not exceed 14 units. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned.

GEO 102B. Summer Field Geology (1-14) field, 30-420 hours per quarter. Prerequisite(s): GEO 102A. Covers geological mapping and interpretation, as well as writing of geological reports. May be undertaken as a one-, two-, or three-quarter course (GEO 102A, GEO 102B, GEO 102C). Total credit awarded for GEO 102A plus GEO 102B plus GEO 102C may not exceed 14 units. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned.

GEO 102C. Summer Field Geology (1-14) field, 30-420 hours per quarter. Prerequisite(s): GEO 102B. Covers geological mapping and interpretation, as well as writing of geological reports. May be undertaken as a one-, two-, or three-quarter course (GEO 102A, GEO 102B, GEO 102C). Total credit awarded for GEO 102A plus GEO 102B plus GEO 102C may not exceed 14 units. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned.

GEO 115. Geologic Maps and Landforms (5)
Lecture, 2 hours; laboratory, 6 hours; field, 30 hours per quarter. Prerequisite(s): GEO 001 (may be taken concurrently); MATH 004 or MATH 005, or MATH 008A. Examines characteristics patterns of bedrock outcrops, surficial deposits, the related landforms, and their representation on maps. Covers conformal, faults, intrusions, alluvial fans, river terraces, and landforms indicative of glaciers, volcanoes, landslides, and earthquakes. Applies map information to resource and hazard evaluation.

GEO 116. Structural Geology (5)
Lecture, 2 hours; laboratory, 6 hours; two 1-day field trips. Prerequisite(s): GEO 115 with a grade of “C-” or better; PHYS 040A. Examines structural fringes in the field. Covers the graphical solution of structural problems and laboratory map study; the genetics of rock structures and physics of rock deformation, and Mohr diagrams and elementary stress analysis.

GEO 118. Sedimentology and Stratigraphy (5)
Lecture, 2 hours; laboratory, 6 hours; two 1-day and one 2-day field trips. Prerequisite(s): GEO 115 with a grade of “C-” or better. A study of the principles of sedimentology and the comparative study of the origins of sediments and sedimentary rocks from various modern and ancient clastic, carbonate, and mixed siliciclastic-carbonate depositional environments. Emphasizes field and stratigraphic relationships, as well as petrographic and hand specimen identification.

GEO 122. Introductory Mineralogy (5)
Lecture, 3 hours; laboratory, 5 hours; two half-day and one 1-day field trips. Prerequisite(s): both CHEM 001B and CHEM 01LB or both CHEM 01HB and CHEM 1HLB (CHEM 001B, CHEM 01LB, CHEM 01HB, and CHEM 1HLB may be taken concurrently). GEO 001 with a grade of “C-” or better. A study of common and important minerals and their identification using structural and crystallographic methods. Stresses distinctive structural and chemical features, diagnostic physical and optical properties, and the growth and development of minerals in various geologic environments.

GEO 123. Analytical Mineralogy (5)
Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC; GEO 122 with a grade of “C-” or better. Advanced techniques in mineralogy. Covers optical crystallography, with an introduction to X-ray diffraction, electron microscopy, and other analytical techniques.

GEO 124. Advanced Petrogenesis (4) Lecture, 2 hours; laboratory, 6 hours; two 1-day field trips. Prerequisite(s): GEO 100 with a grade of “C-” or better. Explores advanced topics in the petrogensis of igneous and metamorphic rocks in the Earth’s crust and mantle. Examines field and structural relationships of crystalline rocks and how thermodynamics, experimental phase equilibria, and computer modeling are used to study petrogenesis. Each student completes a field and laboratory research project and prepares a written and oral report on the project.

GEO 132. Groundwater Geology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): both CHEM 001B and CHEM 01LB or both CHEM 01HB and CHEM 1HLB, MATH 009B or MATH 09HB, PHYS 040A. Covers the nature and behavior of waters in geologic media; including the chemical nature of groundwaters and geothermal fluids; principles of fluid flow in sediments and rocks; chemical reactions between solutes and geologic media; geologic aspects of contaminant migration in groundwaters; behavior of geothermal fluids; elementary computer modeling of groundwater and geothermal fluid flow in geologic media.

GEO 136. Introduction to Molecular and Petroleum Geochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC or equivalents; GEO 001 with a grade of “C-” or better or GEO 002 with a grade of “C-” or better. Explores the global carbon cycle and the origin and fate of organic carbon molecules throughout Earth’s history. Covers production and composition of biogenic matter and microbial, chemical and thermal processing of sedimentary organic matter, leading to oil, gas and coal formation. Addresses important applications to the petroleum and environmental sectors.

GEO 137. Environmental Geochemistry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC or equivalents; GEO 001 with a grade of “C-” or better or GEO 002 with a grade of “C-” or better. Examines the chemical principles of geologic processes at and near the Earth’s surface. Topics include geochemical cycles of the elements during chemical interactions of the Earth’s crust, hydrosphere, and atmosphere, applications of thermodynamics and kinetics to the study of low-temperature geologic processes; and the use of isotopic techniques in age dating and tracing geologic processes.

GEO 138. Soil Morphology and Classification (4) Lecture, 3 hours; laboratory, normally 3 hours; two 1-day field trips. Prerequisite(s): ENSC 100/WSWC 100 or ENSC 100H/WSWC 100H; GEO 001 or GEO 002; or consent of instructor. The study of soils as they occur in the field and their relations to current and past environmental conditions. Use of field and laboratory data to understand soil genesis, causes of soil variability, fundamentals of soil classification, and land use potentials. Laboratory emphasizes the description and interpretation of soils and landscapes in the field. Cross-listed with ENSC 13B and SWSC 13B.

GEO 140. Introduction to the Physics of the Earth (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): GEO 001 with a grade of “C-” or better; MATH 009C or MATH 09HC, PHYS 040C. Application of classical physics to the study of the Earth. Origin of the Earth, its gravitational, geomagnetic, and geothermal characteristics, seismcity and the dynamics of the Earth’s crust, plate tectonics, and continental drift.
GEO 144. Earthquake Seismology (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): MATH 010A, MATH 010B, MATH 046, PHYS 040A, PHYS 040B, PHYS 040C; or consent of instructor. Introduction to the theories and observations of earthquake seismology. Includes use of physical principles and mathematical techniques to study the earthquake process, wave propagation, and ground motion. The laboratory emphasizes computer-assisted analysis of various types of seismic data, as well as simple modeling techniques.

GEO 145. Shallow Subsurface Imaging (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): GEO 001 with a grade of "C-" or better, or GEO 002 with a grade of "C-" or better, or GEO 003 with a grade of "C-" or better, or consent of instructor. Covers techniques of geophysical investigation of the shallow subsurface as they apply to solving groundwater, environmental, archaeological, and engineering problems. Emphasizes methods, survey design, and interpretation with focus on case studies. Laboratory consists of both field training and computer exercises using geographic information systems for analysis of spatial data.

GEO 147. Active Tectonics and Remote Sensing (4) Lecture, 2 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): GEO 001, GEO 115; or consent of instructor. A computer-based course that introduces active tectonics and the earthquake cycle and how they are studied using remote sensing data. Explores examples of actively deforming areas from around the world using computer visualization software and freely available data sources (satellite imagery, digital topography, GPS and earthquake data).

GEO 151. Principles of Paleontology (4) Lecture, 3 hours; laboratory, 3 hours; one 1-day field trip. Prerequisite(s): BIOL 010G/GEOL 003 with a grade of "C-" or better or BIOL 005C. Emphasis is on understanding fossils as living organisms. Topics include fundamental mechanisms of evolution and the fossil record, introductory morphometrics and biosystemic theory, functional morphology, and metazoan organization and classification.

GEO 152. Principles of Invertebrate Paleobiology and Paleoecology (4) Lecture, 2 hours; laboratory, 3 hours; three 1-day field trips. Prerequisite(s): BIOL 005C with a grade of "C-" or better or BIOL 010G/GEOL 003 with a grade of "C-" or better or consent of instructor. Analysis of world vegetation patterns, migrations, and ecological considerations at scales ranging from geologic to historical. Topics include plant migration, endemism, continental species patterns, ecological convergence, island biogeography, and world species diversity.

GEO 160. Global Climate Change (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 002C or PHYS 040C or consent of instructor. Surveys historical and paleoclimatic change using basic principles on gas laws, radiant energy exchange, atmospheric circulation and oceanography, and use of proxy data. Topics include variability in modern climate, greenhouse gases, global warming, El Nino, Pacific decadal oscillation, ozone hole, volcanism, ice age climate profiles, plate tectonics, greenhouse climates, paleovegetation, modern species diversity, and snowball Earth.

GEO 161. Quaternary Paleoenvironmental Change (4) Lecture, 2 hours; laboratory, 2 hours; two 2-day field trips. Prerequisite(s): GEO 001 with a grade of "C-" or better or GEO 002 with a grade of "C-" or better. Examines geological evidence of environmental change throughout Quaternary times ("Ice Age") to provide a framework for understanding natural environmental change and for predicting future change.

GEO 162. Geomorphology (4) Lecture, 2 hours; laboratory, 6 hours; one 2-day field trip. Prerequisite(s): upper-division standing or consent of instructor. A study of surficial processes related to the development and evolution of landforms and landscapes at the Earth's surface. Emphasis is on weathering regimes, mass wasting and hill slope development, river processes, and forms. Examines erosional and depositional processes in tectonic, volcanic, arid, karst, glacial, and coastal landscapes.

GEO 167. Conservation Biogeography (4) Lecture, 3 hours; laboratory and field, 3 hours. Prerequisite(s): BIOL 005C with a grade of "C-" or better or BIOL 010G/GEOL 003 with a grade of "C-" or better. Application of biogeographic and ecological theories in the conservation of plants, animals, and wildlands. Topics include biological preserve design, ecological consequences of land development, and wildlife-habitat relationships.

GEO 168. Biogeography (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005C with a grade of "C-" or better or BIOL 010G/GEOL 003 with a grade of "C-" or better. Analysis of world vegetation patterns, migrations, and ecological considerations at scales ranging from geologic to historical. Topics include plant migration, endemism, continental species patterns, ecological convergence, island biogeography, and world species diversity.

GEO 169. California Vegetation (4) Lecture, 3 hours; laboratory, 3 hours; two 1-day field trips. Prerequisite(s): BIOL 005C with a grade of "C-" or better or BIOL 010G/GEOL 003 with a grade of "C-" or better. Survey of the flora, distribution, and ecology of California ecosystems, including Mediterranean shrubland, conifer forests, desert scrub, valley forbfilds, and exotic grasslands. Discusses vegetation in relation to climate, physiography, fire, landscape steady states, biological invasions, paleobotany, and broad-scale change due to land development, invasive species, grazing, and fire suppression.

GEO 190. Special Studies (1-5) Individual study, 3.15 hours. Prerequisite(s): upper-division standing; consent of instructor and department chair. Individual study to meet special curricular needs. Course is repeatable to a maximum of 9 units.

GEO 191. Undergraduate Seminar in Geological Sciences (1) Seminar, 1 hour. Prerequisite(s): open to upper division Geological Sciences majors only. For undergraduate students who desire formal participation in the weekly departmental seminar. In addition to attending the seminar, students must write abstracts describing two of the presentations. Graded Satisfactory (S) or No Credit (NC). May be repeated to a total of 6 units.

GEO 195A. Senior Thesis (3-5) hours per week to be established by supervisor. Prerequisite(s): senior status; consent of instructor. Preparation of a thesis based upon supervised field and/or laboratory research and literature review in the geological sciences. The thesis may be undertaken as a one-, two-, or three-quarter sequence. In the case of a two- or three-quarter sequence, the final grade will be deferred until completion of the last quarter. Total credits for GEO 195A, GEO 195B, and GEO 195C may not exceed 9 units.

GEO 195B. Senior Thesis (3-5) hours per week to be established by supervisor. Prerequisite(s): senior status; consent of instructor. Preparation of a thesis based upon supervised field and/or laboratory research and literature review in the geological sciences. The thesis may be undertaken as a one-, two-, or three-quarter sequence. In the case of a two- or three-quarter sequence, the final grade will be deferred until completion of the last quarter. Total credits for GEO 195A, GEO 195B, and GEO 195C may not exceed 9 units.

GEO 195C. Senior Thesis (3-5) Prerequisite(s): senior status; consent of instructor. Preparation of a thesis based upon supervised field and/or laboratory research and literature review in the geological sciences. The thesis may be undertaken as a one-, two-, or three-quarter sequence. In the case of a two- or three-quarter sequence, the final grade will be deferred until completion of the last quarter. Total credits for GEO 195A, GEO 195B, and GEO 195C may not exceed 9 units.

GEO 198-I. Independent Internship (1-12) Field, 3-36 hours. Prerequisite(s): consent of instructor, under-graduate advisor, and department chair. Independent study in a surrogate job condition under non-university supervision. Internships are normally in public or private institutions such as planning departments, research labs, or industry. Position, task, method of reporting completion and accomplishments, and units must have prior agreement among student, instructor, and supervisor. One unit for every three hours per week spent in internship. Graded Satisfactory (S) or No Credit (NC).

Graduate Courses

GEO 203. Mineral Equilibria (4) Lecture, 4 hours. Prerequisite(s): GEO 137 or consent of instructor. Applications of thermodynamics and kinetics to evaluating equilibria among minerals and fluids in geological environments. Emphasis placed on equilibria in geothermal systems, ore deposits, metamorphic and igneous rock, and groundwater.

GEO 205. Geohydrology (4) Lecture, 3 hours; laboratory, 3 hours; one 1-day field trip. Prerequisite(s): GEO 132 or ENSC 163. Fluid flow in geologic media, resource evaluation, and relevant geohazard and geotechnical problems.

GEO 206A. Stratigraphy (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): GEO 118; consent of instructor. Covers rocks stratigraphy and time stratigraphy with an emphasis on their principles, history, and methods. Includes reading and analysis of pertinent literature and field trips.

GEO 206B. Stratigraphy (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): GEO 118; consent of instructor. Covers time stratigraphy and biostratigraphy with an emphasis on their principles, history, and methods. Includes reading and analysis of pertinent literature and field trips.
GEO 212. Ecological Systems in Space and Time (4) Lecture, 3 hours; field, 30 hours per quarter. Prerequisite(s): BIOL 117 or BIOL 152/GEO 152 or equivalent or consent of instructor. Focuses on how ecological systems are integrated and reconciled at the community, landscape, and paleontological scales. Addresses the role of extrinsic factors operating at each of these scales. Also examines the historical development of our understanding of ecological systems at various scales. Cross-listed with BIOL 212 and ENTM 212.

GEO 219. Theory of Systems (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): BIOL 112/BPSC 112/ENTM 112 or equivalent or consent of instructor. Examines topics developed around a series of classical and recent papers on the principles, philosophy, and methodology of modern systems and phylogenetic methods. Cross-listed with BIOL 219 and ENTM 219.

GEO 221. Electron Microscopy and Microanalysis (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to electron microscopy and microanalysis of inorganic solids including minerals and synthetic materials. Students learn the physical principles, strengths, and limitations of the method. Laboratory provides hands-on experience with scanning and transmission electron microscopes and interpretation of images and data.

GEO 223. Seminar in Geobiology (1) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Lectures, discussions and demonstrations by students, faculty and invited scholars on current research topics in Geobiology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

GEO 224. Sierran Studies: The Paleoclimate Record of the Sierra (4) Field, 90 hours per quarter; term paper, 3 hours. Prerequisite(s): graduate standing. A study of climate change in the Sierra Nevada Mountains, extending from Precambrian glacial sediments to modern glaciers. Utilizes field evidence to access the controls of climate and determine the resolution and limitations of the climate record. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as topics change to a maximum of 8 units.

GEO 225A. Geology of Carbonate Rocks (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): GEO 118; consent of instructor. Covers characterization, recognition, and interpretation of carbonate rocks. Laboratory work includes study of polished and thin sections of selected suites of rocks.

GEO 225B. Geology of Detrital Rocks (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): GEO 118, consent of instructor. Covers characterization, recognition, and interpretation of detrital rocks. Laboratory work includes study of polished and thin sections of selected suites of rocks.

GEO 226. Soil Geomorphology (4) Lecture, 2 hours; laboratory, 6 hours; two Saturday field trips per quarter. Prerequisite(s): ENSC 138/GEOL 138/SWS 138, GEO 162, or equivalents. Examines the interaction of pedogenic and geomorphic processes during the Quaternary, with an emphasis on the rate of these processes. Group research includes field data collection and analysis. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with SWSC 226.

GEO 239. Advanced Topics in Resource Geology (4) Seminar, 4 hours. Prerequisite(s): GEO 100; consent of instructor. Covers topics in nonrenewable mineral and energy resources, such as petroleum resources; nuclear energy and waste disposal; toxic metals and groundwater contamination; and coal resources and global warming. Discusses geologic and environmental aspects of these resource issues. Content may vary from year to year. Requires oral and written research reports. Course is repeatable to a maximum of 8 units.

GEO 241. Advanced Field Geophysics (14) Lecture, 10 hours; laboratory, 16 hours; field, 14 hours. Prerequisite(s): GEO 140; proficiency in a word processing, spread sheet, or programming language. Advanced applications of modern geophysical field techniques to the solution of complex geological problems, using seismic reflection and refraction, electrical and electromagnetic, potential field, and well-logging methods.

GEO 243. Earthquake Physics (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): GEO 144, MATH 010A, MATH 010B, MATH 046, PHYS 040A, PHYS 040B, PHYS 040C; basic computer programming experience; or consent of instructor. MATH 146A, MATH 146B, and MATH 146C are recommended. An exploration of the physics of the earthquake process. Focuses on processes controlling fault slip and friction mechanics, as well as modeling the space/time characteristics of earthquake occurrence. Utilizes theoretical/analytical tools and numerical models. Includes an independent project in computer earthquake modeling.

GEO 243A. Earthquake Physics (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): GEO 144, MATH 010B, PHYS 040C; basic computer programming experience; or consent of instructor. MATH 046 is recommended. An exploration of the physics of the earthquake process. Focuses on processes controlling fault slip and friction mechanics, as well as modeling the space/time characteristics of earthquake occurrence. Utilizes theoretical/analytical tools and numerical models. Includes an independent project in computer modeling.

GEO 243B. Earthquake Physics (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): GEO 144, MATH 010B, PHYS 040C; basic computer programming experience; or consent of instructor. MATH 046 is recommended. An exploration of the physics of the earthquake process. Focuses on fault dynamics during the earthquake rupture and slip processes and its relationship to ground motion. Utilizes theoretical/analytical tools and numerical models. Includes an independent project in computer modeling.

GEO 245. Principles and Applications of Geochemistry (3-5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): GEO 001 or GEO 030 or equivalent or consent of instructor. Selected advanced topics from sedimentary petrology and mineralogy. Course content varies from year to year. Course is repeatable to a maximum of 6 to 10 units.

GEO 245B. Principles and Applications of Geochemistry (3-5) Lecture, 3 hours; laboratory, 0-6 hours. Prerequisite(s): GEO 001 or GEO 030 or equivalent or consent of instructor. Selected advanced topics from sedimentary petrology and mineralogy. Course content varies from year to year. Course is repeatable.

GEO 246. Earth’s Deep Interior: Frontiers in Mantle Petrology and Mineralogy (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): GEO 001 or GEO 030 or equivalent or consent of instructor. Discusses mineral reactions in extreme conditions in the Earth’s mantle and at the core-mantle boundary, the possible fate of continental and oceanic plates subducted to Earth’s deep interior, and new models of the origin and evolution of mantle convection and plumes. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 8 units.

GEO 257. Current Issues in Seismology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores current topics in seismology that are not covered by existing graduate courses. Discussion and research topics may include the history of seismology, source mechanics, seismic wave propagation, site effects, earthquake prediction, and whole Earth structure. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

GEO 257B. Advanced Topics in Geophysics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Selected advanced topics from geophysics. Course content
varies from quarter to quarter. Each segment is repeatable to a maximum of 12 units.

**GEO 259. Tectonics of California (4)** Lecture, 2 hours; seminar, 2 hours. Prerequisite(s): consent of instructor. Geological, geophysical, and paleontological bases of interpreting tectonic development of California, with special emphasis on southern California. Interdisciplinary approach will be emphasized. Weekly reading assignments, active participation in discussions, and appropriate field and library research will be required. Participants will prepare two papers and give presentations.

**GEO 260. Global Climate Change (4)** Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): PHYS 002C or PHYS 040C or consent of instructor. Explores global climate change in historic and geologic time scales. Topics include ocean-atmosphere feedbacks, El Niño, Pacific decadal oscillation, anthropogenic CO2, volcanism, cosmic rays, polar ozone depletion, global climate modeling, stable isotopes, "ice house" Pleistocene climates, "greenhouse" climates of the Mesozoic and Tertiary, plate tectonics, and the "snowball" Earth.

**GEO 263. Organic and Petroleum Geochemistry (4)** Lecture, 4 hours; seminar, 1 hour. Prerequisite(s): graduate standing. BIOL 010/GEO 003; CHEM 001C or equivalent; or consent of instructor. Explores the geologic fate of organic molecules in the sedimentary record, from fossil DNA to lipids. Addresses current analytical techniques used for detecting molecular fossils and for characterizing sedimentary organic matter. Covers topical applications of organic geochemical tools to archaeology, geobiology, paleoclimatic and palaeoenvironmental reconstruction, petroleum exploration, and cosmochemistry research. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

**GEO 264. Biogeochemical Cycles through Time (3)** Lecture, 2 hours; two to three 2-day field trips. Prerequisite(s): BIOL 010/GEO 003; CHEM 001C or equivalent; GEO 001; GEO 002; or consent of instructor. A comprehensive exploration of the major biogeochemical cycles at and near Earth's surface. Emphasis is on microbially mediated cycling of elements and isotopes within diverse sedimentary environments and the cause-and-effect relationships with the ocean and atmosphere. Explores 4 billion years of biospheric evolution in light of these cycles. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

**GEO 265. Special Topics in Earth and Environmental Sciences (1-3)** Seminar, 1-3 hours. Prerequisite(s): graduate standing. Involves oral presentations and small-group discussions of selected topics in the areas of biogeochemistry, global climate change, geomicrobiology, earth surface processes, and interplanetary life. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes to a maximum of 10 units. Cross-listed with ENSC 265.

**GEO 268. Seminar in Biogeography (4)** Seminar, 2 hours; research, 6 hours. Prerequisite(s): graduate standing. Topics include Mediterranean ecosystems, fire ecology, naturalization of exotic species, succession and ecosystem steady state theory, and mapping of vegetation. Course is repeatable to a maximum of 8 units.

**GEO 290. Directed Studies (1-6)** Prerequisite(s): consent of instructor. Research and special studies in the geological sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**GEO 297. Directed Research (1-6)** Prerequisite(s): consent of instructor. Research for individual graduate students in geological sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**GEO 299M. Research for Master's Thesis (1-12)** research, 3 hours per unit. Prerequisite(s): consent of instructor. Thesis research. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**GEO 299P. Research for Dissertation (1-12)** research, 3 hours per unit. Prerequisite(s): consent of instructor. Research for dissertation, arranged in consultation with the staff. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**Professional Courses**

**GEO 301. Teaching of Geosciences at the College Level (1) Seminar, 1 hour. Prerequisite(s): graduate standing in Geological Sciences. A program of weekly meetings and individual formative evaluation required of new Teaching Assistants for Geosciences courses. Covers instructional methods and classroom/section activities most suitable for teaching Geosciences. Conducted by the Teaching Assistant Development Program. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**GEO 302. Teaching Practicum (1-4)** Seminar, 1-4 hours; practicum, 2-8 hours. Prerequisite(s): restricted to those graduate students appointed as Teaching Assistants. Supervised teaching of upper and lower-division courses in Geosciences. Required of all Teaching Assistants. Graded Satisfactory (S) or NC Credit (NC). Course is repeatable for credit, but units not applicable toward degree unit requirements.

**Economics**

**Subject abbreviation: ECON**

**College of Humanities, Arts, and Social Sciences**

Aman Ullah, Ph.D., Chair
Department Office, 4133 Sproul
(951) 827-1470; economics.ucr.edu

**Professors**
Richard Arnott, Ph.D.
Taradas Bandypadhyay, Ph.D.
Susan B. Carter, Ph.D.
Stephen E. Cullenberg, Ph.D.
Anil B. Deolalikar, Ph.D.
Gary A. Dymski, Ph.D.
David H. Fairris, Ph.D.
Mason Gaffney, Ph.D.
Gloria Gonzalez-Rivera, Ph.D.
Jang-Ting Guo, Ph.D.
Tae-Hwy Lee, Ph.D.
Victor D. Lippt, Ph.D.
David Malueg, Ph.D.
R. Robert Russell, Ph.D.
Richard C. Sutch, Ph.D.
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**Professors Emeriti**
Ronald H. Chilcote, Ph.D.
Keith B. Griffin, Ph.D.
Azizur R. Khan, Ph.D.
Prasanta K. Pattanaik, Ph.D.
Howard J. Sherman, Ph.D., Jur.D.

**Associate Professors**
Marcelle Chauvet, Ph.D.
Steven M. Helfand, Ph.D.

**Assistant Professors**
Jorge Agiño, Ph.D.
Wei Li, Ph.D.
Mindy Marks, Ph.D.

Todd Sorensen, Ph.D.
Ming Hon Suen, Ph.D.
Victoria Umanskyaya, Ph.D.

**Cooperating Faculty**
Kenneth A. Baerenklau, Ph.D. (Environmental Sciences)
Linda Fernandez, Ph.D. (Environmental Sciences)
Keith C. Knapp, Ph.D. (Environmental Sciences)
Roger L. Ransom, Ph.D. (History)
Kurt A. Schwabe, Ph.D. (Environmental Sciences)
Henry J. Vaux, Jr., Ph.D. (Environmental Sciences)

**Majors**

Economics studies the production and distribution of goods and services, as well as the way in which productive activity helps shape social existence. Economists are concerned with the factors determining national income, inflation, unemployment, output, growth and inequality (macroeconomics), as well as the behavior of individual decision-making units like households and firms (microeconomics). Economists are also concerned with the role of markets, money and interest rates, the forces affecting international trade, and many other problems of production and distribution.

Economics is the basis for many careers, some of which require only a B.A. degree while others require more advanced work. Possible careers include business, government, education and law.

The B.A. is the most general degree offered in economics. It is appropriate background for a wide variety of purposes, including graduate study and professional schools. However, those planning to attend a graduate program in economics may need more quantitative training than the B.A. requires. Students who are considering attending a graduate program in economics should consult with their undergraduate advisor. The Business Economics B.A. degree provides more specific preparation for careers in business administration or management or for graduate work in business.

**University Requirements**
See Undergraduate Studies section.

**College Requirements**
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Math 009A and Math 009B may also be used to meet baccalaureate requirements.

**Major Requirements**
The Economics Department offers B.A. degrees in Economics, Business Economics, Economics/Administrative Studies, and Economics/Law and Society.

**Economics Major**
The major requirements for the B.A. degree in Economics are as follows:

1. Lower-division requirements (4 courses [at least 16 units])
   a) ECON 002, ECON 003
1. Lower-division requirements (17 units)
   a) BUS 010, BSAD 020A
   b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
   c) CS 008 (may be used to satisfy breadth requirements)

2. Upper-division requirements (20 units)
   a) Two courses (8 units) from the list below:
      (1) ECON 102A or ECON 130 or ECON 162/BSAD 162
      (2) PSYC 140 or PSYC 142
      (3) SOC 150 or SOC 151 or SOC 171
      (4) POSC 181 or POSC 182 or POSC 183
      (5) ANTH 127 or ANTH 131

These two courses must be outside the discipline of Economics and cannot be courses included as part of the three-course Business Administration track or their cross-listed equivalents.

b) A three-course track (12 units) in Business Administration courses from one of the following:
   (1) Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
   (2) Human Resources Management/Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
   (3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186
   (4) Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
   (5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
   (7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
   (8) Management Information Systems: BUS 101, BUS 171, BUS 173
   (9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 122, BUS 127/STAT 127

Note: Up to 4 units of internship credit may be counted toward the upper-division electives in Economics.

Administrative Studies requirements (37 units)
1. Lower-division courses (17 units)
   a) BUS 010, BSAD 020A
   b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
   c) CS 008 (may be used to satisfy breadth requirements)

2. Upper-division requirements (20 units)
   a) Two courses (8 units) from the list below:
      (1) ECON 102A or ECON 130 or ECON 162/BSAD 162
      (2) PSYC 140 or PSYC 142
      (3) SOC 150 or SOC 151 or SOC 171
      (4) POSC 181 or POSC 182 or POSC 183
      (5) ANTH 127 or ANTH 131

These two courses must be outside the discipline of Economics and cannot be courses included as part of the three-course Business Administration track or their cross-listed equivalents.

b) A three-course track (12 units) in Business Administration courses from one of the following:
   (1) Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
   (2) Human Resources Management/Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
   (3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186
   (4) Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
   (5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
   (7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
   (8) Management Information Systems: BUS 101, BUS 171, BUS 173
   (9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 122, BUS 127/STAT 127

Note: Up to 4 units of internship credit may be counted toward the upper-division electives in Economics.

Economics/Law and Society Major
The major requirements for the B.A. degree in Economics/Law and Society are as follows:

1. Economics requirements (11 courses (at least 44 units))
   a) ECON 002, ECON 003
   b) ECON 119
   c) ECON 102A, ECON 102B, ECON 103A
   d) Five additional upper-division courses in Economics worth 4 or 5 units each. Two 2-unit courses can replace one 4- or 5-unit elective course.

Note: Up to 4 units of internship credit may be counted toward the upper-division electives in Economics.

2. Law and Society requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWSO 100
   c) One course chosen from ECON 111, POSC 114, SOC 004 or equivalent course in research methods
   d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 175, SOC 159
   e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 186, POSC 147, SOC 149, SOC 180
   f) LWSO 193, Senior Seminar

Note: For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (This limitation applies to specified Economics requirements and Law and Society requirements.)

Minor
The minor in Economics provides a background in this discipline. Students take basic microeconomic and macroeconomic theory courses, and then are given freedom of choice in pursuing upper-division courses of great interest.

All candidates for the minor in Economics must take

1. Lower-division requirements (8 units): ECON 002, ECON 003

2. Upper-division requirements (at least 25 units):
   a) ECON 102A, ECON 103A
   b) Four additional upper-division courses (at least 16 units) in Economics

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and
Programs section of this catalog for additional information on minors.

Graduate Program

The Department of Economics offers the M.A. and Ph.D. degrees in Economics.

The graduate Economics program is designed to prepare students for research and teaching in academic institutions as well as for positions in government, international agencies, and the private sector.

Admission Students are normally admitted only in the fall quarter. Applicants should apply electronically, at www.graduate.ucr.edu. Students submit the completed application, GRE scores, three letters of recommendation (from persons familiar with the student’s academic work), and transcripts in duplicate of previous academic work.

Master’s Program Students should have first-year calculus, a course in statistics, and some background in economics before beginning course work. Students who do not meet these requirements may still be admitted but normally must take these courses as prerequisites to the required courses. Applicants to the M.A. program must have the same academic potential as Ph.D. applicants, as reflected by GPA and GRE scores. Admission to the M.A. program does not guarantee later admission to the Ph.D. program.

Doctoral Program The department encourages applicants from a variety of backgrounds, but a good understanding of intermediate microeconomics, intermediate macroeconomics, multivariate calculus, and elementary linear algebra is necessary to begin taking the core requirements, described below. In addition, two courses in basic probability and statistics or econometrics are required before beginning the core econometrics sequence. Students who do not satisfy the requirements, or who have been out of school for several years, should consider enrolling in the one-year M.A. program.

Master's Degree

The M.A. degree is designed as a preparatory program for those students interested in pursuing the Ph.D. but who are not adequately prepared to enter the Ph.D. program directly (e.g., students who lack the necessary prerequisites in economics or mathematics or students who have been out of school for some time).

Doctoral Degree

The Ph.D. is the primary degree objective of the graduate program. Students first complete a core curriculum in economic theory and quantitative methods. These courses provide training in the fundamental concepts and research methods of the discipline. Following demonstration of professional competence in the core areas, students specialize in theoretical or applied areas of economics. This leads to the development of independent research and the writing of the Ph.D. dissertation.

Core Requirements

1. Economic Theory

Students must complete the following:
   a) ECON 200A, ECON 200B, ECON 200C (Microeconomic Theory)
   b) ECON 201A, ECON 201B, ECON 201C (Macroeconomic Theory)
   c) ECON 212 (History of Economic Theory and Methodology) or ECON 213 (Methods and Themes in Economic History)

All students must pass two cumulative examinations: one in microeconomic theory (covering topics encompassed in the course sequence ECON 200A, ECON 200B, and ECON 200C) and one in macroeconomic theory (covering the topics covered in ECON 201A, ECON 201B, ECON 201C). Both examinations are given at the end of the first year, at the beginning of the fall quarter. After completing the sequence of courses, students must sit for each examination at each offering until they have passed the requirement. An unexcused failure to sit for a required examination will be regarded as a failure. No student will be given more than three attempts to achieve a satisfactory grade on each of the two examinations. Copies of the rules regarding these cumulative examinations are available in the department office.

2. Quantitative Methods

Students must complete the following: ECON 205A, ECON 205B, ECON 205C (Econometric Methods I, II, III)

To satisfy these course requirements, students must attain a “B” average in the sequences ECON 200A, ECON 200B, and ECON 200C; ECON 201A, ECON 201B, and ECON 201C; and ECON 205A, ECON 205B, and ECON 205C. They also must receive a grade of “B-” or better in ECON 212 or ECON 213. Core courses may be waived, based on equivalent graduate work completed elsewhere. The comprehensive examinations, however, may not be waived.

Colloquium Requirement

Students must enroll in at least one offering of ECON 289 (Colloquium in Economics) each quarter of their formal residence.

Field Requirement

All students must complete course work by taking one of the following options:

Option 1 Students must complete course work in two fields and pass a comprehensive field examination in the field they designate as their major field. Students must take at least three courses in each of both fields.

Option 2 Students must complete course work in one major field consisting of three courses and two fields consisting of two courses each.

Students must pass a comprehensive examination in their major field.

Field comprehensive examinations are given twice a year. No one course may be used to satisfy more than one requirement:

1. Advanced Econometrics

Students must complete the courses a) and b) and one of the courses from c), d), e), or f) listed below.
   a) ECON 285E (Advanced Econometric Methods)
   b) ECON 285F (Topics in Econometrics)
   c) ECON 285G (Applied Econometrics)
   d) ECON 285-I (Macroeconometrics)
   e) ECON 285J (Nonparametric Econometrics)
   f) ECON 285K (Microeconometrics)

2. Advanced Macroeconomic Theory

Students must complete the following:
   ECON 282E (Foundations of Macroeconomics)
   ECON 282F (Advanced Monetary Theory)
   ECON 282G (Special Topics in Macroeconomic Theory)

3. Advanced Microeconomic Theory

Students must complete three of the following:
   ECON 283E (Rational Choice Theory)
   ECON 283F (Measurement and Aggregation in Economics)
   ECON 283G (General Equilibrium)
   ECON 283I (Social Choice and Welfare)
   ECON 283J (Uncertainty and Information)
   ECON 283K (Special Topics in Microeconomic Theory)

4. Advanced Political Economy

ECON 202A (Topics in Economic Theory: Critiques and Alternative Approaches) is recommended.

Students must complete three of the following:
   ECON 272A (Political Economy: Marxian Economics)
   ECON 272B (Political Economy: Efficiency, Justice, and Power)
   ECON 272C (Political Economy: Comparative Political Economy)
   ECON 271 (Radical Political Economy)
   ECON 279 (Political Economy: Advanced Topics)

5. Development Economics

Students must complete three of the following:
   ECON 260 (Theories of Economic Development)
ECON 261 (Contemporary Development Strategies)
ECON 262 (Project Evaluation in Developing Countries)
ECON 265 (Agricultural and Rural Development)
ECON 266 (The Political Economy of Imperialism)

6. Economic History
Students must complete three of the following:
ECON 212 (History of Economic Theory and Methodology)
ECON 213 (Methods and Themes in Economic History)
ECON 223 (American Economic History)
ECON 224 (Economic History of the World Economy in the Twentieth Century)

7. International Trade Theory
Students must complete the following:
ECON 234 (International Trade Theory)
ECON 235 (Topics in International Trade Theory)

8. Labor Economics
Students must complete three of the following:
ECON 240 (Labor Supply, Labor Demand, and the Structure of Wages)
ECON 241 (Labor Institutions and Macro Labor Outcomes)
ECON 243 (Topics in Labor)
ECON 244 (Empirical Research Methods)

9. Money, Credit, and Business Cycles
Students must complete three of the following:
ECON 250 (Money, Credit, and the Macroeconomy)
ECON 251 (Business Cycle Theory)
ECON 254 (Topics in Money, Credit, and Business Cycles)

10. Resource and Environmental Economics
Students must complete three of the following:
ECON 207 (Environmental Economics)
ECON 208 (Models of Nonrenewable Resource Management)
ECON 209 (Models of Renewable Resource Management)
ECON 210 (Topics in Environmental Economics)

11. Public Economics
Students must complete the following:
ECON 246 (Introduction to Public Economics)
ECON 247 (Recent Advances in Public Economics)

Not all of these fields and courses are offered every year; offerings depend primarily on student demand.

As the department faculty is expanding, we expect to add additional fields in the near future. These may include International Economics and Health Economics.

Oral Qualifying Examination Students must pass an oral qualifying examination, which covers a dissertation prospectus and subject matter related to the student’s major and minor fields. It is given by a committee of five faculty, at least one of whom must not be a member of the Department of Economics faculty. Students who enter the program fully prepared normally take the examination before the beginning of the third year.

Dissertation and Final Examination The final requirement is the completion of a dissertation, under the direction of a dissertation committee, and passing a final examination defending the dissertation. The dissertation committee is normally composed of three Department of Economics faculty members (including cooperating faculty), usually chosen from the oral qualifying examination committee. Students who enter the program fully prepared normally complete the dissertation by the end of the fifth year. Students are encouraged to present a dissertation prospectus to a meeting of ECON 289 in their third year.

Master’s Degree
Plan II (Comprehensive Examination) Students must complete a total of 36 units, 24 of which must be at the graduate level. Students must complete the following:
1. ECON 200A (Microeconomic Theory) or ECON 206 (Mathematics for Economists)
2. ECON 204A (Microeconomic Theory for Master’s Students) or ECON 200A-ECON 200B (Microeconomic Theory)
3. ECON 204B (Microeconomic Theory for Master’s Students) or ECON 201A-ECON 201B (Macroeconomic Theory)
4. ECON 205A (Econometric Methods I) and ECON 205B (Econometric Methods II)
5. ECON 212 (History of Economic Theory and Methodology) or ECON 213 (Methods and Themes in Economic History)

Examination Requirements Students must pass one of the following examinations:
1. Master’s examination covering the topics in ECON 204A, ECON 204B
2. Doctoral cumulative examination in either microeconomic theory or macroeconomic theory (graded at the master’s level)

3. Doctoral Comprehensive Examination in any of the ten fields described above (graded at the master’s level)

Lower-Division Courses

ECON 001. Introduction to Economics (4) Lecture, 3 hours; discussion, 1 hour. Examines the history of economic institutions, the ideas of the great economists, and selected contemporary issues.

ECON 002. Introduction to Macroeconomics (5) Lecture, 3 hours; discussion, 1 hour; written work, 30 hours per quarter. Prerequisite(s): none. An introduction to the study of the economic system from a macro, or aggregate, perspective. Includes analysis of unemployment, inflation, and the impact of government policies on the level of economic activity. Credit is awarded for only one of ECON 002, ECON 002H, or ECON 004.

ECON 002H. Honors Introduction to Macroeconomics (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3-3.5 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ECON 002. An introduction to the study of the economic system from a macro, or aggregate, perspective. Includes analysis of unemployment, inflation, and the impact of government policies on the level of economic activity. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ECON 002, ECON 002H, or ECON 004.

ECON 003. Introduction to Microeconomics (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. An introduction to the study of the economic system from the micro, or individual decision-maker’s, perspective. Includes analysis of competition, monopoly, and the distribution of income. Credit is awarded for only one of ECON 003 or ECON 004.

ECON 004. Principles of Economics (5) Lecture, 4 hours; discussion, 1 hour. Prerequisite(s): a status in pre-Business or Business Preparatory or a major in Business Administration. Studies the economic system from both the micro, or individual decision-maker’s perspective, and macro, or aggregate perspective. Includes analysis of competition, monopoly, distribution of income, unemployment, inflation, and the impact of government policies on economic activity. Credit is awarded for only one of ECON 002, ECON 002H, or ECON 004 and for only one of ECON 003 or ECON 004.

ECON 005. Data Analysis for Economics and Business (5) Lecture, 3 hours; outside research, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 (or ECON 002H), ECON 003, or ECON 004; or consent of instructor. Introduction to the sources of economic and business data and data analysis using graphs, plots, computers, and descriptive statistics. Also covers index numbers, measures of inequality, and simple regression analysis.

ECON 006. Introduction to Environmental Economics (4) Lecture, 3 hours; discussion, 1 hour. An introduction to the basic principles of economics and their application to problems of environmental quality and natural resource utilization. Emphasis is on the failure of markets as a cause of environmental degradation and the role of government in resolving problems of resource scarcity. Does not satisfy the Natural Science breadth requirement for the College of Humanities, Arts, and Social Sciences. Cross-listed with ENSC 006. Does not satisfy the Natural Science breadth requirement for the College of Humanities, Arts, and Social Sciences.
Upper-Division Courses

ECON 101. Statistics for Economics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour; individual laboratory, 2 hours. Prerequisite(s): MATH 008B or MATH 009A or MATH 009H or MATH 022 or equivalent. An introduction to the basic statistical methods for economics. Topics include economic data analysis, index numbers, univariate and bivariate probability distributions, correlation and regression, sampling distributions, properties of estimators, and hypothesis testing.

ECON 102A. Microeconomic Theory (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): ECON 003 or ECON 004; MATH 008B or MATH 009A or MATH 009H or MATH 022; enrollment priority is given to Business Economics majors, Economics majors and minors, Economics/Administrative Studies majors, and Economics/Law and Society majors. A comprehensive discussion of the competitive market system, modern utility theory of consumer behavior, firm behavior in product and factor markets, and monopoly.

ECON 102B. Microeconomic Theory (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): ECON 102A or consent of instructor; enrollment priority is given to Business Economics majors, Economics majors and minors, Economics/Administrative Studies majors, and Economics/Law and Society majors. A continuation of ECON 102A. Covers imperfect competition, general equilibrium, welfare economics, intertemporal decision making, uncertainty, and information.

ECON 103A. Macroeconomic Theory (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): ECON 002 or ECON 002H or ECON 004; enrollment priority is given to Business Economics majors, Economics majors and minors, Economics/Administrative Studies majors, and Economics/Law and Society majors. Discusses the theory of income, employment, price level and the role of the international economy. Introduces fiscal and monetary policy.

ECON 103B. Macroeconomic Theory (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): ECON 103A. ECON 102A is recommended; enrollment priority is given to Business Economics majors, Economics majors and minors, Economics/Administrative Studies majors, and Economics/Law and Society majors. Investigates developments in macroeconomic theory and events. Presents models that explain economic growth and business cycle fluctuations and their empirical relevance and policy implications.

ECON 107. Introductory Econometrics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): ECON 002 or ECON 002H or ECON 003 or ECON 004; ECON 101; or consent of instructor. An introduction to the basic tools of econometrics. Focuses on the issues relating to the linear regression model, including heteroskedasticity, serial correlation, and multicollinearity.

ECON 108. Introductory Econometrics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour; written work, 1 hour; outside research, 1 hour. Prerequisite(s): ECON 107 or consent of instructor. A continuation of ECON 107. Covers, at an introductory level, the basic concepts related to logit and probit models, simultaneous equations models, dynamic time series models, unit roots and auto-regressive conditional heteroskedasticity (ARCH), and forecasting.

ECON 110. Mathematical Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. Covers the use of mathematical tools to analyze economic problems, with emphasis on linear algebra and differential calculus. Also addresses applications to comparative statics and optimization problems.

ECON 111. Research Methods in Business and Economics (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): ECON 002 or ECON 002H or ECON 003 or ECON 004. Introduction to research methods in business and economics. Topics include the scientific method and notions of progress in science, problems of research design, data sources and data gathering techniques, the case study method, and measurement and interpretation of business and economic data.

ECON 112. Forecasting in Business and Economics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour; written work, 2 hours. Prerequisite(s): ECON 002 or ECON 002H or ECON 003 or ECON 004 or equivalent; ECON 107; or consent of instructor. Provides a basic knowledge of forecasting and its applications, particularly by using business and economic data. Covers basic methods of forecasting, such as regression methods, exponential smoothing, algorithms, and autoregressive integrated moving average (ARIMA) methods. Also explores how to combine and evaluate various forecasts. Uses computer analysis extensively.

ECON 115. Marxian Political Economy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Fundamental concepts of Marxian political economy, including historical materialism, surplus value, exploitation, class analysis, economic crises, the state, socialism, and Marxian methodological foundations.

ECON 116. Foundations of Political Economy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores ways of thinking about economic and social issues precluded by conventional approaches to economic analysis. Topics include the class relations between labor and capital, discrimination, market socialism, and alternative perspectives on development, macroeconomic instability, and the environment.

ECON 117. Economics and Philosophy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102B or consent of instructor. Examines issues on the boundary of economics and philosophy. Topics include social choice theory and economic justice; foundations of utility theory, rational choice, and economic welfare; epistemology and the philosophies of science of Popper, Kuhn, and others. Cross-listed with PHIL 119.

ECON 118. The Contemporary United States Economy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004. Provides a broad survey of issues relating to the development of the U.S. economy and especially its contemporary structure. Incorporates issues relating to both macro- and micro-economic phenomena, with a focus on questions that are of particular relevance to current policy.

ECON 119. Law and Economics (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ECON 002 or ECON 002H or ECON 003 or ECON 004 or consent of instructor. An economic analysis of legal institutions and their evolution, including the areas of property laws, contract law, tort law, and criminal law.

ECON 120. The Great Economists (4) Lecture, 6 hours; individual study, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. In-depth study of selected influential writers or a school of writers on economics or political economy. Emphasis is on selected writers' relations to other schools and other writers. Offered in summer only.

ECON 121E. The Wizard of Oz (2) Lecture, 15 hours per quarter, written work, 15 hours per quarter. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004. Focuses on the Populist Movement, the rise of William Jennings Bryan's third-party presidential bid, and the contemporary political struggle regarding management of the U.S. money supply.

ECON 121E. The Revolutions in Agricultural Biology (2) Lecture, 15 hours per quarter; individual study, 15 hours per quarter. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004; or consent of instructor. An introduction to the basic statistical methods for economics. Topics include economic data analysis, index numbers, univariate and bivariate probability distributions, correlation and regression, sampling distributions, properties of estimators, and hypothesis testing.

ECON 121F. The Great Crash and the Great Depression (2) Lecture, 15 hours per quarter; individual study, 15 hours per quarter. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004; or consent of instructor. Examines the history of biotechnology. Covers the impact on standards of living, the distribution of welfare, and the pace and pattern of economic growth. Topics include the origin of agriculture, the Columbian Exchange, the dwarfing of wheat and rice, hybrid corn, and the adoption of genetically modified crops.

ECON 121G. Economic Aspects of Contemporary Mexican Immigration to the United States (2) Lecture, 15 hours per quarter; written work, 15 hours per quarter. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004. Examines the origin and nature of migrant flows, their implications for the economic development of Mexico, and impacts on U.S. labor markets, income and wage inequality, provision of social services, and the evolution of government policy.

ECON 122F. The Federal Deficit and the National Debt (2) Lecture, 15 hours per quarter; individual study, 15 hours per quarter. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004; or consent of instructor. Stresses economic and political controversies, and tax policies of the federal government, focusing on causes and consequences of federal deficit spending. Topics include discretionary and mandatory spending (social security benefits, Medicare, etc.), tax credits and loopholes, debt finance, the life-cycle hypothesis of saving, and the burden of the national debt.

ECON 123. American Economic History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON
ECON 120. World Economic History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003, or ECON 004. Covers the economic history of the world from Paleolithic times to the present.

ECON 125. History of Economic Thought (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003, or ECON 004. Study of the development of major economic theories, including those of Adam Smith, Karl Marx, and John Maynard Keynes. Focus is on how alternative theories define and address economic problems differently and the policy implications that follow.

ECON 129. Health Economics (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ECON 003, ECON 102A. Economic analysis of health and medical care, medical technology, and the functioning of insurance markets. Emphasis is on behaviors of insurance companies, physicians, and the pharmaceutical industry. Major concerns include the rising cost of health care, government involvement, and health care reform.

ECON 130. Introduction to Money, Banking, and Credit (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): ECON 103A. Covers the basic theories of modern monetary systems, money, credit, and interest rate behavior; financial intermediation and central banking; and methods and objectives of monetary and regulatory policy.

ECON 132. Public Finance (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A, ECON 103A; BUS 106/ECON 134 or ECON 130 is recommended. Covers functions of government in a market economy: distributive equity, taxation, spending, borrowing, and debt management. Addresses promotion of capital formation, full employment, stability, and efficient resource use as well as intergovernmental relations.

ECON 134. Financial Theories and Markets (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 003 or ECON 004; upper-division standing; BSAD 020A and BSAD 020B are recommended. Covers the foundation materials for both corporate financial management, and investment and portfolio analysis. Topics include time value of money, capital budgeting, capital structure, dividend policy, portfolio theory, Capital Asset Pricing Model, and market efficiency. Cross-listed with BUS 106.

ECON 135. The Stock Market (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003, or ECON 004. ECON 103A is strongly recommended. An analysis of the history of the stock market and its role in the macroeconomy. Topics include factors governing stock prices, fundamental and technical analysis, the impact of inflation and interest rates, international investing, and the role of social institutions in the determination of stock prices.

ECON 136. Empirical Financial Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 107 or consent of instructor. Discusses various empirical aspects of financial economics and financial risk management. Addresses both theoretical and applied issues in finance, risk management, and econometrics. Also discusses quantitative analysis, simulation methods, and case studies.

ECON 143A. Environmental Economics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 003 or ECON 004 or equivalent, MATH 022 or equivalent; or consent of instructor. Introduction to economic analysis of natural resources and the environment with emphasis on environmental quality. Topics include environmental-economy interactions and social choice theory; source control costs, damage valuation, and efficient pollution control; and design of efficient and equitable environmental policy. Cross-listed with ENSC 143A.

ECON 143B. Natural Resource Economics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 143A/ENSC 143A or consent of instructor. Considers the extraction and use of natural resources. Topics include land use and natural capital economics and valuation; economics of mineral and nonrenewable resources including recycling; and managing biological and renewable resources, including common property, efficient usage, and regulation. Cross-listed with ENSC 143B.

ECON 143C. Ecological Economics and Environmental Valuation (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 143A/ENSC 143A or consent of instructor. Survey of environmental valuation and economic analysis of environmental programs. Methods covered include hedonic pricing, weak complements, contingent valuation, and ecosystem services. Environmental macroeconomic topics include population growth, biophysical constraints to economic growth, intertemporal welfare and sustainability, and sustainable development. Cross-listed with ENSC 143C.

ECON 146. Urban Economic Problems (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. An analysis of economic principles to the major problems of the modern urban community, such as poverty, discrimination, deterioration of the environment, and housing problems. Programs for alleviation or solution. Cross-listed with URST 146.

ECON 148. Land and Resource Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. Distinctive qualities of land and its rent; valuation of land as an investment. Assembly, division, and development of land; efficiency of land markets and effects of taxation. Concentrated ownership, separation of ownership and management, rent and taxable surplus, and origins and kinds of tenure.

ECON 152. Economics of Labor Relations (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. An analysis of the history of labor and industrial relations in the U.S. with emphasis on problems of collective action, long-run agreements for economic growth, income inequality, and the role of government. Cross-listed with BUS 152.

ECON 153. Labor Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. Focuses on economic analyses of four topics: women’s work in and out of the paid labor force; gender differences in occupation, earnings, and income; marriage, divorce, and childbearing; and public policy regarding women’s work and standard of living. Explores differences among women by race, ethnicity, class, marital status, and parental responsibilities. Cross-listed with WMST 155.

ECON 156. Population Dynamics and Economic Well-being (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002, ECON 003. Examines the causes and consequences of population dynamics. Economic models of such demographic behavior as fertility, mortality, marriage, and migration are presented. Consequences of population change for economic growth, the environment, and well-being are discussed.

ECON 159. Economics of Art, Entertainment, and Culture (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ECON 002 or ECON 002H or ECON 003 or consent of instructor. Overview of the economic aspects of art, entertainment and culture. Topics include consumer demand, economic models of nonprofit organizations, competition and market structure in the arts and entertainment industries, copyright issues, public support of the arts, and the role and impact of public and private subsidies.

ECON 160. Industrial Organization (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. A study of the organization and structure of the American industrial system with emphasis on its production and pricing behavior and policies, and its market structure and public policies regulating or influencing its market behavior. Cross-listed with BUS 160.

ECON 162. Managerial Economics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 102A. Examines applications of economic analysis to problems of management, especially of capital. Emphasis is on production economics and cost analysis. Cross-listed with BSAD 162.

ECON 163. Economics and Business Strategy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. Provides an understanding of the basic concepts of game theory as well as many strategic interactions, including price wars, cooperation, commitment, bargaining, and the strategic use of information.

ECON 170 (E-Z). Case Studies in Economic Development (2) for hours and prerequisites, see segment descriptions. A detailed study of the history, problems and prospects of economic development in a selected geographical region.

ECON 170E. Economic Development in India (2) Lecture, 15 hours per quarter; written work, 15 hours per quarter. Prerequisite(s): ECON 102A or consent of instructor. A detailed study of India, its problems and prospects of economic development in India.

ECON 170F. Economic Development in Australia (2) Lecture, 15 hours per quarter; individual study, 15 hours per quarter. Prerequisite(s): ECON 002 or ECON 002H, ECON 003, or ECON 004. Discusses Australian economic development from the first European settlements to the present day. Focus is on Australia as a “settler economy,” created through a process of large-scale migration from well-established states to a land-abundant, previously unorganized region and involving the marginalization of the indigenous population.

ECON 171. International Finance (4) Lecture, 3 hours; individual study, 3 hours. Prerequisites: ECON 102A, ECON 103A. Covers international monetary theory and its applications. Topics include balance of payments, exchange rates, open-economy macroeconomics, and international monetary institutions. Addresses selected policy issues.

ECON 175. Comparative Analysis of Economic Systems (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or con-
sent of instructor. Examines the varieties of capitalism as well as its characteristic features and systemic problems. Topics also include the search for an alternative; central planning; and market socialism.

ECON 178. International Trade (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. A study of the pure theory of trade, trade policy, and international factor movements including illustrative applications to current issues and problems. Cross-listed with BUS 178.

ECON 180. Transition from Socialism to Capitalism (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 (or ECON 002H), ECON 003; or ECON 004; or consent of instructor. Examines the transition from central planning to a more market-oriented economic system in Central and Eastern Europe, the countries of the former Soviet Union, China, Mexico, and Vietnam. Evaluates alternative transition strategies using Russia and China as the key examples.

ECON 181. Economic Development: Theory and Policy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H, ECON 003; or ECON 004. A survey of the main theories of economic development and an analysis of the major development strategies and policies.

ECON 182. Trade, Globalization, and Development (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. Explores the theory of comparative advantage as a guide to development policy. Discusses trade regimes and their effects on development. Analyzes the nature and consequences of the globalization of the world economy.

ECON 183. Population and Development (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A and ECON 107 or consent of instructor. Study of interactions between population growth and economic development. Topics include the history of demographic thought; lessons for developing countries from the demographic experience of currently-developed countries; household production models, demand for children, mortality, health and nutrition, migration, and human capital; and macroeconomic demographic linkages in developing countries.

ECON 184. Economic Development in Africa (4) Lecture, 3 hours; extra reading, 1 hour; written work, 1 hour; term paper, 1 hour. Prerequisite(s): ECON 102A or ECON 103A; ECON 107; or consent of instructor. Examines major current issues in development economics, focusing on Sub-Saharan Africa.

ECON 185. Economic Development in Latin America (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A or ECON 103A. A comparative analysis of the major trends in Latin American economies in the twentieth century. Topics include historical legacies, primary export economies, the theory and practice of import substitution industrialization, the debt crisis, stabilization and structural adjustment, poverty and income distribution, the informal sector, the agricultural sector, and the environment. Cross-listed with LNST 185.

ECON 187. Contemporary Public Policy Challenges in Latin America (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 or ECON 002H or ECON 003 or ECON 004 or consent of instructor. A survey of the wide-sweeping policy reforms since the 1980s and of contemporary public policy challenges in Latin America. Challenges discussed include extremely high levels of poverty and inequality, inadequate educational and healthcare systems, pressures for land reform, problems of trade competitiveness, and recurring currency crises. Cross-listed with LNST 187.

ECON 190. Special Studies (1-5) Course is repeatable to a maximum of 12 units.

ECON 193A. Senior Seminar (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): senior standing; ECON 102A, ECON 102B, ECON 103A, ECON 103B. Advanced research in various fields of faculty interest. Students complete a research paper and present their results in the seminar. Topics vary from year to year. Graded In Progress (IP) until ECON 193A and ECON 193B are completed, at which time a final grade is assigned.

ECON 193B. Senior Seminar (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): senior standing; ECON 193A. Advanced research in various fields of faculty interest. Students complete a research paper and present their results in the seminar. Topics vary from year to year.

ECON 198-I. Individual Internships in Economics (1-12) Prerequisite(s): junior standing with major in Economics and consent of instructor (to be obtained in person). A study of the pure theory of trade, trade policy, and international factor movements including illustrative applications to current issues and problems. Cross-listed with LNST 185.

ECON 200A. Microeconomic Theory (5) Lecture, 4.5 hours; discussion, 1 hour. Prerequisite(s): ECON 102A or ECON 103A; ECON 107; or consent of instructor. Examines the basic issues in microeconomic theory, the formal models, (4) programming methods, (5) problems of economic phenomena, (3) computable general equilibrium models, (4) programming methods, (5) problems of economic phenomena, (3) computable general equilibrium models, (4) programming methods, (5) problems of economic phenomena.
ECON 209. Models of Renewable Resource Management (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 200A; ECON 205A or equivalent. The study of economic valuation of natural resources and the environment. Includes topics such as environmental demand theory, travel cost models, random utility models, discrete choice models, the contingent valuation technique, and hedonic wage and pricing models. Covers theory, empirical methods, and applications.

ECON 210. Environmental Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 207 or consent of instructor. An in-depth study in selected areas of environmental and natural resource economics. E. Transportation and Environmental Quality. ECON 210E is repeatable to a maximum of 8 units.

ECON 212. History of Economic Theory and Methodology (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 207 or consent of instructor. The origins and contemporary development of alternative economic theories. Methodological and philosophical debates in economics.

ECON 213. Methods and Themes in Economic History (4) Lecture, 3 hours; term paper, 1.5 hours; extra reading, 1.5 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys central themes in world economic history to introduce the subject and methodology of economic history. Topics illustrate a wide variety of historical experiences and illuminate the process of economic growth. Economics graduate students receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

ECON 223. American Economic History (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to economic history as an approach to economics. Surveys major issues pertaining to the historical and institutional bases for the distinctive performance of the American economy. Economics graduate students receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade. Carter, Sutch

ECON 224. Economic History of the World Economy in the Twentieth Century (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to world economic history as an approach to economics. Surveys major issues pertaining to the historical and institutional bases for the performance of the world economy during the twentieth century. Economics graduate students receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade. Sutch

ECON 225. International Trade Theory (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 200A, ECON 200B, ECON 200C, or consent of instructor. An examination of the determinants of trade in goods and services, international flow of labor and capital, and the effects of trade policy on welfare and income distribution.

ECON 235. Topics in International Trade Theory (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): Requirements: ECON 234 or consent of instructor. An in-depth study in selected areas of international trade theory. Topics include, but are not limited to, trading blocks, trade agreements and strategic interactions, trade and the environment, and the political economy of international trade. Course is repeatable to a maximum of 8 units.

ECON 240. Labor Supply, Labor Demand, and the Structure of Wages (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. This course introduces students to the theoretical structure of labor supply and demand and on the structure of wages. The contributions of neoclassical, institutional, and radical economists will be discussed.

ECON 241. Labor Institutions and Macro Labor Outcomes (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A historical perspective on industrial structure, personnel management systems, labor unions, and government, and their relation to macro labor outcomes such as income distribution, productivity growth, and unemployment.

ECON 243. Topics in Labor (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. In-depth study in selected areas of labor economics. Topics include, but are not limited to, economic demography and race and gender issues. Course is repeatable as topics change.

ECON 244. Empirical Research Methods (4) Lecture, 3 hours; tutorial, 1 hour; written work, 2 hours. Prerequisite(s): ECON 205B or equivalent. Introduction to empirical techniques used in modern applied economics, with a focus on identification strategies. Topics include: basic regression analysis, panel data techniques, and time series analysis. Emphasis is on practical application of techniques and issues of empirical researchers.

ECON 246. Introduction to Public Economics (4) Lecture, 3 hours; written work, 2 hours; extra reading, 1 hour. Prerequisite(s): ECON 200C. An introduction to public economic theory and its applications: Topics include the theory of economic justice, welfare economics, the theory of market failure, the positive theory of taxation, and cost-benefit analysis.

ECON 247. Recent Advances in Public Economics (4) Lecture, 3 hours; extra reading, 1 hour; term paper, 1 hour. Written work, 1 hour. Prerequisite(s): ECON 200C. Focuses on the use of controlled and natural experiments, analysis of panel data, and the cross-country study of the role of social, cultural, and economic institutions in economic growth. Also covers theories of tax systems, public sector management, government contracting, procurement, and regulation; and fiscal federalism theory and the political economy.

ECON 250. Money, Credit, and the Macroeconomy (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An in-depth study of the role of money, credit, and financial institutions in influencing growth, distribution, employment, prices, and business cycles in capitalist economies. Fiscal policy, monetary policy, and public investments are addressed from alternative theoretical perspectives.

ECON 251. Business Cycle Theory (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An in-depth study of the role of money, credit, and financial institutions in influencing growth, distribution, employment, prices, and business cycles in capitalist economies. Fiscal policy, monetary policy, and public investments are addressed from alternative theoretical perspectives.

ECON 254. Topics in Money, Credit, and Business Cycles (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A survey of the performance of the macroeconomy, monetary and fiscal theory, and monetary and fiscal policy.

ECON 260. Theories of Economic Development (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A survey of the major theories of development and the major strategies of development implemented in the recent past or currently under implementation.

ECON 262. Project Evaluation in Developing Countries (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A review of practical methods and economic evaluation techniques used by aid agencies in developing countries.

ECON 264. Topics in Economic Development (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A review of practical methods and economic evaluation techniques used by aid agencies in developing countries.

ECON 265. Agricultural and Rural Development (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A review of practical methods and economic evaluation techniques used by aid agencies in developing countries.

ECON 266. The Political Economy of Imperialism (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An in-depth study of the political economy of imperialism.

ECON 268. Economics of Biotechnology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing in Economics or in one of the biological sciences or consent of instructor. Covers the economic causes and consequences of revolutions in biotechnology. Topics may include the agricultural revolution, the Columbian exchange, and biotechnological advances in mechanization, breeding, and animal animal breeding. Focuses on the implications of adopting genetically modified crops such as Bacillus thuringiensis corn and herbicide-resistant crops. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes.

ECON 271. Radical Political Economy (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A survey of the methodology of radical political economy and an examination of its logical, empirical, and normative bases.

ECON 272A. Political Economy: Marxist Economics (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A study of Marxist economic theory,
including historical materialism, the role of value, class, exploitation, and accumulation in Marxian economics, and a survey of current debates on these issues.

ECON 272B. Political Economy: Efficiency, Justice, and Power (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers the various notions of efficiency used in political economic analysis, as well as their application in historical and comparative institutional contexts. Theories of justice in the distribution of rewards and the extent to which efficiency is separable from justice. Different notions of how power influences economic outcomes.

ECON 272C. Political Economy: Comparative Political Economy (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores economic institutions and various methodological approaches to economics from a comparative perspective. Topics include types of capitalism (market-oriented, welfare-state, and the East Asian model), transitional economies, and market socialism. Institutional, socioeconomic, and radical political economy approaches to economic analysis are also discussed.

ECON 279. Political Economy: Advanced Topics (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Topics in the methodology and theory of political economy. Course is repeatable to a maximum of 8 units.

ECON 282 (E-Z). Advanced Macroeconomic Theory (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): passing grade on the Macroeconomic Cumulative Examination or consent of instructor. Covers advanced topics in macroeconomic theory. Students read state-of-the-art research papers and books. Includes presentations by students and faculty. E. Foundations of Macroeconomics; F. Advanced Monetary Theory; G. Special Topics in Macroeconomic Theory. ECON 282G is repeatable to a maximum of 8 units.

ECON 283 (E-Z). Advanced Microeconomic Theory (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): passing grade on the Microeconomic Cumulative Examination or consent of instructor; for ECON 283M, ECON 283N, ECON 283P, ECON 283Q, ECON 283R, ECON 200C. Covers advanced topics in microeconomic theory. Involves reading current research papers and books, and presentations by students and faculty. E. Rational Choice Theory; F. Measurement and Aggregation in Economics; G. General Equilibrium; I. Social Choice and Welfare; J. Uncertainty and Information; K. Special Topics in Microeconomic Theory; M. The Microtheoretic Bases of Development Economics; N. Applications of Games and Information Economics; O. Measurement of Productivity and Efficiency; P. Public Economic Theory; Q. Economics of Contract: Theory and Applications; R. Measurement of the Standard of Living, Inequality, and Deprivation. ECON 283K is repeatable to a maximum of 8 units.

ECON 285 (E-Z). Advanced Econometrics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): ECON 205A, ECON 205B, ECON 205C; or consent of instructor. Advanced topics and recent developments in econometrics. State-of-the-art research papers and books are read, and presentations are made by students as well as faculty. E. Advanced Econometric Methods; F. Topics in Econometrics; G. Applied Econometrics; I. Macroeconometrics; J. Nonparametric Econometrics; K. Microeconometrics. ECON 285F is repeatable to a maximum of 8 units.

ECON 289. Colloquium in Economics (2) Seminar, 1.5 hours; written work, 1.5 hours. Prerequisite(s): graduate standing. Lectures and discussion by students, faculty and invited scholars on specially selected topics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes.

ECON 290. Directed Studies (1-6) Prerequisite(s): graduate standing and consent of instructor. Directed studies of selected problems of economic analysis. Open to graduate students who desire to do special work in a particular field. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

ECON 291. Individual Study in Coordinated Areas (1-12) Outside research, 3-36 hours. A program of study designed to advise and assist candidates who are preparing for examination. Graded Satisfactory (S) or No Credit (NC). Repeatable as follows: (1) a student may take up to 12 units prior to the award of the M.A. (these 12 units do not count toward the required M.A. units); (2) a student may take up to 18 additional units after award of the M.A. but prior to successful completion of the Ph.D. qualifying examination.

ECON 292. Concurrent Analytical Studies (2-4) Lecture, 1-3 hours; outside research, 6-12 hours. Prerequisite(s): consent of instructor. Each 292 course will be taken concurrently with some 100-series course, but on an individual basis. It will be devoted to completion of a graduate paper based on research or criticism related to the 100-series course. Faculty guidance and evaluation will be provided through the quarter. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ECON 297. Directed Research (1-6) Prerequisite(s): graduate standing and consent of instructor. Directed research on selected problems in economics. Designed for graduate students who have not yet passed their qualifying examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

ECON 299. Research for Thesis or Dissertation (1-12) Research in economics under the direction of a staff member to be included as part of the doctoral dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

ECON 302. Teaching Practicum (1-4) Practicum, 3-11 hours; seminar, 1 hour. Prerequisite(s): limited to department TAs; graduate standing. Supervised teaching in upper- and lower-division courses. Required of all economics teaching assistants. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

Education
Subject abbreviation: EDUC
Graduate School of Education

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Douglas E. Mitchell, Ph.D.
Richard S. Newman, Ph.D.
Rolland E. O'Connor, Ph.D.
Reba N. Page, Ph.D.
H. Lee Swanson, Ph.D.
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Professors Emeriti
Irving H. Balow, Ph.D.
Robert C. Caffee, Ph.D.
Jerry S. Carlson, Ph.D.
Dan M. Donlan, Ph.D.
E. Mark Hanson, Ph.D.
Irving G. Hendrick, Ed.D.
Donald L. MacMillan, Ed.D.
Flora I. Ortiz, Ph.D.

Associate Professors
Begoña Echeverría, Ph.D.
Margaret A. Nash, Ph.D.
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Melanie Sperling, Ph.D.
Michael L. Vanderwood, Ph.D.
John S. Wills, Ph.D.

Assistant Professors
Natalie C. Becker, Ph.D.
Sara Castro-Olivo, Ph.D., NCSP
Michael J. Ornosco, Ph.D.
Gregory Pardy, Ph.D.
Robert K. Ream, Ph.D.

Special Programs
Cathernine M. Lussier, Ph.D.
Robert A. Case, Ph.D.
Pamela S. Clute, Ph.D.
Jane L. Zykowski, Ph.D.

Graduate Advisor
Luciana N. Dar
Lindsey E. Malcolm

Cooperating Faculty
Steven G. Brint, Ph.D. (Sociology)

Director of Teacher Education Services
Anne F. Jones, Ed.D.

Supervisors of Teacher Education
Kathy Evans, M.A.
Deborah Magnus, M.A.
Elaine Mays, M.S.

Lecturers
Pamela S. Clute, Ph.D.
Catherine M. Lussier, Ph.D.
Inge E. Pelzer, Ph.D.
Roger F. Yoho, Ph.D.

222 / Programs and Courses
Graduate Program

General university requirements, such as residence and unit requirements, are in the Graduate Studies section of this catalog. **Policies and Procedures for Graduate Degree Programs** may be obtained from the Graduate Degree Program Office. To obtain a list of dates for Graduate Degree Info sessions, check education.ucr.edu. The sessions are free; reservations are recommended but not required.

**Admission**
Admission is based upon GPA and letters of recommendation from writers knowledgeable about the candidate's ability to succeed in graduate study. In addition, M.A. and Ph.D. applicants must submit scores from the GRE General Test (verbal, quantitative, analytical), no more than five years old from the date of their matriculation. Students intending to specialize in School Psychology are also required to submit GRE scores for the subject test in Psychology. Ph.D. applicants must submit a writing sample. The GRE is not required of applicants seeking admission to credential programs or to the M.Ed. program. The Ph.D. program admits students in the Fall quarter only.

**Master's Degrees**
Two types of M.A. degrees are available.

**Type A—Education** (with a cooperating department)
At present, 13 departments and programs cooperate with the Graduate School of Education in this program. They include Anthropology, Biology, English, French, Geological Sciences, Germanic Studies, History, Mathematics, Music, Political Science, Psychology, Sociology, and Spanish.

**Plan II (Comprehensive Examination)** Students must complete a minimum of 36 upper-division and graduate units, including a minimum of 18 units in Education and 18 in the cognate discipline. Baccalaureate level training in the cognate field is presumed. The candidate must pass comprehensive examinations in Education and the cognate field.

**Type B—Education**
Candidates enrolled in this program normally have completed an undergraduate major or its equivalent in a subject field other than education. General areas of specialization include Educational Leadership and Policy, Higher Education Administration and Policy, Special Education, Curriculum and Instruction, School Psychology (for students working toward the Ph.D.) and Educational Psychology. Only students matriculating in a Graduate School of Education Ph.D. program may earn a concurrent, Type B, Education Masters degree in School Psychology (Plan I Thesis option only). Course requirements for the programs may be obtained from the Graduate Degree Program Office, 1124 Sproul Hall. Before the end of the first quarter, the student's advisor develops a program plan that specifies the courses the student will take.

The M.A. program gives students (with the exception of School Psychology students) the option of completing a thesis or taking a comprehensive written examination.

**Plan I (Thesis)** Students complete a minimum of 36 upper-division and graduate units. At least 24 of these units are in graduate courses. A maximum of 12 units may be in graduate research for the thesis.

At the beginning of the second, and generally not later than the third quarter of full-time work, candidates submit a plan for the thesis to their committee. Students must pass an oral defense of the thesis. Candidates also list courses to be taken for developing competence in their area of specialization. The plan is reviewed and approved by a committee of three faculty members. Upon completion of the thesis, the candidate submits it to this committee for approval. Upon successful completion of the thesis, the student is recommended to the Graduate Division for the M.A. degree.

**Plan II (Comprehensive Examination)** Students must complete a minimum of 36 quarter units in upper-division and graduate courses in Education and related fields as defined in existing programs. At least 18 of the 36 units must be in graduate courses, and none in graduate research for the thesis.

A faculty member from the program area specialization is appointed by the graduate advisor to guide the candidate. A program plan must be filed with the graduate advisor by the end of the first quarter of residency.

Upon or near completion of course work, the student applies to take a comprehensive written examination. Upon successful completion of the examination, the candidate is recommended to the Graduate Division for the M.A. degree.

**Normative Time to Degree**
6 quarters from admission to the M.A. program

**Master of Education**
A Master of Education (M.Ed.) degree program is offered that allows students to select from six emphases. The GRE is not required for admission to the M.Ed. program. No thesis or comprehensive examination is required. Instead, students complete an analytical project that builds on course work and links educational theory and research with the dynamics of teaching, learning, and leadership.

**General Education Teaching Emphasis**
M.Ed. and California Teaching Credential in Multiple Subjects or Single Subject

This emphasis allows qualified students to complete requirements for a California teaching credential and a master's degree in one academic year and two summer sessions.

The General Education Teaching Emphasis is ideally suited to UCR graduates who have taken prerequisite courses for a multiple subject or single subject teaching credential as an undergraduate. Students from other institutions should contact the Teacher Education Admission Office for options on taking the prerequisite courses. All prerequisites must be completed before a student can be admitted to this M.Ed. emphasis.

To be considered for the General Education Teaching Emphasis prospective students must submit an application to the Graduate Division. Apply at www.graddiv.ucr.edu/admitoc.html.

Students not admitted to this M.Ed. emphasis can still be accepted into the Multiple Subjects or Single Subject credential program to earn a teaching credential. However, students cannot be in this emphasis without concurrent enrollment in the credential program. Those who already possess California teaching credentials are not eligible for this graduate degree, but may apply for admission to the M.A. program in Education.

Students can complete this M.Ed. emphasis at the same time or after teaching credential requirements have been met.

**Admission**
The following are requirements:

1. A baccalaureate degree from an accredited institution
2. The prerequisite courses EDUC 109, EDUC 110, EDUC 116, EDUC 139, and either EDUC 172 or EDUC 174 (All prerequisite courses are available in the summer and during the academic year)
3. A minimum GPA of 3.2 based on the last 90 quarter units in the baccalaureate program
4. Verification of subject-matter proficiency through completion of an approved program or passing the appropriate test
5. Passage of the California Basic Educational Skills Test (CBEST) or equivalent
6. Possession of a Certificate of Clearance from the California Commission on Teacher Credentialing
7. Submission of letters of recommendation and official transcripts

**Course Work**
This M.Ed. emphasis requires 36 units in the 200-series core courses. Four of the required courses must be taken during summer sessions. The teaching credential requires an additional 30 units that are not part of the M.Ed. curriculum.

**Analytical Project**
The analytical project centers on comprehensive, critical self-analyses of instructional practice in K-12 classrooms. A final version of the analytical project is submitted to the Graduate School of Education in electronic form for faculty committee review and may become part of a larger electronic portfolio developed by all credential students.

**Teaching Requirement**
Students complete supervised teaching assignments in elementary or secondary classrooms.
Special Education Teaching Emphasis
M.Ed. and California Specialist Special Education Credential

This emphasis is earned with a California Specialist Level I Preliminary Credential program in either Mild/Moderate or Moderate/Severe Disabilities. Three credential courses taken during the credential year can be credited toward both the Level I credential and the Special Education Teaching Emphasis M.Ed. Two courses will be credited toward both the Level II credential and the M.Ed. Students entering the credential and M.Ed. program with prerequisites completed can finish the Level I credential in one year and the M.Ed. plus two courses toward the Level II credential in Winter of the second year. Students enrolled in the Dual Credential program earning general and special education credentials may also be admitted to this program.

To be considered for the Special Education Teaching Emphasis prospective students must submit an application to the Graduate Division, available at www.graduated.ucr.edu. Students cannot be admitted to this M.Ed. emphasis without being first admitted to the Education Specialist credential program. Students can petition to add this M.Ed. emphasis after admission to the Special Education Specialist credential program and before the end of the first quarter. Those who already possess Education Specialist teaching credentials are not eligible for this M.Ed. emphasis but may apply to the M.A. program with an emphasis in special education.

Students will complete this M.Ed. emphasis at the same time or after the Education Specialist credential requirements have been met.

Admission The following are requirements:
1. Admission to the Education Specialist Credential program in Mild/Moderate or Moderate/Severe Disabilities
2. Submission of letters of recommendation and transcripts

Admission is based upon GPA and letters of recommendation from writers knowledgeable about the candidate’s ability to succeed in graduate study.

Course Work This M.Ed. emphasis requires 36 units, at least 24 of which must be graduate courses. 12 units may be in selected upper-division courses required for the Education Specialist Credential taken during the credential year. Two of the required courses must be taken during summer sessions. The Education Specialist Level I credential requires additional courses that are not part of this M.Ed. curriculum.

Analytical Report Students will complete a final written project that integrates the content of theory and teaching methods courses. A final version of the report will be submitted to the Graduate School of Education and evaluated by faculty in the Special Education area.

Reading Emphasis
M.Ed. and Reading and Language Arts Specialist Credential

This emphasis is a collaboration between the Graduate School of Education and University Extension. It allows qualified students who are completing the requirements for a California Reading and Language Arts Specialist Credential, offered by University Extension, to concurrently earn an M.Ed. with a reading emphasis. Three courses required for the reading credential will be credited toward both the credential and the M.Ed. Two courses are offered during Summer Session.

To be considered for this M.Ed. emphasis, prospective students must have K-12 teaching experience and first be admitted to the Reading and Language Arts Specialist program offered through University Extension. Students must apply to the M.Ed. program before completing the Specialist credential.

Admission The following are requirements:
1. A teaching credential
2. 3 years teaching experience
3. Admission to Reading and Language Arts Specialist program
4. Submission of letters of recommendation and transcripts

Admission is based upon GPA and letters of recommendation from writers knowledgeable about the candidate’s ability to succeed in graduate study.

Course Work This M.Ed. emphasis requires 37 units, 9 of which are in the 400-series professional courses offered by University Extension that satisfy requirements for the Reading and Language Arts Specialist credential and are offered by University Extension. The remaining 28 units are in 200-series courses. Two courses will be offered only during Summer Session. The Reading and Language Arts Specialist credential requires additional units that are not part of this M.Ed. curriculum.

Analytical Report Students are given a case study to examine and develop a reading intervention and plan for implementation and assessment. A final version of the case study report is submitted to the Graduate School of Education for faculty committee review.

Leadership Emphasis
M.Ed. course work can be applied to optional Administrative Services Credential.

This M.Ed. emphasis is closely connected to the Educational Leadership and Policy area in GSOE and focuses on the application of educational research and theory to solving problems of professional practice in education. This M.Ed. emphasis consists of nine 4-unit, 200-level courses offered in the GSOE.

Eight courses (32 units) required for this M.Ed. emphasis can also be credited toward the Preliminary Administrative Services Credential (ASC 1/Tier 1) that is required for most leadership positions in K-12 schools. The ASC 1/Tier 1 requires an additional 12 units of professional development/fieldwork courses. Concurrent enrollment in the Administrative Services Credential program is not required for M.Ed. students in this emphasis.

Applications
Decisions are based on the following:
1. CBEST and verification of at least 2 years of teaching, counseling, employment as a specialist, or teacher on special assignment in a public or private K-12 school
2. Letters of Recommendation
3. Official transcripts
4. Statement of purpose

Course Work
This M.Ed. emphasis requires 36 units of 200-level courses, including a capstone course described below. Candidates earning the optional ASC 1/Tier 1 credential with the M.Ed. will take an additional 12 units of professional development courses and submit a Professional Growth Portfolio. The additional ASC requirements do not have to be completed before the student completes the M.Ed.

Analytical Report
In the last quarter of this M.Ed. emphasis, a 4-unit capstone course draws on students’ knowledge and skills acquired in other courses. The product is a case study report evaluated by faculty in the Educational Leadership and Policy area.

Higher Education Administration and Policy Emphasis
This M.Ed. emphasis examines scholarship and research on institutions, policy, systems, and demographic, historical, political, social, and economic contexts. It emphasizes reflective practice and prepares practitioners for careers in higher education institutions so that they can be knowledgeable scholars and expert professionals.

Admission The following are requirements:
1. A baccalaureate degree from an accredited institution
2. Career interests in a higher education setting
3. Three letters of recommendation from academic sources
4. Strong academic record, with an undergraduate GPA of at least 3.0

A sample of written academic work (e.g., undergraduate essay)

Course Work
36 units are required. The majority of courses are offered in the Graduate School of Education and focus on higher education, but program plans may also include relevant courses offered in other departments.

Analytical Report
After students complete their course work they will complete a case study report that integrates content from higher education courses with practice.

A final version of the report is submitted to the Higher Education faculty committee in the
Graduate School of Education for review and approval.

**Autism Emphasis**
This M.Ed. emphasis focuses on children with Autism Spectrum Disorder. A unique partnership between the Graduate School of Education and University Extension reflects a balance of research and theory from active researchers and relevant K-12 application knowledge from practitioners in the field.

**Admission**
The following are requirements:

1. Teaching credential in general education or special education
2. Letters of Recommendation
3. Strong academic record

**Course Work**
Required courses are offered in the Graduate School of Education, Summer Session, and University Extension. Some courses are offered only in GSOE, one course is offered only at Extension, and one course is offered in Summer Session. For some course requirements, students may choose from courses with comparable content in GSOE and Extension or Summer Session. A minimum of 36 units are required.

**Analytical Report**
Students will complete a final written report that integrates the content of theory and teaching methods courses. A final version of the project will be submitted to the Graduate School of Education and evaluated by faculty in the Special Education area.

**Doctoral Degree**
The doctoral program in Education is designed to prepare scholars for teaching and research in the area of education. More information about graduate programs in Education, contact the graduate advisor, Graduate School of Education, (951) 827-6362, or visit education.ucr.edu.

**Admission**
Admission is based on strong academic preparation at the baccalaureate level and a master's degree in education such as that offered at UCR or a master's degree in an ancillary field. Doctoral students begin their programs in the fall quarter.

**Specialization**
General areas of specialization include Curriculum and Instruction, Educational Leadership and Policy, Higher Education Administration and Policy, Special Education, Educational Psychology, and School Psychology. The School Psychology Program is accredited by the American Psychological Association (APA) and approved by the National Association of School Psychologists (NASP). School Psychology Ph.D. students can also obtain a Pupil Personnel Credential.

Following admission to the program, students are assigned a preliminary faculty advisor who guides them during the initial phase of their program. Students work closely with a faculty advisor during their doctoral program. In addition, three faculty committees — a program guidance committee, an oral qualifying examination committee, and a dissertation committee — are formed at various stages of the program.

**Course Work**
In the first year of the program students in all areas except School Psychology take a year-long methodology sequence in which students examine the nature of inquiry and uses of qualitative and quantitative research methods in education. All students take specialized area seminars in the first year. Students may take additional specialization courses during the first year.

During the next phase of the program, students pursue in-depth studies in at least two fields of concentration. The student and a three-member program guidance committee identify and document on a program plan the remaining coursework in these areas. Preparation in each field consists of sufficient study to allow the students to grasp the essential concepts and inquiry methods of that field.

**Qualifying Examination**
After or near completion of course work in the second phase and before being advanced to candidacy, the student must pass written and oral qualifying examinations. The student's faculty advisor, in consultation with faculty associated with the student's area of specialization, coordinates the construction of the written examination. Students must

1. Review critical literature in an assigned field
2. Demonstrate competence in research methodologies, and
3. Demonstrate competence over content in fields of specialization.

The faculty associated with the student's area of specialization evaluate the written qualifying examination. Following the written examination and before the oral qualifying examination, the Graduate Dean appoints an oral qualifying committee consisting of the student's faculty advisor, three additional faculty members from the Graduate School of Education, and one faculty member from outside the school.

**Prospectus**
In preparation for the oral qualifying examination, students develop a prospectus, setting forth the direction of their dissertation. Once the faculty advisor determines that the prospectus is ready for the oral examination, it is distributed to the oral qualifying committee. The committee uses the prospectus as a focus for examining the student, but the questioning may go beyond the prospectus. Students pass the oral qualifying examination when the committee is satisfied that 1) the prospectus, as well as the student's grasp of the theoretical and empirical aspects of its core, leads in a productive direction toward a competent dissertation, and 2) the student has demonstrated competence in areas covered by the written examination that are also addressed in the oral examination. Students in the School Psychology program must complete and pass the oral qualifying examination before starting the required 1500-hour internship.

**Teaching Requirement**
Determined by the student's program guidance committee.

**Foreign Language Requirement**
None

**Dissertation**
Prior to commencing the dissertation research, students must have a dissertation proposal approved by the dissertation committee. Following completion of the dissertation, the chair of the candidate's committee schedules an oral defense. The dissertation must meet with the approval of the dissertation committee and the Graduate Council before the candidate is recommended for the degree.

**Normative Time to Degree**
15 quarters from admission to the Ph.D. program

**Credential Programs**
The Graduate School of Education offers teaching credential programs, a program for the preparation of administrators, and one for school psychologists. These programs are accredited by the California Teaching Commission.

**Admission**
Admission to GSOE credential programs is based upon GPA and letters of recommendation from individuals knowledgeable about the candidate's ability to succeed in professional study. Most programs also require an interview. Admission to the teaching credential programs also requires candidates to submit verification of passage of the California Basic Educational Skills Test (CBEST) and verification of subject-matter proficiency (by passing the appropriate California Examinations for Teachers (CSET) or completing a state approved subject matter program). Course prerequisites depend on the intended program. At minimum, 30 hours of observation in a public school and an introduction to professional study. Admission information and deadlines are available at www.education.ucr.edu. Contact GSOE at (951) 827-5225 or at cred-ed@ucr.edu. Information can also be obtained at the GSOE Student Services Office, 1124 Sproul Hall. For the best information attend an Information Session. The dates are listed on the website.

**Programs for the Preparation of Teachers**

**Integrated Baccalaureate and Credential Programs**
Qualified students majoring in liberal studies or science, technology, engineering, mathematics (STEM) have the opportunity to prepare for an accelerated program resulting in a preliminary elementary or single subject teaching credential. The end goal is to be able to begin “professional” student teaching in the final quarter of the senior year. Students attend an additional two post baccalaureate quarters (many in a paid intern teaching position) to complete the requirements for the preliminary credential. Liberal studies’ students should contact Susan Braddock in the Office of Interdisciplinary Programs, 3111 INTS, (951) 827-2743 to
obtain materials to assist in the development of a professional undergraduate plan. STEM students should contact the California Teach-Science Mathematics Initiative (CaTEACH-SMI) Resource Center, 1104 Pierce Hall, (951) 827-4970 to sign up for an advising workshop. This program requires admission to Teacher Education Services. Prospective candidates submit their applications and supporting documentation during fall quarter of the senior year. Admission information and deadlines are available at www.education.ucr.edu.

Post baccalaureate Teaching Credential Programs

The Graduate School of Education offers credential programs that result in teacher certification and do not require admission to a master degree program. The following programs are offered:

- **Multiple Subjects** Generally for the elementary setting. An emphasis in Bilingual, Crosscultural, Language Academic Development (BCLAD) Spanish is available to qualified candidates who want to be authorized to deliver instruction in Spanish to English learners.

- **Single Subject** Generally for the middle school or high school setting. GSOE offers the following single subject areas: English, Languages Other than English, Mathematics, Sciences, and Social Science.

- **Education Specialist** For those who want to be special education teachers. GSOE offers the following specializations: Mild/Moderate or Moderate/Severe Disabilities.

- **Dual Multiple Subjects/Education Specialist** Allows students to earn two teaching credentials: Mild/Moderate or Moderate/Severe Disabilities.

All credential programs offer the option of student or intern teaching. The intern option requires candidates to have some teaching experience (ex: substitute teaching or instructional aides) and completion of pre-service requirements prior to admission. Students interested in teaching are encouraged to attend information sessions to learn more about programs and credential admission requirements (dates and times are available on the Teacher Education website www.education.ucr.edu).

Combined teacher credential programs with a Master of Education degree (M.Ed.) are described in the Master of Education section.

California Teach-Science Mathematics Initiative (CaTEACH-SMI)

California Teach-Science Mathematics Initiative (CaTEACH-SMI) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SMI at UCR offers undergraduate students paid/unpaid opportunities to explore STEM teaching as a career option. Through CaTEACH-SMI, students receive advising and mentoring to prepare for entrance into an intern teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SMI Resource Center provides future STEM teachers with material and financial resources to promote planning and professional development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit http://smi.ucr.edu or at the Resource Center at 1104 Pierce Hall.

Program for the Preparation of Administrators

Advanced programs for the Preliminary and Professional Administrative Services Credentials are also offered.

Students who have received, or are working toward, advanced degrees in educational administration are eligible to pursue a program of study leading to the Administrative Services Credentials. UCR is approved by the California Commission on Teacher Credentialing to recommend candidates for both the Preliminary and Professional level Administrative Services Credentials. Internships maybe available for students earning a preliminary ASC.

**Lower-Division Courses**

**EDUC 001. Imagining Teaching** (2) Lecture, 2 hours. Prerequisite(s): none. Considers images of teaching produced in popular culture, professional writing, and personal recollections, and how the images impact and reflect teaching in schools. Designed for lower-division students considering teaching as a career. Credit is awarded for only one of EDUC 001 or EDUC 003.

**EDUC 002. Looking in Classrooms** (3) Lecture, 2 hours; field, 3 hours. Prerequisite(s): EDUC 001 or EDUC 003. Involves observation in classrooms in local schools identified as having exemplary programs. Students record and interpret their observations and compare them to published studies of classrooms. Credit is awarded for only one of EDUC 002 or EDUC 004.

**EDUC 003. Imagining Teaching: Science/Mathematics Emphasis** (3) Lecture, 2 hours; field, 3 hours. Prerequisite(s): admission to the California Teach program; consent of instructor. Considers images of teaching produced in popular culture, professional writing, and personal recollections, and how the images impact and reflect teaching in schools. Addresses topics related to teaching mathematics and science in the K-12 classroom. Includes 3 hours per week of participation and observation in public school classrooms. Designed for lower-division students who plan to teach mathematics or science in the public schools. Credit is awarded for only one of EDUC 001 or EDUC 003.

**Upper-Division Courses**

**EDUC 004. Looking in Classrooms: Science/Mathematics Emphasis** (3) Lecture, 2 hours; field, 3 hours. Prerequisite(s): EDUC 003; admission to the California Teach program; consent of instructor. Involves observation in classrooms in local schools identified as having exemplary programs in mathematics and science. Students record and interpret their observations and compare them to published studies of classrooms. Designed for lower-division students who plan to teach mathematics or science in the public schools. Credit is awarded for only one of EDUC 002 or EDUC 004.

**EDUC 004. Principles of Healthful Living** (4) Lecture, 3 hours; outside research, 3 hours. Introduction to personal, family, and community health. Discusses the attitudes and behaviors associated with healthful living and the use of health-related scientific information. Explores the effects of alcohol, dangerous drugs, narcotics, degenerative and infectious diseases, and tobacco on the human body and the community resources available to assist in their treatment.

**EDUC 100A. Tutorial Teaching: Community Outreach** (2) Lecture, 5 hours per quarter; field, 3 hours; outside research, 15 hours per quarter. Prerequisite(s): upper-division standing. Motivation and teaching of children and adolescents in a tutorial setting in a school or other appropriate community educational center. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.

**EDUC 100B. Tutorial Teaching: Professional Development** (2) Lecture, 5 hours per quarter; field, 3 hours; outside research, 15 hours per quarter. Prerequisite(s): upper-division standing; consent of instructor. Guided and sequenced tutorial experiences with children and adolescents enrolled in local schools having cooperative arrangements with the University. Provides experience in one-on-one teaching and supports the professional development of students planning to teach. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.

**EDUC 101. Academic Disciplines and Professional Education** (1) Lecture, 1 hour. Prerequisite(s): EDUC 100A or EDUC 100B or EDUC 172 or EDUC 174; upper-division standing. Introductory study of how academic disciplines relate to pedagogy, including developing a personal educational philosophy, discovering ways to communicate knowledge, and reflecting on how a scholar becomes a teacher. Designed for undergraduates contemplating education as a professional career. Graded Satisfactory (S) or No Credit (NC).

**EDUC 104. Mathematics Education** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): sophomore, junior, or senior standing. Examines contemporary instructional strategies relating to mathematics education. Includes thinking skills and problem solving strategies applicable to number theory, logic patterns and functions, statistics, probability, and geometry and algebra. Cross-listed with MATH 104.

**EDUC 106. Practicum in Child Development** (4) Lecture, 3 hours; practicum, 3 hours. Prerequisite(s): upper-division standing. Introduction to sociocultural perspectives of child development. Topics include sociocultural theories of development, motivational aspects of learning, technology in education, and school-home linkages. Application of child development theories and research related to them takes place during fieldwork assignments in after-school, computer-based programs for elementary and middle school students. Cross-listed with PSYC 106.
EDUC 109. Education in a Diverse Society (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): completion of or current enrollment in one of the following courses: EDUC 002, EDUC 003, EDUC 100B. Analysis of the classroom as a microcosm of society. Focuses on issues related to meeting the educational needs of students with diverse backgrounds and characteristics including gender, religion, ability, ethnicity, culture, socioeconomic status, class, and language.

EDUC 110. Learning and Instruction (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers the study of stages of intellectual development, principles of learning, the dynamics of human behavior, and cultural differences as they relate to modern curricula and instruction.

EDUC 114. Comparative International Education (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Identification, analysis, and comparison of the educational characteristics of selected developed and developing nations such as Japan, England, Mexico, and Egypt.

EDUC 116. The Exceptional Child (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Characteristics, etiology, and identification of individuals with physical and mental disabilities, emotional disturbance, visual impairments, deaf, or gifted. Emphasizes educational programs and considers the effects of gender, socioeconomic, ethnic, and linguistic factors.

EDUC 120. Guidance in Special Education (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): EDUC 116 or consent of instructor. Application of principles and techniques of counseling children with disabilities and their families or guardians. Emphasizes the role of the teacher in educational, personal, and vocational (transition) guidance for exceptional children. Includes materials for working with families from diverse cultural and linguistics backgrounds.

EDUC 129. Educational Assessment of Individuals with Disabilities (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 116 or consent of instructor. Principles and techniques of assessment and educational planning for children with disabilities. Includes examination of a broad range of assessment tools for general and special education.

EDUC 130. Mild and Moderate Disabilities (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): EDUC 116 or consent of instructor. Explores characteristics, etiology, and identification of individuals with mild and moderate disabilities, history and laws influencing their treatment and education, and current education and transition issues. Includes mild and moderate retardation, learning disabilities, and emotional and behavioral disorders.

EDUC 131. Moderate and Severe Disabilities (4) Lecture, 3 hours; laboratory, 2 hours; outside research, 1 hour. Prerequisite(s): EDUC 116 or consent of instructor. Explores characteristics, etiology, and identification of individuals with moderate and severe disabilities, history and laws influencing their treatment and education, and current education and transition issues. Includes mental retardation, serious emotional disturbance, and autism.

EDUC 139. Curriculum and Instruction (4) Lecture, 3 hours; laboratory, 2 hours; outside research, 1 hour. Prerequisite(s): upper-division standing. The study of modern curricula in the elementary and secondary schools, including the effects of performance objectives, diagnostic-prescriptive teaching, individualized instruction, lesson planning, and performance assessment. Content analysis of curriculum areas will be emphasized.

EDUC 146. Educational Perspectives on the Chicano (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): consent of instructor. An examination of educational policy issues concerning Chicano students, such as testing and testing procedures, learning styles, socialization, and language acquisition. Other topics will deal with the impact of significant legislative acts related to the education of Chicanos. Cross-listed with ETST 146.

EDUC 150. Teacher Education Lecture Series (1) Lecture, 10 hours per quarter. Prerequisite(s): upper-division standing. Presentations, demonstrations and discussions on timely topics in public school teaching. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units.

EDUC 172. Reading and Language Development (5) Lecture, 3 hours; outside research, 3 hours; field, 3 hours. Prerequisite(s): EDUC 100B or equivalent; upper-division standing or consent of instructor. An introduction to reading and language development: theoretical models of reading; linguistics and language development; methods and materials; children's and adolescents' literature, reading in the content areas, individual differences, and measurement and evaluation in reading. Includes observation and participation in assigned schools.

EDUC 173. Teaching Literature to Children and Adolescents (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing. Explores developmental methods appropriate for teaching literature to children and adolescents. Topics include story telling, story reading, pictorialization, dramatics and body movement, and narrative, poetic, and dramatic writing. Examines literature written for children and adolescents and adult fiction appropriate for children and adolescents.

EDUC 174. Reading and Writing in the Content Areas (5) Lecture, 3 hours; field, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 002 or EDUC 003 or EDUC 100B or equivalent; upper-division standing or consent of instructor. An examination of reading, writing, and study skills needed by elementary and secondary students in all content areas of the curriculum. Includes observation and participation in assigned schools.

EDUC 177A. Language Development in Content Areas (4) Lecture, 3 hours; outside research, 2 hours; field, 1 hour. Prerequisite(s): LING 020 or LING 021 equivalent. Study of second language acquisition and models of teaching strategies for English language development in content area instruction. Includes observation and participation in assigned schools. Graded Satisfactory (S) or No Credit (NC) grading is not available.

EDUC 177B. Language Development in Content Areas (3) Lecture, 2 hours; field, 2 hours; outside research, 1 hour. Prerequisite(s): EDUC 177A. Analysis, planning, execution, and evaluation of empirical and theoretical foundations of programs and strategies for English as a second-language instruction and English language development in content area instruction. Includes observation and participation in assigned schools. Graded Satisfactory (S) or No Credit (NC) grading is not available.

EDUC 190. Special Studies (1-5) Outside research, 3-15 hours. Prerequisite(s): upper-division standing; consent of the Dean of the Graduate School of Education. Independent study and research in education. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Graduate Courses

EDUC 200. Human Differences (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): EDUC 212 or equivalent. Covers dimensions of individual differences, varieties of group differences, and factors producing differences in development.

EDUC 201A. Research in Reading and Writing (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A critical evaluation of linguistic, cognitive, social, and cultural aspects of reading and writing, as gleaned from research, and reading and writing research methods.

EDUC 208. Theories and Issues in Literacy (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 201A or consent of instructor. Examination of literacy development in individuals and in society; definitions of literacy; development of structural knowledge; development of communication skills; role of language differences in the problems of learning to read and write; oral language arts; emergent literacy, and writing development.

EDUC 210. History of American Education (4) Lecture, 3 hours. Prerequisite(s): consent of instructor. An analysis of the principal contemporary theories affecting the development of educational policy.

EDUC 227. Education / 227

EDUC 250. Politics of Education: Local School District (4) Lecture, 3 hours. Examination of political power, representation, influence, decision-making and inter-governmental relations in the public schools.

EDUC 260. Advanced Seminar on Federal and State Policy (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 207 or EDUC 209A or EDUC 209B or consent of instructor. Examines state and federal roles in education policy in K-12 education. Focuses on the role of federal and state policy in defining governance and teaching in schools.

EDUC 270. Educational Policy (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines twentieth-century American educational policy covering major issues underlying school reform and the social, political, and economic forces that shape these issues. Also examines state and local strategies to enhance school performance.

EDUC 280. Legislative Action and Educational Policy (4) Lecture, 4 hours. Examination of the legal processes governing educational policy, including significant laws, legal principles, recent litigation, control-
ling relationships of schools to student and teacher rights and duties, administrative behavior, etc. Focuses on connections between legislative and judicial action and the social, political and economic forces affecting education.

EDUC 209A. Education Policy Analysis (4) Lecture, 3 hours; Prerequisite(s): consent of instructor. Theoretical and methodological foundations for education policy analysis. Focuses on theory building—utilizing frameworks from political science, sociology, social psychology, and history.

EDUC 209B. Education Policy Analysis (4) Lecture, 3 hours. Prerequisite(s): consent of instructor. Theoretical and methodological foundations for education policy analysis. Examines conceptualization of variables and the formulation and testing of hypotheses regarding policy formation and effects.

EDUC 210. Issues in Teacher Education (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): enrollment in an M.A. or Ph.D. program. Analyzes research, policies, and practice in teacher education. Examines key issues such as the role of teacher education, major reform efforts, and alternative teacher certification.

EDUC 211A. Cognitive Development (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Survey course on children's cognitive development and the application of cognitive-developmental theory (Vygotsky, Piaget, information processing) and research to children's learning and academic achievement.

EDUC 211B. Social Development (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys social development during childhood and adolescence. Topics include individuality and self, peer relations, adult-child relations, self-system beliefs and attitudes, and achievement motivation. Special attention is paid to issues as they relate to socialization at school.

EDUC 212. Research Methods (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Covers principles of scientific research, including historical, survey, descriptive, correlational, and experimental and quasi-experimental methods, as well as internal and external threats to validity.

EDUC 214. Educational Research: Statistical Inference and Hypothesis Testing (5) Lecture, 3 hours; laboratory, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 241C or consent of instructor. Covers sampling distributions and their use in tests of significance; ANOVA; planned multiple comparisons; fixed, random, and mixed-effects models; and simple and multiple regression. Examples are from education.

EDUC 215. Educational Research: Experimental Design (5) Lecture, 3 hours; laboratory, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 214. Focus is on common designs used in education, including higher order factors, hierarchical designs, and repeated measures. Emphasis is on design application and appropriate statistical analysis for educational research. Covers ANCOVA.

EDUC 216. Educational Research: Advanced Statistics (5) Lecture, 3 hours; laboratory, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 214, EDUC 215. Study of advanced statistical procedures frequently used in educational research. Topics vary. Covers MANOVA, simple and multiple regression, discriminant function analysis, and factor analysis.

EDUC 217. Single-Case Experimental Design (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology or Special Education; or consent of instructor. Covers the logic, applications, and analytic techniques for single-case experimental designs in naturalistic settings. Specific designs include withdrawal, multiple baseline, alternating treatments, changing criterion, and multielement experimental designs. Emphasizes problems of using and changing single-case experimental designs in applied settings.

EDUC 218. Problems in Evaluation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. A study of policies and procedures that define program evaluations in education. Topics include evaluation models, formative and summative strategies, evaluation designs and analyses, and ethical issues.

EDUC 219. Classroom and School Assessment (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Survey course in classroom and school assessment. Covers basic principles of measurement including test administration, construction, scaling, norming, reliability, validity, and interpretation of individual and group tests.

EDUC 221. Technology in K-12 Education (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces computers and related technologies in education. Participants examine educational software and the Internet; explore pedagogical issues raised by technology use for students, teachers, and administrators; and consider how technology may facilitate changes in teaching and learning. Includes hands-on work and individual and group projects.

EDUC 222. Role Formation in Educational Organizations (4) Lecture, 3 hours. Prerequisite(s): consent of instructor. An analysis of adult roles and their formation in schools, e.g., teacher, counselor, principal and central office administrators. Emphasis will center on the individual's early socialization to the school's professional work and related professional ideologies.

EDUC 223A. Qualitative Research Methodologies in Education (5) Seminar, 3 hours; outside research, 6 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on the theoretical underpinnings of qualitative research methodologies and their use in designing, conducting, and representing research.

EDUC 223B. Qualitative Research Methodologies in Education (5) Seminar, 3 hours; outside research, 6 hours. Prerequisite(s): graduate standing or consent of instructor. Covers the collection, analysis, and representation of data in interpretive research.

EDUC 224. Organization and Administration of the School (4) Lecture, 3 hours. The study of school systems and administrative roles in the light of organizational and administrative theory.

EDUC 225. School Finance (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): consent of instructor. Explores methods of financing public education. Identifies budgeting and accounting techniques used by school districts in support of the instructional process and considers legal requirements and public reactions to the financing of education.

EDUC 226. Dimensions of Exceptionality (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): EDUC 116 or equivalent. An examination of exceptionality with particular emphasis on characteristics (general and specific developmental disabilities such as mental retardation and hyperactivity) and manifestations (in home, school, or alternative living environments). Focuses on identifying and intervening with children who have disabilities.

EDUC 227. Educational Change and Innovation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. The study of change and innovation in the public school. Emphasis is placed on (a) the organizational environment of the school which must accommodate the innovation, (b) specific strategies of change, and (c) contemporary educational innovations.

EDUC 228. Human Resources Administration in Education (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): consent of instructor. Examines theory, research, and practices associated with the human resources function in schools. Topics include goals, policies, and outcomes related to planning, recruitment, selection, appraisal, compensation, development, collective bargaining, and the use of management information systems as tools for informed decision making.

EDUC 229. Leadership in School Organizations (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Surveys leadership in schools, e.g., teacher, counselor, principal and central office administrators. Emphasis will center on the individual's early socialization to the school's professional work and related professional ideologies.

EDUC 230. Curriculum Theory and Praxis in Education (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Covers analysis of curriculum theories, trends, innovations, and instructional strategies.

EDUC 230B. Curriculum Theory and Praxis in Education (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 230A recommended. Covers analysis of curriculum organization, design, and implementation.

EDUC 231 (E-Z). Special Problems in Curriculum and Instruction (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 139 or equivalent. Special problems in the curriculum area as follows: E. Curriculum Inquiry; G. Excellence in Teaching; M. Multicultural Programs in Reading and Language Arts; Q. Questioning and Teaching.

EDUC 232. Teaching Strategies (4) Lecture, 3 hours. Prerequisite(s): teaching credential, teaching experience. Development of varied instructional strategies and skills, such as inquiry and questioning, that are compatible with new and evolving curricula. Emphasis will be on classroom applications.

EDUC 233. School Learning Environment (4) Lecture, 3 hours. Prerequisite(s): admission to a graduate degree program, teaching credential and teaching experience. The course will consider (1) the dimensions and characteristics of the school learning environment; (2) the role of teaching models, strategies, programs, policies and interpersonal relationships in establishing the school learning environment; and (3) the impact of the learning environment on student motivation, attitude formation, and achievement.

EDUC 235. Classroom Processes (4) Lecture, 3 hours; consultation, 1 hour. Analysis and synthesis of theoretical and empirical studies of selected classroom processes, including question-answer exchanges and discussions.
EDUC 236. School and Society (4) Lecture, 2 hours; outside research, 6 hours. Prerequisite(s): first-year standing in the Ph.D. program in Education or second-year standing in the Ph.D. program in School Psychology. Introduces concepts of identity, institutional, and organizational influences on schooling. Locates the work of educational professionals in the contexts of the school and the state.

EDUC 237. Research on Teaching (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Examines approaches to research on teaching. Considers the process-product, classroom ecology, ethnographic, and teacher cognition paradigms.

EDUC 238. Education and Gender (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the multiple and complex relationships of gender and education in U.S. society. Analyzes theoretical perspectives on gender and schooling. Topics include cultural constructions of identity, male and female experiences of schooling, and concepts of gender neutrality in the curriculum.

EDUC 239. Developmental Psychopathology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing in Education or Psychology or consent of instructor. Examines the origins of psychopathology from multiple theoretical perspectives with a specific focus on childhood disorders. Topics include biological and environmental contributions to disorder development and treatment paradigms.

EDUC 240. Educational Psychology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 110 or equivalent or consent of instructor. Overview of the major empirical and theoretical bases of educational psychology, followed by detailed analysis of the following topics: (a) cognitive and metacognition as applied to school learning and instruction, (b) motivation, student perceptions, teacher perceptions, classroom processes, (c) effective teaching, and (d) evaluation.

EDUC 241A. Inquiry and Research Methods (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): first-year standing in the Ph.D. program in Education. Examines the nature of inquiry and research in educational studies, including the formulation of questions.

EDUC 241B. Introduction to Qualitative Methods (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 241A; first-year standing in the Ph.D. program in Education. Introduces qualitative research studies. Covers the design, collection, analysis, and interpretation of qualitative data in educational research.

EDUC 241C. Introduction to Quantitative Methods (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 241A; first-year standing in the Ph.D. program in Education. Introduces quantitative research studies. Covers the design, collection, analysis, and interpretation of quantitative data in educational research.

EDUC 242A. Educational and Psychological Measurement and Evaluation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 214; consent of instructor. Examines topics in measurement and evaluation including classical test theory and program evaluation design. Focus is on application in educational and psychological settings and critical examination of norm-referenced and criterion-referenced testing.

EDUC 242B. Advanced Educational and Psychological Measurement and Evaluation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 242A or equivalent or consent of instructor. Examines advanced topics in measurement and evaluation including generalizability theory and item response theory. Emphasis is on the statistical basis of these theories and their application in educational and psychological settings.

EDUC 243. Student Metacognition and Self-Regulated Learning (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines theoretical perspectives and research approaches for studying students’ metacognition and self-regulation and instructional interventions that can foster and support metacognition and self-regulation in children and adults in the areas of mathematics, reading and writing, and science.

EDUC 244. The Student (4) Lecture, 2 hours; outside research, 6 hours. Prerequisite(s): first-year standing in the Ph.D. program in Education. Focuses on the student population of today’s schools through an analytical review of literature on human development, exceptionality, educational psychology, and policy. Students write an in-depth literature review and compose essays on critical research topics.

EDUC 245 (E-Z). Review of Research Literature in Education (4) for hours and prerequisites, see segment descriptions. Critical analyses of research in the various areas of education.

EDUC 245E. History of Church, State, and Schooling (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Overview of the historical roles of religion in the origins and development of public schooling in the United States and the establishment of private religious schooling. Examines the historical roots of contemporary issues of schooling, church, and state, including school prayer, creationism and evolution debates, and censorship.

EDUC 245G. The Opportunity/Achievement Gap (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the nature of the “achievement gap” from a variety of social science disciplines. Explores causes and consequences of racial or ethnic, linguistic, cultural, and socioeconomic differences in educational achievement.

EDUC 245H. Historical Perspectives on Campus Life (4) Seminar, 1 hour. Special attention will be paid to issues as they relate to the learning and teaching of school subjects.

EDUC 245K. Seminar in Educational Psychology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): for EDUC 252N and consent of instructor. Reviews various topics in education / 229
terial psychology at the theoretical and empirical levels. E. History of Educational Psychology; G. Advances in Mental Measurement; N. Children’s Mathematical Cognition.

EDUC 254A. School Psychological Assessment (4) Seminar, 3 hours; practicum, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology or consent of instructor. Covers the administration, scoring, and interpretation of individual measures of intelligence and academic aptitude. Emphasizes the use of these measures for screening and classification decisions and psychological report writing.

EDUC 254B. Behavioral Assessment (4) Seminar, 3 hours; practicum, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology or Special Education; or consent of instructor. Covers procedures and techniques of behavioral assessment, including systematic behavioral observations, curricular-based assessment, behavior rating scales, behavioral interviews, and self-monitoring. Topics include conceptual issues in applying traditional psychometric theories to behavioral assessment data and methods for integrating multimodal behavioral assessment information.

EDUC 255A. Principles of Social Behavior Intervention (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology or Special Education; or consent of instructor. Covers the principles and procedures for developing social competencies in school-age children and youth. Topics include social skills assessment, sociometric assessment, and strategies for promoting acquisition, performance, and maintenance of social skills.

EDUC 255B. Principles of Academic Behavior Intervention (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology or Special Education; or consent of instructor. Covers the principles and procedures for prevention and remediation of academic learning problems and performance. Topics include functional analysis, stimulus control, generalization, and methods for summarizing trends in academic performance.

EDUC 255C. Child Behavior Therapy (4) Seminar, 3 hours; practicum, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology or Special Education; or consent of instructor. Covers principles derived from neobehavioral and social learning theories applied to treat children’s problems. Discusses professional ethics, practice, and responsibility in clinical child behavior therapy.

EDUC 256. Advanced Seminar in Learning Disabilities (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 212 or equivalent or consent of instructor. Critical evaluation of theory and research in the field of learning disabilities. Requires a data-based project reflecting original research.

EDUC 257. Language, Culture, and Education (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines how culture and language influence educational processes and outcomes, by focusing on issues such as testing, gendered pedagogies, cultural adaptations of minority groups, social uses of literacy, Ebonics, bilingual education, and cultural capital.

EDUC 259. Research Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 212 or EDUC 214 or consent of instructor. Involves research reports on topics in educational psychology, special education, curriculum and instruction, and educational administration. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

EDUC 260. History of Curriculum (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): consent of instructor. Investigates the historical construction of schooling in general and specifically the curriculum—formal, informal, and hidden. Explores the purposes of schooling, the relation between schooling and U.S. culture, and the sociocultural contexts for changes and continuities in curriculum.

EDUC 261. School Psychological Consultation (4) Seminar, 3 hours; practicum, 3 hours. Prerequisite(s): admission to Ph.D. program in School Psychology or Special Education; or consent of instructor. Theoretical and applied issues of consultative problem solving conducted in school settings. Principles derived from behavioral systems and organizational theories and how these principles are used in an indirect service-delivery model to facilitate changes in students’ behavior.

EDUC 262. Achievement Motivation (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 110 or equivalent or consent of instructor. This seminar covers the major approaches to achievement motivation with an emphasis on the cognitive approach. Topics include development and individual differences in achievement motivation, achievement-related attitudes and beliefs (e.g., self-concept, attributions, perceived control), relations between motivation and school performance.

EDUC 263. Seminar in School Organization and Management (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): doctoral standing or consent of instructor. Examines critical issues and processes associated with organizational management at the national, state, and local levels. Emphasis given to concerns involving educational decision making, socialization, and human resources management.

EDUC 264. Professional School Psychology (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): admission to Ph.D. program in School Psychology or Special Education; or consent of instructor. Examines critical issues and processes associated with organizational management and the national, state, and local levels. Emphasis given to concerns involving educational decision making, socialization, and human resources management.

EDUC 265. Practicum in School Psychology (1-4) Seminar, 1 hour; practicum, 8-17 hours. Prerequisite(s): admission to the M.A. or Ph.D. program in School Psychology. Closely supervised experience in schools in which students perform psychological, educational, and social work. May include team teaching, supervision of preschool and elementary school personnel, consultation with school faculty, and guidance of students with learning disabilities. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

EDUC 266. Language, Schooling, and Identity (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): admission to the M.A. or Ph.D. program or consent of instructor. Examines how formal and informal educational institutions use language for identity formation and how students/teachers respond to those institutional practices.

EDUC 267. Culture of School Organizations (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the social scientific notion of culture, its use in organizational theory, and its application to the study of schools and school leadership.

EDUC 268. Diversity in Educational Administration (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Provides an understanding of school administrative and management issues related to the increasing diversity in schools. Theories about under-representation, diversity, legislation, harassment, and institutional participation reviewed. Cultural background, communication patterns, social networks, leadership, and administrative styles are considered.

EDUC 269 (E-Z). Topics in Education (2 or 4) Seminar, 2-3 hours; outside research, 0-3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines critical issues and research in special areas of education. Covers a single topic not contained in a regular course. Announcement of each topic will be made when the course is offered and designated as either a 2- or 4- unit course. E. Educational Psychology; I. Curriculum and Instruction; M. Institutional Leadership and Policy Studies; P. School Psychology, Special Education. Each segment is repeatable as topics change to a maximum of 16 units.

EDUC 270. Reading Development and Intervention (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces the findings from national panels on reading development, instruction, and intervention. Topics include practical application of these findings to the development of reading intervention programs for students across grades.

EDUC 271. The School Principal: Tools for Managerial Problems (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. Review of the literature on the principal’s role as leader and manager of the school site. Topics include practices and problems of the school principal, interpersonal relations, political issues, communication techniques, and technology.

EDUC 272. Sociolinguistics and Educational Processes (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): admission to Ph.D. program in Education or consent of instructor. Introduces sociolinguistic concepts (language maintenance and shift, diglossia, code-switching, standard versus dialect) as they relate to schooling. Examines issues such as diversity (linguistics, ethnic, class) and educational inequality, gender and language, minority languages, language attitudes, cultural mismatch, and language socialization.

EDUC 273. Urban Educational Policy and Politics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines issues confronting urban public schools and conditions influencing these institutions. Focuses on reforms advancing and undermining the urban school in America. Analyzes how schools influence and respond to urban and metropolitan environments.
EDUC 274. Text Analysis (4) Lecture, 6 hours; outside research, 6 hours. Prerequisite(s): graduate or professional standing. Considers model definition and specification, identification, estimation, and testing. Considers model definition and specification, identification, estimation, and testing.

EDUC 275. Teaching and Learning (4) Seminar, 2 hours; outside research, 6 hours. Prerequisite(s): first-year standing in the Ph.D. program in Education or second-year standing in the Ph.D. program in School Psychology. Examines issues and questions in teaching, learning, and child development. Addresses implications of various teaching and learning theories for curriculum, instruction, assessment, and teacher education.

EDUC 276. Diversity and Curriculum (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate or professional standing. Describes and analyzes the controversy surrounding efforts to develop a curriculum that addresses diversity in U.S. society. Examines changing theoretical perspectives on multicultural education and key concepts such as race, identity, and culture. Reviews research on multicultural education.

EDUC 277. Theoretical Perspectives on the Practice of Teaching (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): admission to the Ph.D. program in Education or consent of instructor. Examines a range of theoretical perspectives used in studying the practice of teaching. Covers psychological, historical, anthropological, sociological, and philosophical perspectives.

EDUC 278. Research on Online Teaching and Learning (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys issues and research methods relevant to online teaching and learning. Topics include technologies for online learning, efficacy of online teaching and learning, design and usability of online courses, and community building, communication, and identity issues in online environments. Students design and study an online course.

EDUC 279. Literacy and Technology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores historical and contemporary relationships between technology and literacy from those involving clay tablets to those involving the Internet and digital media. Emphasis is on connections between social contexts of literacy practices, such as reading, writing, and language learning, and current technologies, such as video, the web, and interactive media.

EDUC 280 (E-Z). Foundations in Education (4) For hours and prerequisites, see segment descriptions. Foundation core courses that introduce students to theory and research in education. Offered in summer only.

EDUC 280L. The Learner (4) Lecture, 6 hours; outside research, 6 hours. Prerequisite(s): graduate or professional standing. Considers learning from psychological, cognitive, and social perspectives. Draws on recent research on how people learn in schools and other contexts. Emphasis is on the relationship between teaching and learning. Offered in summer only.

EDUC 280P. The Politics of Educational Decision Making (4) Lecture, 6 hours; outside research, 6 hours. Prerequisite(s): graduate or professional standing. Analyzes how the political climate affects American schools. Topics include influences on educational policy, programs, and practice. Offered in summer only.

EDUC 280R. The Classroom (4) Lecture, 6 hours; outside research, 6 hours. Prerequisite(s): graduate or professional standing. Examines anthropological and sociological theory and research on the organization and structure of and practices used in K-12 classrooms. Offered in summer only.

EDUC 280S. The School (4) Lecture, 6 hours; outside research, 6 hours. Prerequisite(s): graduate or professional standing. An analysis of "the school" as a formal organization, a place of work for teachers, and a place of learning for students. Examines the internal and external context of schools. Offered during summer only.

EDUC 281. History of Educational Policy and Reform (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate or professional standing. Introduces a historical context for understanding education policy and reform in the United States. Topics include the ideological forces that shaped the institutional context and character of American education at different periods in the nation's history and how ideas shaped the educational system by institutionalizing certain norms and values.

EDUC 282A. Curriculum Theory and Instructional Processes: Mathematics and Science (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 139, EDUC 172, concurrent enrollment in EDUC 336B or EDUC 338B; or consent of instructor. Introduces curriculum theory and instructional processes as they relate to mathematics and science in the multiple subjects classroom.

EDUC 282B. Curriculum Theory and Instructional Processes: Social Studies, Visual and Performing Arts, and Physical Education (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 139, EDUC 172; concurrent enrollment in EDUC 336B or EDUC 338B or EDUC 345A or EDUC 345B. Introduces curriculum theory and instructional processes as they relate to social studies, visual and performing arts, and physical education in the multiple subjects classroom.

EDUC 283. Analyzing the Practice of Teaching (4) Lecture, 2 hours; discussion, 1 hour; outside research, 3 hours. Prerequisite(s): admission to the M.Ed. program. Focuses on analysis of classroom teaching and examines how curriculum and instruction influence student understanding. Prepares students to conduct comprehensive analyses of K-12 instructional practice.

EDUC 284. Theory and Research on Schooling and Social Inequality (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): admission to the Ph.D. program in Education or consent of instructor. Analyzes the social and cultural organization of schools and the relationship between schooling and social inequality. Draws upon research in sociology, anthropology, and education to examine theoretical perspectives on the relationship between schooling and social stratification, with special attention to the influence of class, race, and ethnicity on academic achievement.

EDUC 285 (E-Z). Curriculum Theory and Instructional Processes (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): EDUC 100, EDUC 110, EDUC 116, EDUC 139, EDUC 172 or EDUC 174; or consent of instructor. Introduces curriculum theory and instructional processes as they relate to the single subject classroom. Emphasis is on one quarter supervised teaching in college level classes under the supervision of the course instructor. Required of all doctoral candidates in the Graduate School of Education. Fulfills teaching portion of Ph.D. requirements. Graded Satisfactory (S) or No Credit (NC). May be taken for a maximum of three quarters.
EDUC 303A. Level II Induction: Mild/Moderate Specialist (4) Lecture, 2 hours; field, 6 hours. Prerequisite(s): A Level I Education Specialist Credential. Mild/Moderate Disabilities. Covers topics related to teaching of Mild/Moderate special education students. Includes development of an Induction Plan, defining the role of the school district mentor, development and maintenance of a professional portfolio, construction of Individualized Education Programs (IEP), Individualized Transition Programs (ITP), case studies, and verification logs. Students develop effective collaboration skills to work productively with the University and school districts. Graded Satisfactory (S) or No Credit (NC).

EDUC 303B. Level II Summative Evaluation: Mild/Moderate Specialist (2) Lecture, 1 hour; field, 3 hours. Prerequisite(s): two years of teaching experience in the specialization area of the student’s Level I Education Specialist Credential. Mild/Moderate Disabilities (may be completed concurrently), EDUC 303A. Students develop a five-year professional development plan, complete a comprehensive and professional portfolio based on their teaching experience in a class for individuals with mild/moderate disabilities, and undergo an evaluation process. Graded Satisfactory (S) or No Credit (NC).

EDUC 304A. Level II Induction: Moderate/Severe Specialist (4) Lecture, 2 hours; field, 6 hours. Prerequisite(s): A Level I Education Specialist Credential: Moderate/Severe Disabilities. Covers topics related to teaching of Moderate/Severe special education students. Includes development of an Induction Plan, defining the role of the school district mentor, development and maintenance of a professional portfolio, construction of Individualized Education Programs (IEP), Individualized Transition Programs (ITP), case studies, and verification logs. Students develop effective collaboration skills to work productively with the University and school districts. Graded Satisfactory (S) or No Credit (NC).

EDUC 304B. Level II Summative Evaluation: Moderate/Severe Specialist (2) Lecture, 1 hour; field, 3 hours. Prerequisite(s): two years of teaching experience in the specialization area of the student’s Level I Education Specialist Credential: Moderate/Severe Disabilities. Students are required to complete the five-year professional development plan, complete a comprehensive and professional portfolio based on their teaching experience in a class for individuals with moderate/severe disabilities, and undergo an evaluation process. Graded Satisfactory (S) or No Credit (NC).

EDUC 320A. Integrating Technology into Classroom Practice (1) Lecture, 8 hours per quarter; laboratory, 3 hours per quarter; field, 3 hours per quarter. Prerequisite(s): EDUC 320A. Focuses on the application of computer technology to curriculum and instruction. Topics include Internet applications, non-computer technology, and use of technology to enhance problem solving skills. Includes field observations in schools. Graded Satisfactory (S) or No Credit (NC).

EDUC 320B. Integrating Technology into Classroom Practice (1) Lecture, 8 hours per quarter; laboratory, 3 hours per quarter; field, 3 hours per quarter. Prerequisite(s): EDUC 320A. Focuses on the application of computer technology to curriculum and instruction. Topics include Internet applications, non-computer technology, and use of technology to enhance problem solving skills. Includes field observations in schools. Graded Satisfactory (S) or No Credit (NC).

EDUC 320C. Integrating Technology into Classroom Practice (1) Lecture, 4 hours per quarter; laboratory, 15 hours per quarter; field, 3 hours per quarter. Prerequisite(s): EDUC 320A, EDUC 320B. Addresses issues related to the use of technology in schools. Using presentation software, the Internet, and other computer-based technology, students develop and teach a curriculum unit appropriate to their teaching subject area and/or grade level. Emphasis is on integrating the use of computer-based applications with instruction. Graded Satisfactory (S) or No Credit (NC).

EDUC 336A. Supervised Teaching in the Elementary School (2) Field, 9 hours. Prerequisite(s): admission to a teaching credential program; concurrent enrollment in EDUC 282A and EDUC 344A; concurrent enrollment in or completion of EDUC 337A. Supervised teaching in the multiple subjects classroom. Required of all candidates for the Multiple Subjects Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 336A or EDUC 338A.

EDUC 336B. Supervised Teaching in the Elementary School (2) Field, 18 hours. Prerequisite(s): EDUC 110, EDUC 139, EDUC 172, EDUC 336A; concurrent enrollment in EDUC 282B and EDUC 344B; concurrent enrollment in or completion of EDUC 337B. Supervised teaching in the multiple subjects classroom. Required of all candidates for the Multiple Subjects Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 336B or EDUC 338B.

EDUC 336C. Supervised Teaching in the Elementary School (11) Field, 36 hours. Prerequisite(s): EDUC 336B; concurrent enrollment in EDUC 344C; concurrent enrollment in or completion of EDUC 337C. Supervised teaching in the multiple subjects classroom. Required of all candidates for the Multiple Subjects Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 336C or EDUC 338C.

EDUC 337A. Teaching Performance Assessment for Multiple Subjects Candidates (1) Field, 2 hours; written work, 2 hours. Prerequisite(s): admission to a teaching credential program or an internship teaching program; concurrent enrollment in or completion of EDUC 336A or concurrent enrollment in completion of EDUC 338A. Performance assessment for California teachers. Topics include lesson design, classroom instruction in public school programs. Fieldwork hours completed in regular placement as assigned for EDUC 336A or EDUC 338A. Required of all candidates for the Multiple Subjects Credential. Graded Satisfactory (S) or No Credit (NC).

EDUC 337B. Teaching Performance Assessment for Multiple Subjects Candidates (1) Field, 2 hours; written work, 2 hours. Prerequisite(s): admission to a teaching credential program or an internship teaching program; concurrent enrollment in or completion of EDUC 336B or concurrent enrollment in completion of EDUC 338B. Performance assessment for California teachers. Topics include lesson design, classroom instruction in public school programs. Fieldwork hours completed in regular placement as assigned for EDUC 336B or EDUC 338B. Required of all candidates for the Multiple Subjects Credential. Graded Satisfactory (S) or No Credit (NC).

EDUC 337C. Teaching Performance Assessment for Multiple Subjects Candidates (1) Field, 2 hours; written work, 2 hours. Prerequisite(s): admission to a teaching credential program or an internship teaching program; concurrent enrollment in or completion of EDUC 336C or concurrent enrollment in or completion of EDUC 338C. Performance assessment for California teachers. Topics include lesson design, classroom instruction in public school programs, and assessment design. Fieldwork hours completed in regular placement as assigned for EDUC 336C or EDUC 338C. Required of all candidates for the Multiple Subjects Credential. Graded Satisfactory (S) or No Credit (NC).

EDUC 338A. Intern Teaching in the Elementary School (9) Field, 30 hours. Prerequisite(s): EDUC 110, EDUC 139, EDUC 172; admission to internship teaching program; concurrent enrollment in EDUC 282A and EDUC 344A; concurrent enrollment in or completion of EDUC 337A. Intern teaching in the multiple subjects classroom. Required for the Multiple Subjects Internship Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 336A or EDUC 338A.

EDUC 338B. Intern Teaching in the Elementary School (9) Field, 30 hours. Prerequisite(s): EDUC 338A; concurrent enrollment in EDUC 282B and EDUC 344B; concurrent enrollment in or completion of EDUC 337B. Intern teaching in the multiple subjects classroom. Required for the Multiple Subjects Internship Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 336B or EDUC 338B.

EDUC 338C. Intern Teaching in the Elementary School (9) Field, 30 hours. Prerequisite(s): EDUC 338A; concurrent enrollment in EDUC 282B and EDUC 344B; concurrent enrollment in or completion of EDUC 337C. Intern teaching in the multiple subjects classroom. Required for the Multiple Subjects Internship Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 336C or EDUC 338C.

EDUC 340A. Instructional Processes for Students with Mild Handicaps and Behavior Disorders (5) Lecture, 3 hours; laboratory, 5 hours. Prerequisite(s): admission to the Specialized Preparation Program. Development and learning needs of handicapped students: curriculum, procedures, and materials. Includes participation in special school programs.

EDUC 340B. Instructional Processes for Severely Handicapped Students (5) Lecture, 3 hours; laboratory, 5 hours. Prerequisite(s): admission to the Specialized Preparation Program. Development and learning needs of severely handicapped students: curriculum, procedures, and materials. Includes participation in special school programs.

EDUC 344A. Multiple Subjects Credential Seminar (2) Seminar, 2 hours. Prerequisite(s): concurrent enrollment in EDUC 336A or EDUC 338A or consent of instructor. Analyzes instructional processes used in multiple subjects classrooms. Topics include classroom management, curriculum planning, instructional strategies, and oral and written communication skills.

EDUC 344B. Multiple Subjects Credential Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 119, EDUC 139, EDUC 172, EDUC 344A; concurrent enrollment in EDUC 336B or EDUC 338B. Analyzes instructional processes used in multiple subjects classrooms. Topics include classroom management, curriculum planning, instructional strategies, and oral and written communication skills.

EDUC 344C. Multiple Subjects Credential Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 344B; concurrent enrollment in EDUC 336C or EDUC 338C. Analyzes instructional processes used in multiple subjects classrooms. Topics include classroom management, curriculum planning, instructional strategies, and oral and written communication skills.
EDUC 345A, Supervised Student Teaching in a Special Class for Individuals with Mild/Moderate Disabilities (12) Field, 36 hours. Prerequisite(s): admission to a special education credential program; EDUC 340A (may be taken concurrently). Student teaching in a special education day class for individuals with mild/moderate disabilities. Required for the Education Specialist Internship Credential in Mild/Moderate Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 345B, Supervised Student Teaching in a Special Class for Individuals with Moderate/Severe Disabilities (12) Field, 36 hours. Prerequisite(s): admission to a special education credential program; EDUC 340A (may be taken concurrently). Student teaching in a special education day class for individuals with moderate/severe disabilities. Required for the Education Specialist Internship Credential in Moderate/Severe Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 346A, Supervised Intern Teaching in a Special Class for Individuals with Mild/Moderate Disabilities (7) Field, 21 hours. Prerequisite(s): admission to an internship program in mild/moderate disabilities; EDUC 346A (may be taken concurrently). Intern teaching in a special education day class for individuals with mild/moderate disabilities. Required for the Education Specialist Internship Credential in Mild/Moderate Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 346B, Supervised Intern Teaching in a Special Class for Individuals with Mild/Moderate Disabilities (7) Field, 21 hours. Prerequisite(s): admission to an internship program in mild/moderate disabilities; EDUC 346A (may be taken concurrently). Intern teaching in a special education day class for individuals with mild/moderate disabilities. Required for the Education Specialist Internship Credential in Mild/Moderate Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 346C, Supervised Intern Teaching in a Special Class for Individuals with Mild/Moderate Disabilities (7) Field, 21 hours. Prerequisite(s): admission to an internship program in mild/moderate disabilities; EDUC 346A (may be taken concurrently). Intern teaching in a special education day class for individuals with mild/moderate disabilities. Required for the Education Specialist Internship Credential in Mild/Moderate Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 347A, Supervised Intern Teaching in a Special Class for Individuals with Moderate/Severe Disabilities (7) Field, 21 hours. Prerequisite(s): admission to an internship program in moderate/severe disabilities; EDUC 347A. Intern teaching in a special education day class for individuals with moderate/severe disabilities. Required for the Education Specialist Internship Credential in Moderate/Severe Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 347C, Supervised Intern Teaching in a Special Class for Individuals with Moderate/Severe Disabilities (7) Field, 21 hours. Prerequisite(s): admission to an internship program in moderate/severe disabilities; EDUC 347A. Intern teaching in a special education day class for individuals with moderate/severe disabilities. Required for the Education Specialist Internship Credential in Moderate/Severe Disabilities. Graded Satisfactory (S) or No Credit (NC).

EDUC 348A, Single Subject Intern Teaching Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 110, EDUC 139; concurrent enrollment in EDUC 378A. Analyzes instructional problems encountered by interns in the single subject classroom. Topics include basic curriculum, classroom management, interpersonal relationships, self-evaluation, and professional competencies. Credit is awarded for only one of EDUC 348A or EDUC 349A.

EDUC 348B, Single Subject Intern Teaching Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 348A; concurrent enrollment in EDUC 378A. Analyzes instructional problems encountered by interns in the single subject classroom. Topics include basic curriculum, classroom management, interpersonal relationships, self-evaluation, and professional competencies. Credit is awarded for only one of EDUC 348B or EDUC 349B.

EDUC 348C, Single Subject Intern Teaching Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 348B; concurrent enrollment in EDUC 378C. Analyzes instructional problems encountered by interns in the single subject classroom. Topics include basic curriculum, classroom management, interpersonal relationships, self-evaluation, and professional competencies. Credit is awarded for only one of EDUC 348C or EDUC 349C.

EDUC 349A, Single Subject Student Teaching Seminar (2) Seminar, 2 hours. Prerequisite(s): concurrent enrollment in EDUC 376A. Analyzes applied problems in the process of instruction in the single subject classroom. Also addresses interpersonal relationships.

EDUC 349B, Single Subject Student Teaching Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 349A; concurrent enrollment in EDUC 376B. Analyzes applied problems in the process of instruction in the single subject classroom. Also addresses interpersonal relationships.

EDUC 349C, Single Subject Student Teaching Seminar (2) Seminar, 2 hours. Prerequisite(s): EDUC 349B; concurrent enrollment in EDUC 376C or EDUC 345A or EDUC 345B. Analyzes applied problems in the process of instruction in the single subject classroom. Also addresses interpersonal relationships.

EDUC 354A, Orientation to Educational Administration and Policy (4) Seminar, 15 hours per quarter; field, 7.5 hours. Prerequisite(s): admission to the Preliminary Administrative Services Credential program. Orientation to the field of educational administration and policy formation. Focuses on analysis, management skills, and mentoring.

EDUC 354B, Competence in Educational Administration and Policy (4) Seminar, 15 hours per quarter; field, 7.5 hours. Prerequisite(s): EDUC 354A; admission to the Preliminary Administrative Services Credential program. Evaluation of the students’ skills in educational administration and policy formation. Students present professional growth portfolios demonstrating their competence in inquiry, reflection, and problem solving.

EDUC 355, Student Teaching in Secondary School (4) Lecture, 3 hours; fieldwork, 3-15 hours. Prerequisite(s): consent of instructor. Supervised field experience. The planning, execution and evaluation of administrative tasks under the supervision of local school administrators and university personnel. May be repeated for credit.

EDUC 365A, Advanced Study of Educational Administration and Policy Formation (4) Seminar, 2 hours; field, 6 hours. Prerequisite(s): admission to the Professional Administrative Services Credential program. Advanced study of educational administration and policy formation. Emphasis is on analysis and problem solving. Topics include interpersonal relationships, mentoring, policy development, and policy administration.

EDUC 365B, Advanced Study of Educational Administration and Policy Formation (4) Seminar, 2 hours; field, 6 hours. Prerequisite(s): admission to the Professional Administrative Services Credential program. Evaluation of the students’ skills in educational administration and policy development. Students present professional growth portfolios demonstrating their competence in inquiry, reflection, and problem solving.

EDUC 366, Specialized Field Experience in School Administration (4) Seminar, 3 hours; fieldwork, 10-15 hours. Prerequisite(s): EDUC 365A-EDUC 365B; possession of California Preliminary Administrative Services Credential or equivalent; an administrative job in education or consent of instructor. Advanced level field experience covering special topics in educational administration. Individually planned and guided tasks in an area of specialized study, selected in consultation with faculty and executed under the supervision of selected school administrators and University faculty.

EDUC 376A, Supervised Teaching in the Secondary School (2) Field, 9 hours. Prerequisite(s): concurrent enrollment in or completion of EDUC 110, EDUC 139, EDUC 174, EDUC 377A; admission to a teaching credential program; concurrent enrollment in EDUC 349A. Supervised teaching in the single subject classroom. Required of all candidates for the Single Subject Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 376A or EDUC 378A.

EDUC 376B, Supervised Teaching in the Secondary School (5) Field, 18 hours. Prerequisite(s): EDUC 376A; concurrent enrollment in or completion of EDUC 377B; concurrent enrollment in EDUC 349B. Supervised teaching in the single subject classroom. Required of all candidates for the Single Subject Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 376B or EDUC 378B.

EDUC 376C, Supervised Teaching in the Secondary School (11) Field, 36 hours. Prerequisite(s): EDUC 376B; concurrent enrollment in or completion of EDUC 377C; concurrent enrollment in EDUC 349C. Supervised teaching in the single subject classroom. Required of all candidates for the Single Subject Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 376C or EDUC 378C.

EDUC 377A, Teaching Performance Assessment for Single Subject Candidates (1) Field, 2 hours; written work, 2 hours. Prerequisite(s): admission to a teaching credential program or an intern teaching program; concurrent enrollment in or completion of EDUC 376A or concurrent enrollment in or completion of EDUC 378A. Performance assessment for California teach-
ers. Topics include lesson design, classroom instruction in public schools, and assessment design. Fieldwork hours completed in regular placement as assigned for EDUC 376A or EDUC 378A. Required of all candidates for the Single Subject Credential. Graded Satisfactory (S) or No Credit (NC).

EDUC 377B. Teaching Performance Assessment for Single Subject Candidates (1) Field, 2 hours; written work, 2 hours. Prerequisite(s): admission to a teaching credential program or an intern teaching program; concurrent enrollment in or completion of EDUC 376B or concurrent enrollment in or completion of EDUC 378B. Performance assessment for California teachers. Topics include lesson design, classroom instruction in public schools, and assessment design. Fieldwork hours completed in regular placement as assigned for EDUC 376B or EDUC 378B. Required of all candidates for the Single Subject Credential. Graded Satisfactory (S) or No Credit (NC).

EDUC 377C. Teaching Performance Assessment for Single Subject Candidates (1) Field, 2 hours; written work, 2 hours. Prerequisite(s): admission to a teaching credential program or an intern teaching program; concurrent enrollment in or completion of EDUC 376C or concurrent enrollment in or completion of EDUC 378C. Performance assessment for California teachers. Topics include lesson design, classroom instruction in public schools, and assessment design. Fieldwork hours completed in regular placement as assigned for EDUC 376C or EDUC 378C. Required of all candidates for the Single Subject Credential. Graded Satisfactory (S) or No Credit (NC).

EDUC 378A. Intern Teaching in the Secondary School (9) Field, 30 hours. Prerequisite(s): EDUC 110, EDUC 139, EDUC 174; admission to intern teaching program; concurrent enrollment in or completion of EDUC 377A; concurrent enrollment in EDUC 348A. Intern teaching in the single subject classroom. Required for the Single Subject Internship Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 376A or EDUC 378A.

EDUC 378B. Intern Teaching in the Secondary School (9) Field, 30 hours. Prerequisite(s): EDUC 378A; concurrent enrollment in or completion of EDUC 377B; concurrent enrollment in EDUC 348B. Intern teaching in the single subject classroom. Required for the Single Subject Internship Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 376B or EDUC 378B.

EDUC 378C. Intern Teaching in the Secondary School (9) Field, 30 hours. Prerequisite(s): EDUC 378B; concurrent enrollment in or completion of EDUC 377C; concurrent enrollment in EDUC 348C. Intern teaching in the single subject classroom. Required for the Single Subject Internship Credential. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of EDUC 376C or EDUC 378C.

Education Abroad Program

Michael Cowan, Ph.D., Acting Executive Director
Universitywide Program Office, Goleta, CA

UCR Representative
Kiril Tomoff, Ph.D., Director, EAP
1669 Statistics-Computer Bldg. (951) 827-3779
internationalcenter.ucr.edu/Search for programs by specific areas at eap.ucop.edu/programwizard

Purpose

The Education Abroad Program (EAP) offers students the opportunity to experience a different culture while earning UC credit. Established in 1961, the EAP is an overseas study program that serves students at all UC campuses. International study options are available in 34 countries throughout the world at the finest universities abroad.

Most of the program study centers are directed by a UC faculty member in residence. The directors and staff advise students on academic, cultural, social, and personal matters, and the centers serve as information centers for cultural and social opportunities.

Stimulation of general intellectual development, enhancement of independent study and second language skills, improved prospects for graduate and professional school admission, an increase of self-awareness, clarification of career and life purposes, and a broadening and deepening of personal values are a few of the advantages gained from this opportunity.

Academic Program

See internationalcenter.ucr.edu for partner universities and study options. Participants may fulfill lower-division, degree, major, or elective requirements and often enhance their UC education by taking courses not available at UCR. The study center director facilitates the academic work of the students through liaison with faculty at the host university.

Spanning all continents, EAP offers traditional academic year, short-term, and summer programs. Students who want to gain basic foreign language skills have Language and Culture options. Thematic options include Engineering in Hong Kong and Japan, Environmental Sciences in Australia, Tropical Biology in Costa Rica, Asian Development Studies, and Health Sciences. Students anticipating a business career have a broad range of locations to enhance their preparation, including in-depth study on NAFTA, the European Union, and Central Europe. Internships can be arranged in nearly all fields of study. Future teachers, in particular, have benefited from teaching opportunities in China, Japan, and Mexico. Undergraduates have several possibilities to conduct field research in Costa Rica, Ghana, Mexico, and South Africa.

Depending upon the study center, EAP also provides a 5- to 10-week Intensive Language Program, which prepares students for the new country and academic system by augmenting the prerequisite language background.

Academic Planning

Interested students should consult well in advance with their academic advisor and college counselor to determine how participation in the program would affect their degree progress. Students with a double major or minor must pay particular attention to pre-departure planning.

Search for programs by specific areas of study at eap.ucop.edu/programwizard.

Eligibility and Selection

Requirements vary widely by program option. For most programs, students must meet the cumulative grade point average requirements of partner universities at the time of selection and maintain the support of the UCR Selection Committee throughout the pre-departure period.

In addition to academic criteria, the Selection Committee attaches much importance to indications of the student’s seriousness of purpose, maturity, clear goals, and the capacity to adapt to the experience of study abroad.

Prior to departure, selected students must obtain clearance from the university’s Student Health Service, participate in orientation activities, and take a language placement proficiency test, where applicable.

Graduate students who have completed at least one year of graduate work and have the approval of their department and the Graduate Division are eligible for some EAP study centers. Foreign language proficiency, if required, must be demonstrated. Graduate students remain under the academic direction of their UCR graduate advisor. An EAP experience may prove especially valuable to doctoral candidates who have been advanced to candidacy and are engaged in independent study and research directed toward their dissertation.
### EAP Opportunities and Countries

(visit internationalcenter.ucr.edu for updates)

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<td>Adelaide-The University of Adelaide</td>
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<td>Brisbane–The University of Queensland</td>
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<td>Canberra–The Australian National University</td>
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<td>Melbourne–Monash University</td>
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<td>The University of Melbourne</td>
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<td>Perth–The University of Western Australia</td>
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<td>Sydney–The University of New South Wales</td>
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<td>Wollongong City–The University of Wollongong</td>
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<td><strong>Denmark</strong></td>
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<td><strong>Egypt</strong></td>
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<td>Lyon–University of Lyon</td>
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<td>Paris–Ecole Normale Supérieure, rue d’Ulm; Institut d’Etudes Politiques (Sciences Po); UC Center in Paris</td>
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<td><strong>Ghana</strong></td>
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<td><strong>Hong Kong</strong></td>
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<td>The Chinese University of Hong Kong; Hong Kong University of Science and Technology; University of Hong Kong</td>
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<td><strong>Hungary</strong></td>
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<td><strong>India</strong></td>
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<td><strong>Italy</strong></td>
<td>Bologna–University of Bologna; Milan–University of Commerce Luigi Bocconi, Padova–University of Padova; Rome–UC Center in Rome; Siena–UC Center in Siena; University of Italian Studies for Foreigners</td>
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<tr>
<td><strong>Japan</strong></td>
<td>Kyoto–Doshisha University; Kyoto University Osaka–Osaka University; Sendai–Tohoku University Tokyo–International Christian University; Hitotsubashi University; Keio University, Sophia University; The University of Tokyo; Tsukuba Science City–University of Tsukuba; Tsuru City–Tsuru University; Yokohama–Meiji Gakuin University</td>
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<td><strong>Korea</strong></td>
<td>Seoul–Yonsei University</td>
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<td><strong>Mexico</strong></td>
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<td><strong>Netherlands</strong></td>
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<td>Maastricht–University College; Maastricht University; Utrecht–University College; Utrecht University; Wageningen–University and Research Center</td>
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<td><strong>New Zealand</strong></td>
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<td>Christchurch–Lincoln University, University of Canterbury; Dunedin–University of Otago; Hamilton–University of Waikato; Palmerston North–Massey University; Wellington–Victoria University</td>
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<td><strong>Philippines</strong></td>
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<td><strong>Russia</strong></td>
<td>Moscow–International University</td>
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<td><strong>South Africa</strong></td>
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<td>Durban–University of KwaZulu-Natal; Pietermaritzburg–University of KwaZulu-Natal</td>
<td>Spring</td>
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1 Check internationalcenter.ucr.edu or visit the International Education Center for program details.
2 The academic year begins in the winter.
Financial Matters

EAP is financially comparable to studying at UCR. In some cases, study on EAP costs less. Additional costs directly related to the program are round-trip transportation, health clearance, on-site orientation, and, if required, intensive language instruction.

The university shares the cost of comprehensive medical and hospitalization coverage for all participants.

Many forms of financial assistance are available to EAP participants. Students who do not currently receive UC financial aid may qualify for aid while on EAP. Students receiving state and federal financial aid may use their scholarships, grants, loans, and veteran's benefits to finance their program abroad. In addition to campus-awarded financial aid, EAP provides support through various scholarships and grants. Prospective participants should consult early with EAP counselors for national scholarship opportunities.

Student Conduct

Students selected for the EAP program have made a serious commitment to profit from all aspects of their international experience. As guests in another country and another university, their conduct reflects on both the UC and the United States. Students are responsible to the study center director, to the director of EAP, and to the faculty of the UC and the host university related to the program. The director of EAP reserves the right to terminate the participation in the program of any student whose conduct (in either academic or nonacademic matters), after careful consideration and full review, is judged to be contrary to the standards and regulations of the UC and the host university.

Study center directors are available to students and are responsible for all aspects of student welfare and conduct.

Application

Applications for 2009–2010 will be available beginning September 2008. Students are encouraged to consult counselors in the International Education Center early to avoid disqualification through a missed deadline. The center is located in 1669 Statistics/Computer Bldg., or call (951) 827-4113. Program details are available at internationalcenter.ucr.edu.
Electrical Engineering

Subject abbreviation: EE
The Marlan and Rosemary Bourns
College of Engineering

Roger Lake, Ph.D., Chair
Department Office,
343 Engineering Building Unit 2
(951) 827-2484; www.ee.ucr.edu

Professors
Alexander Balandin, Ph.D.
Matthew J. Barth, Ph.D.
Gerardo Beni, Ph.D.
Bir Bhatia, Ph.D.
Jie Chen, Ph.D.
Ilya Dumer, Ph.D.
Jay A. Farrell, Ph.D.
Susan Hackwood, Ph.D.
Yingbo Hua, Ph.D.
Alexander Korotkov, Ph.D.
Roger Lake, Ph.D.
Albert Wang, Ph.D.

Associate Professors
Sakhra Khizirov, Ph.D.
Ping Liang, Ph.D.
Mihri Ozkan, Ph.D.
Xiang-Dong “Sheldon” Tan, Ph.D.
Zhengyuan “Daniel” Xu, Ph.D.

Assistant Professors
Atchint Abbadi, Ph.D.
Elaine D. Haberer, Ph.D.
Jianlin Liu, Ph.D.
Ilya Lyubomirsky, Ph.D.
Anastasios I. Mourkis, Ph.D.
Amit Roy Chowdhury, Ph.D.
Ertem Tuncel, Ph.D.

Adjunct Professors
Bahram Parvin, Ph.D.
Hossny El-Shenn, Ph.D.

Cooperating Faculty
Guillermo Aguilar, Ph.D. (Mechanical Engineering)
Ludwig Bartels, Ph.D. (Chemistry)
Laxmi Bhuyan, Ph.D. (Computer Science and Engineering)
Paulo C. Chagas, Ph.D. (Music)
Michalis Faloutsos, Ph.D. (Computer Science and Engineering)
Dimitrios Gunopulos, Ph.D. (Computer Science and Engineering)
Robert Haddon, Ph.D. (Chemistry/Chemical and Environmental Engineering)
Harry Hsieh, Ph.D. (Computer Science and Engineering)
Qing Jiang, Ph.D. (Mechanical Engineering)
Tao Jiang, Ph.D. (President’s Chair (Computer Science and Engineering))
Srikanth Krishnamurthy, Ph.D. (Computer Science and Engineering)
Keh-Shin Liu, Ph.D. (Statistics)
Mart Molle, Ph.D. (Computer Science and Engineering)
Walid Najjar, Ph.D. (Computer Science and Engineering)
Cengiz Ozkan, Ph.D. (Mechanical Engineering)
Thomas Stahovich, Ph.D. (Mechanical Engineering)
Frank Vahid, Ph.D. (Computer Science and Engineering)
Sundararajan Venkatadriagram (Mechanical Engineering)
Junian Wang, Ph.D. (Mechanical Engineering)

Affiliated Emeritus
J. Keith Oddson, Ph.D. (Mathematics)

Major
The Department of Electrical Engineering offers B.S., M.S., and Ph.D. degrees in Electrical Engineering.
The Electrical Engineering program objectives are to produce graduates able to:

- develop and pursue successful careers in electrical engineering
- apply electrical engineering knowledge and skills to further careers in a broad range of professional occupations
- conduct successful graduate studies and research at major research universities
- demonstrate innovation and creativity and pursue lifelong learning in solving engineering problems
- work effectively in a team environment, communicate well, attain professional growth, and provide leadership in engineering
- exercise professional responsibility and sensitivity to a broad range of social concerns, such as ethical, environmental, economic, regulatory, and global issues

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www.engr.ucr.edu/studentaffairs for details.
The Electrical Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700. For more details see ee.ucr.edu.

Undergraduate Program Focus Areas
The electrical engineering undergraduate program offers the following focus areas:

1. Communications, Signal Processing and Networking
   Fundamental and state-of-the-art theory and applications of communications, networking of devices, and related signal processing, involving information sources in the form of audio, video, image and text messages and transmission media of wire, wireless (radio frequency), fiber optics, etc.

2. Computer Engineering
   The Electrical Engineering department offers a Computer Engineering program in conjunction with the Computer Science and Engineering department. Example applications are embedded system design, reconfigurable systems, parallel and high-performance computing, microprocessors, nanometer integrated circuit design, and computer-aided design (CAD) techniques. See detailed descriptions in the Computer Engineering Program.

3. Control and Robotics
   Theory and design of control of systems and robots. Example applications include control systems in automotive, satellite, aircraft, computer hard drive, robotic manufacturing, autonomous robots, cell phone signal tracking, among others.

4. Intelligent Systems
   Theory, design and development of systems capable of intelligent decisions. Example applications include video surveillance systems, medical imaging devices, intelligent transportation systems, and manufacturing automation.

5. Nanotechnology, Advanced Materials and Devices
   Synthesis and characterization of advanced materials at nanometer scale, theory, design and fabrication of electronic and optoelectronic devices. Example applications include creation of ultra-fast low-power transistors, efficient solar cells for energy generation, high-density memory for smart phones and mobile services, and tiny devices for medical applications.

6. VLSI Design and Systems
   Theory, design and methodologies of very large scale, nanometer integrated circuits. Example applications include microprocessors, analog and mixed signal circuits, RF circuits for cell phones and wireless networks, system-on-chip (SOC), application specific integrated circuits (ASIC).

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www.engr.ucr.edu/studentaffairs for details.

University Requirements
See Undergraduate Studies section.

College Requirements
See The Marlan and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Electrical Engineering major uses the following major requirements to satisfy the college’s Natural Sciences and Mathematics breadth requirement.

1. One course in the biological sciences chosen from an approved list
2. CHEM 001A, CHEM 01LA
3. MATH 008B or MATH 009A
4. PHYS 040A, PHYS 040B

Major Requirements
1. Lower-division requirements (70 units)
   a) One course in the biological sciences chosen from an approved list
   b) CHEM 001A, CHEM 01LA
   c) CS 010, CS 013, CS 061
   d) EE 001A, EE 01LA, EE 001B, EE 010
   e) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   f) PHYS 040A, PHYS 040B, PHYS 040C
2. Upper-division requirements (81 units)
   a) EE 100A, EE 100B, EE 105, EE 110A, EE 110B, EE 114, EE 115, EE 116, EE 132, EE 141, EE 175A, EE 175B
   b) CS 120A/EE 120A, CS 120B/EE 120B
   c) ENGR 180
   d) Twenty (20) units of technical electives (chosen with the approval of a faculty advisor) from CS 122A, CS 130, CS 143/EE 143, CS 161, CS 168, EE 117, EE 128, EE 133, EE 134, EE 135, EE 136, EE 137, EE 138, EE 139, EE 140, EE 144, EE 146, EE 150, EE 151, EE 152, EE 160

The choice of technical electives must ensure that the upper division requirements include at least one coherent sequence of at least three (3) electrical engineering courses to ensure depth in one area of electrical engineering. Example course sequences are available through the Student Affairs Office in the College of Engineering or http://www.engr.ucr.edu/studentaffairs/.

Graduate Program

The Department of Electrical Engineering offers programs leading to M.S. and Ph.D. degrees. University requirements for the M.S. and Ph.D. degrees in Electrical Engineering are given in the Graduate Studies section of this catalog.

Research focus areas currently include communications, computer vision, control, detection and estimation, distributed systems, electronic materials, error-correcting codes, image processing, information theory, intelligent sensors, intelligent systems, machine learning, modeling and simulation, multimedia, nanostuctures and nanodevices, navigation, neural networks, pattern recognition, robotics and automation, signal processing, solid-state devices and circuits, system identification, and transportation systems.

Admission All applicants must submit official scores for the GRE General Test. All applicants whose native language is not English and who do not have a degree from an institution where English is the exclusive language of instruction must complete the Test of English as a Foreign Language (TOEFL) with a minimum score of 550 (paper-based), 213 (computer-based), or 80 (Internet-based).

Applicants must meet the general admission requirements of the Riverside Division of the Academic Senate and the UCR Graduate Council as set forth in the UC Riverside Graduate Student Application. In addition, Master’s Degree Applicants should have completed a program equivalent to UCR’s B.S. in Electrical Engineering or demonstrate the required knowledge and proficiency in the following subjects:
   1. Mathematics, including calculus, differential equations, and complex variables
   2. Circuits and electronics (equivalent of EE 100)
   3. Signals and systems (equivalent of EE 110)
   4. Communication and signal processing (equivalent of EE 115, EE 141)
   5. Logic design, digital systems, and microcomputers (equivalent of EE 120)
   6. Control systems (equivalent of EE 132)
   7. At least one major high-level programming language and associated programming techniques (equivalent of CS 010)

Students with background in other scientific fields are encouraged to apply. Applicants lacking minimum undergraduate preparation in the above areas may be admitted but must take the appropriate undergraduate courses. Under special circumstances, students who have not completed all undergraduate requirements may be admitted provided that the deficiencies are corrected within the first year of graduate study. Courses taken for this purpose do not count towards an advanced degree.

Master of Science

The Department of Electrical Engineering offers the M.S. degree in Electrical Engineering.

General university requirements are listed in the Graduate Studies section of this catalog. Students may obtain an M.S. degree in Electrical Engineering through either Plan I (Thesis) or Plan II (Comprehensive Examination). The normative time for a student to complete the M.S. degree under both Plan I or Plan II is six quarters (two years). Students who are admitted with deficiencies may require up to three additional quarters.

Plan I (Thesis) Students must complete 36 units of graduate or upper-division undergraduate work in Electrical Engineering and other approved subject areas. At least 24 of these units must be in graduate-level courses taken at a campus of the UC, including at least 12 units of required graduate courses. The required and approved courses in each area are determined by the graduate program committee. No more than 12 units may be in graduate research (courses numbered 297 or 299). Upper-division undergraduate courses numbered 125 and above can be counted towards the degree requirements.

A thesis on a research topic must be submitted and approved by the faculty. The thesis must demonstrate the student’s in-depth knowledge of the chosen research topic. Publishable results are encouraged. The thesis defense is a two-hour examination session open to the public and begins with a brief presentation of the thesis by the candidate, followed by a question-and-answer session.

Plan II (Comprehensive Examination) The same requirements as in Plan I apply, except that students must complete at least 18 quarter units of graduate-level courses taken at a UC campus, and none of these credits can be in courses numbered 297 or 299. A maximum of 6 units can be taken in Directed Studies (290).

Students must take the preliminary examination. The examination is conducted jointly with the Ph.D. preliminary examination. The examination emphasizes the fundamental knowledge of the study area rather than the specifics covered in individual courses. Candidates must pass at least five problems in at least three different major areas. No more than three problems may be chosen from the student’s major area of specialization (i.e., communications and signal processing, control, robotics, and manufacturing; intelligent systems; circuits and devices).

Normative Time to Degree Six quarters (two years)

Doctoral Degree

The Department of Electrical Engineering offers the Ph.D. degree in Electrical Engineering.

Admission An M.S. or equivalent degree in Electrical Engineering or a related field is normally required. Exceptional applicants may be admitted directly without an M.S. degree. Students with backgrounds in other scientific fields are encouraged to apply. Applicants lacking undergraduate preparation in the above areas may be admitted but must take the appropriate undergraduate courses. Under special circumstances, students who have not completed all undergraduate requirements may be admitted, provided that the deficiencies are corrected within the first year of graduate study. Courses taken for this purpose do not count towards an advanced degree.

Course Work There is no strict course or unit requirement for the Ph.D. degree. The faculty recommends that the student take a minimum of 36 quarter units of 200- or 300-level course work (excluding EE 297 or EE 299) while in graduate standing as evidence of preparation for the doctoral qualifying examination. The courses may include graduate course work used for the M.S. degree.

Students must complete a minimum of six quarters (two years) in residence in the UC with a GPA of 3.00 or better.

Students must submit a formal study plan before the end of the second quarter of academic residency. Initially, the plan lists the student’s entire expected program of course work. After passing the preliminary examination, an amended version of the study plan must be submitted to and approved by the student’s doctoral committee.

Students must establish a major subject area. A coherent program of approximately 24 units of graduate course work in the major area is recommended. Students may need to take considerably more than the 24 units to prepare for the Ph.D. research. The balance of the courses should lend support to the major field of study.
while adding breadth to the student's overall program. These courses may consist of Electrical Engineering courses in an area distinctively different from the major area and/or courses from other campus departments.

Preliminary Examination
The purpose of the preliminary examination is to screen candidates for continuation in the doctoral program. The examination is administered by the graduate program committee and is combined with the M.S. comprehensive examination. Candidates must solve at least five problems in at least three different major areas. No more than three problems may be chosen from the student's major area of specialization (i.e., communications and signal processing, control, robotics, and manufacturing; intelligent systems; circuits and devices).

Plan II M.S. candidates who took the combined M.S. comprehensive and Ph.D. preliminary examination and successfully passed at the Ph.D. level are given credit for having passed the Ph.D. preliminary examination.

Dissertation Proposal and Oral Qualifying Examination
After passing the preliminary examination, doctoral candidates must prepare and submit a dissertation proposal to their qualifying examination committee before the qualifying examination. The format of the proposal is flexible, but the proposal should clearly indicate the proposed problem under study, demonstrate substantial knowledge of the topic and related issues, state the progress made towards a solution, and indicate the work remaining to be done. The new approaches and methods to be used in the research should also be discussed. An extensive bibliography for the problem under study should be attached to the proposal.

The oral qualifying examination focuses on the dissertation problem. It includes considerable depth in the student's area of specialization, as required for a successful completion of the dissertation. The examination is a three-hour session, which begins with the student's presentation of the dissertation topic and is followed with questions and suggestions by the doctoral committee.

A doctoral dissertation should be an original and substantial contribution to knowledge in the student's major field. It must demonstrate the student's ability to carry out a program of independent advanced research and to report the results in accordance with standards observed in recognized scientific journals.

Dissertation Examination and Defense
When the doctoral committee determines that a suitable draft of the dissertation has been presented, a dissertation examination and defense for the student is scheduled. The defense consists of a public seminar followed by questions from the committee members and the audience.

Language Requirement
To meet the degree requirements of the Electrical Engineering program, all admitted Ph.D. students whose native language is not English must take ESL classes until they get a “clear pass” on the TAST or SPEAK test.

Normative Time to Degree
12 quarters (15 quarters for students without an M.S. in Electrical Engineering)

Preparation for Careers in Teaching
All doctoral students are recommended to be employed as teaching assistants for at least three quarters during their graduate career. The department is developing special courses to aid in the learning of effective teaching methods, such as handling discussion/lab sessions and preparing and grading examinations.

Contact the Graduate Student Affairs Assistant at the Department of Electrical Engineering, (951) 827-2484, or visit ee.ucr.edu for information on graduate courses.

Lower-Division Courses

EE 001A. Engineering Circuit Analysis I (3) Lecture, 3 hours. Prerequisite(s): MATH 046, PHYS 040C (both may be taken concurrently); concurrent enrollment in EE 01A. Ohm's law and Kirchhoff's laws; nodal and loop analysis; analysis of linear circuits; network theorems; transients in RLC circuits. Application of SPICE to circuit analysis.

EE 001B. Engineering Circuit Analysis II (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001A and EE 01A. Sinusoidal steady state analysis, polyphase circuits, magnetically coupled networks, frequency characteristics, Laplace and Fourier transforms, Laplace and Fourier analysis. Application of SPICE to complicated circuit analysis.

EE 002. Electrical and Electronic Circuits (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): PHYS 040C (may be taken concurrently). Intended for non-Electrical Engineering majors for whom knowing the design of electrical and electronic circuits is not crucial but is helpful. Involves direct-circuit calculations with resistors, inductors, and capacitors, followed by steady state sinusoidal analysis. Discusses logic circuits before electronics, which includes diodes, amplifiers, and transistors.

EE 010. Introduction to Electrical Engineering (2) Lecture, 3 hours; lecture, 1 hour. Prerequisite(s): none. Introduces common everyday electrical engineering and technology devices. Aims to enrich students' appreciation of technology and the application of simple science and engineering concepts in the design and operation of these electrical and electronic devices, and to provide students with an early positive engineering experience and interaction with departmental faculty. Graded Satisfactory (S) or No Credit (NC).

EE 011A. Engineering Circuit Analysis I Laboratory (1) Lecture, 3 hours. Prerequisite(s): EE 001A (may be taken concurrently). Laboratory experiments closely tied to the lecture material of EE 001A: resistive circuits, attenuation and amplification, network theorems and superposition, operational amplifiers, transient response, application of SPICE to circuit analysis.

Upper-Division Courses

EE 100A. Electronic Circuits (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001B. Electronic systems, linear circuits, operational amplifiers, diodes, nonlinear circuit applications, junction and metal-oxide-semiconductor field-effect transistors, bipolar junction transistors, MOS and bipolar digital circuits. Laboratory experiments are performed in the subject areas and SPICE simulation is used.

EE 100B. Electronic Circuits (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 100A. Differential and multistage amplifiers, output stages and power amplifiers, frequency response, feedback, analog integrated circuits, filters, tuned amplifiers, and oscillators. Laboratory experiments are performed in the subject areas and SPICE simulation is used.


EE 110A. Signals and Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010; EE 001B (may be taken concurrently); MATH 046. Basic signals and systems, linear time-invariant (LTI) systems, Fourier analysis, frequency response, and Laplace transforms for LTI systems. Laboratory experiments with signals, transforms, harmonic generation, linear digital filtering, and sampling/aliasing.

EE 110B. Signals and Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110A. Fourier analysis for discrete-time signals and systems, filter design, sampling and interpolation, z-transforms, laboratory experiments with signals, transforms, harmonic generation, linear digital filtering, and sampling/aliasing.

EE 114. Probability, Random Variables, and Random Processes in Electrical Engineering (4) Lecture, 4 hours; discussion, 1 hour. Prerequisite(s): EE 110A. Covers fundamentals of probability theory, random variables, and random processes with applications to electrical and computer engineering. Includes probability theory, random variables, densities, functions of random variables, expectations, and moments, and multivariate distributions. Also addresses random processes, autocorrelation function, spectral analysis of random signals, and linear systems with random inputs.

EE 115. Introduction to Communication Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B. Covers spectral density and correlation, modulation theory, amplitude, frequency, phase and analog pulse modulation and demodulation techniques, signal-to-noise ratio, and system performance calculations. Laboratory experiments involve techniques of modulation and demodulation.

EE 116. Engineering Electromagnetics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 001B (may be taken concurrently). Transmission lines, fields and field operators, electrostatic and magnetostatic fields, time-varying fields, electromagnetics, electromagnetic waves, plane waves, guided waves, and applications to engineering problems.
EE 117. Electromagnetics II (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 116. Applications of Maxwell's equations. Skin effect, boundary-value problems, plane waves in lossy media, transverse EM waves, hollow metal waveguides, cavity resonators, microstrips, propagation in dielectrics and optical fibers, optical fibers applications, radiation, and antennas. Laboratory work involves both software simulations and hardware experiments in basic electromagnetic technology.

EE 120A. Logic Design (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 061 with a grade of "C-" or better. Covers the design of digital systems. Topics include Boolean algebra; combinational and sequential circuits; and use of arithmetic and logic units, carry-lookahead adders, multiplexers, decoders, comparators, multipliers, flip-flops, registers, and simple memories; state-machine design; and basic register-transfer level design. Interdisciplinary laboratories involve use of hardware description languages, synthesis tools, programmable logic, and significant hardware prototyping. Cross-listed with CS 120A.

EE 120B. Introduction to Embedded Systems (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 120A/EE 120A. Introduction to hardware and software design of digital computing systems embedded in electronic devices (such as digital cameras or portable video games). Topics include embedded processor programming, custom processor design, standard peripherals, memories, interfacing, and hardware/software tradeoffs. Interdisciplinary laboratory involves use of synthesis tools, programmable logic, and microcontroller development and working embedded systems. Cross-listed with CS 120B.

EE 128. Data Acquisition, Instrumentation, and Process Control (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 120A/EE 120A, EE 100B, or consent of instructor. Analog signal transducers, conditioning and processing; step motors, DC servo motors, and other actuation devices; analog to digital and digital to analog converters; data acquisition systems; microcomputer interfaces to commonly used sensors and actuators; design principles for electronic instruments, real-time process control and instrumentation.

EE 132. Automatic Control (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 105 or ME 103 or equivalent, EE 110A or ENGR 118; or consent of instructor. Covers mathematical modeling of linear systems for time and frequency domain analysis. Topics include transfer function and state variable representations for analyzing stability, controllability, and observability; and closed-loop control design techniques by Bode, Nyquist, and root-locus methods. Laboratories involve both simulation and hardware exercises.

EE 133. Solid-State Electronics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 100A. Presents the fundamentals of solid-state electronics. Topics include electronic band structure, Fermi and quasi-Fermi levels; doping; contacts; junctions; field-effect, bipolar, and metal-oxide-semiconductor (MOS) transistors; and charge-coupled devices. Also reviews device fabrication concepts.

EE 134. Digital Integrated Circuit Layout and Design (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 120A/EE 120A, EE 001A, EE 001B, EE 100A, EE 100B, EE 133. Covers integrated circuit design layout, and verification of complementary metal oxide semiconductors (CMOSs) with use of computer-aided design tools. Topics covered are digital models, inverters, static logic gates, transmission gates, flip-flops, dynamic logic gates, memory circuits, and digital phase-locked loops.

EE 135. Analog Integrated Circuit Layout and Design (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001A, EE 001B, EE 100A, EE 100B, EE 133. Covers analog circuit design layout, and verification of complementary metal oxide semiconductor (CMOS) with use of computer-aided design tools. Topics covered are analog metal oxide semiconductor field effect transistor (MOSFET) models, current sources, references, amplified design, nonlinear analog circuits, analog-to-digital converters (ADCs), and digital-to-analog converters (DACs).

EE 136. Semiconductor Device Processing (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 133 or equivalent. Presents device simulations and hands-on experience in integrated-circuit fabrication techniques and device characterization. Using four-mask metal-oxide semiconductor (MOS) technology, students fabricate resistors, junctions, capacitors, and MOS transistors and perform electrical evaluation.

EE 137. Introduction to Semiconductor Optoelectronic Devices (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 133. An introduction to semiconductor optoelectronic devices for optoelectronic communications and optical processing. Topics include basic optical processes in semiconductors, semiconductor light-emitting diode, semiconductor heterojunction lasers, photodetectors, solar cells, optoelectronic modulation, and switching devices.

EE 138. Electrical Properties of Materials (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing; PHYS 040C or equivalent. Introduces the electrical properties of materials. Includes the electron as a particle and a wave; hydrogen and the periodic table; chemical bonds; free-electron theory of metals; band theory of solids; semiconductors and dielectrics; measurements of material properties; and growth and preparation of semiconductors.

EE 139. Magnetic Materials (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing; PHYS 040C or equivalent. Introduces fundamentals of magnetic materials for the next-generation magnetic, nanomagnetic, and spintronics-related technologies. Includes basics of magnetism, models of the equivalent magnetic charge and current, para-magnetic and diamagnetic materials, soft and hard magnetic materials, equivalent magnetic circuits, and magnetic system design foundations.

EE 140. Computer Visualization (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): senior standing in Computer Engineering, Computer Science, or Electrical Engineering. Introduction to visual perception and thinking, fundamentals of three-dimensional geometrical transformations, camera models, perspective transformation, illumination and color models, ray tracing, representations of three-dimensional shape, texture, motion and shading, and rendering and animation. Laboratories on visual realism methods cover two-dimensional and three-dimensional object representation and recognition techniques. Experiments for each topic are carried out.

EE 150. Digital Communications (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 114, EE 115. Topics include modulation, probability and random variables, correlation and power spectra, information theory, errors of transmission, equipartition and coding methods, shift and phase keying, and a comparison of digital communication systems.

EE 151. Introduction to Digital Control (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 132, EE 141. Review of continuous-time control systems; review of Z-transform and properties; sampled-data systems; stability analysis and criteria; frequency domain analysis and design; transient and steady-state response; state-space analysis, controllability and observability; pole placement; observer design; Lyapunov stability analysis. Laboratory experiments complementary to these topics include simulations and hardware design.

EE 152. Image Processing (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B. Digital image acquisition, image enhancement and restoration, image compression, computer implementation and testing of image processing techniques. Students gain hands-on experience of complete image processing systems, including image acquisition, processing, and display through laboratory experiments.

EE 160. Fiber-Optic Communication Systems (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 115, EE 116. An introduction to fiber-optic communication systems. Topics include optical fiber transmission, optical amplifiers, transmitters, receivers, and wavelength-division multiplexing.

EE 162. Introduction to Nanoelectronics (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): EE 133 or consent of instructor; familiarity with MATLAB or equivalent and with basic matrix algebra is recommended. Presents the basic concepts of nanoelectronics with a focus on current flow through nanoscale devices. Topics include new paradigms of nanoelectronics, an atomic view of electrical resistance, Schrödinger's equation, Coulomb blockade, basis functions, bandstructure, quantum capacitance, level broadening, and coherent transport.
EE 175A. Senior Design Project (4) Consultation, 1 hour; lecture, 1 hour; laboratory, 6 hours. Prerequisite(s): ENGR 180, senior standing in Electrical Engineering. Under the direction of a faculty member, students (individually or in small teams with shared responsibilities) propose and design electrical engineering devices or systems. Requires detailed oral report of project and test plan. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment. Graded In Progress (IP) until EE 175A and EE 175B are completed, at which time a final, letter grade is assigned.

EE 175B. Senior Design Project (4) Consultation, 1 hour; lecture, 1 hour, laboratory, 6 hours. Prerequisite(s): EE 175A, senior standing in Electrical Engineering. Under the direction of a faculty member, students (individually or in small teams with shared responsibilities) build, test, and redesign electrical engineering devices or systems. Requires a written report at the end of the course; presentation of the design aspects. Satisfactory (S) or No Credit (NC) grading is not available.

EE 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): consent of instructor and department chair. Individual study to meet special curricular needs. Course is repeatable to a maximum of 9 units.

EE 191 (E-2). Seminar in Electrical Engineering (1-4) Seminar, 2-8 hours. Prerequisite(s): upper-division standing or consent of instructor. Additional prerequisites may be required for some segments of this course; see department. Consideration of current topics in electrical engineering. Offered in summer only.

EE 194. Independent Reading (1-2) Extra reading, 3-6 hours. Prerequisite(s): upper-division standing or consent of instructor. Independent reading in material not covered in course work. Normally taken in senior year. Course is repeatable to a maximum of 4 units.

EE 197. Research for Undergraduates (1-4) Outside research, 12-10 hours. Prerequisite(s): consent of instructor and Electrical Engineering undergraduate program advisor. Directed research on a topic relevant to electrical engineering. Requires a final written report. Course is repeatable to a maximum of 8 units.

EE 198-L. Individual Internship in Electrical Engineering (1-12) Internship, 2-24 hours; written work, 1-12 hours. Prerequisite(s): upper-division standing; at least 12 units in Electrical Engineering. Provides the undergraduate student with career experience as an electrical engineer in an industry or a research unit under the joint supervision of an off-campus sponsor and a faculty member in Electrical Engineering. Each individual program must have the prior approval of both supervisors. Requires a final report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Graduate Courses

EE 201. Applied Quantum Mechanics (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 046, PHYS 040A; or consent of instructor. Covers topics in quantum mechanics including Schroedinger equation, operator formalism, harmonic oscillator, quantum wells, spin, bosons and fermions, solids, perturbation theory, Wentzel-Kramers-Brillouin approximation, tunneling, tight-binding model, quantum measurements, quantum cryptography, and quantum computing.

EE 202. Fundamentals of Semiconductors and Nanostructures (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 133, EE 201; or consent of instructor. Examines principles of semiconductor materials and nanostructures. Topics include periodic structures, electron and phonon transport, defects, optical properties, and radiative recombination. Also covers absorption and emission of radiation in nanostructures, and nonlinear optics effects. Emphasizes properties of semiconductor superlattices, quantum wells, wires, and dots.

EE 203. Solid-State Devices (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 133 or consent of instructor. Covers electronic devices including p-n junctions, field-effect transistors, heterojunction bipolar transistors, and nanostructure devices. Explores electrical and optical properties of semiconductor heterostructures, superlattices, quantum wires and dots, as well as devices based on these structures.

EE 204. Advanced Electromagnetics (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 117 or consent of instructor. Presents selected topics in electromagnetic theory and antenna design. Topics include power transmission and attenuation in microstrip transmission lines (TL) and waveguides (WG); transient analysis and applications of TL and WG; radiation of electromagnetic waves; antenna design; electromagnetic interference and compatibility; and numerical methods in electromagnetic theory.

EE 205. Optoelectronics and Photonic Devices (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 203, 204, or consent of instructor. A study of the physical optical and photonic devices and their use in an optical communication system. Covers silica fibers, light-emitting diodes (LEDs), heterojunction lasers, p-i-n photodiodes, and avalanche photodiodes.

EE 206. Nanoscale Characterization Techniques (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 201, EE 202, EE 203; or consent of instructor. An in-depth study of nanoscale materials and device characterization methods. Covers atomic force microscopy (AFM) and scanning tunneling microscopy (STM). Topics include semiconductor fabrication fundamentals; metrology requirements; in situ monitoring; interconnects and failure analysis; principles of AFM, STM, and scanning electron microscopy. X-ray methods; optical and infrared techniques; and electrical characterization.

EE 207. Noise in Electronic Devices (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 203 or consent of instructor. A study of fluctuation processes in solids and noise in electronic devices. Topics include the theory of random processes and analysis of noise types such as generation-recombination noise, low-frequency noise, random telegraph noise, thermal noise, and shot noise.

EE 208. Semiconductor Electron, Phonon, and Optical Properties (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 202. Topics include semiconductor electronic band structure theory and methods; phonon dispersion theory and methods; defects in semiconductors; and optical properties of semiconductors. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

EE 209. Semiconductors and the Boltzmann Transport Equation (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 201, EE 203, EE 208. Covers the Boltzmann transport equation as applied to semiconductor device modeling. Topics include the physics of carrier scattering in common semiconductors, theoretical treatments of low and high field transport, balance equations, and Monte Carlo solutions. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

EE 210. Advanced Digital Signal Processing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 110B, EE 141. Provides in-depth coverage of advanced techniques for digital filter and power spectral estimation. Topics include digital filter design, discrete random signals, finite-wordlength effects, non-parametric and parametric power spectrum estimation, multirate digital signal processing, least square methods of digital filter design, and digital filter applications.

EE 211. Adaptive Signal Processing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 210, EE 215, EE 236. Provides an in-depth understanding of adaptive signal processing techniques. Covers Volterra decomposition, Yule-Walker equations, spectral estimation, Wiener filters, linear prediction, Kalman filtering, time-varying system tracking, nonlinear adaptive filtering, and performance analysis of adaptive algorithms and their variations including stochastic gradient, least mean square, least squares, and recursive least squares.

EE 212. Quantum Electron Transport (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 208. Covers the theory and methods used to model quantum electron transport in ultrascalar traditional semiconductor devices such as transistors, nanoscale research semiconductor devices (such as quantum dots), and novel electronic material systems (such as carbon nanotubes and molecular wires). May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

EE 213. Computer-Aided Electronic Circuit Simulation (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 201A, EE 201B, EE 133. Introduction to numerical algorithms and computer-aided techniques for the simulation of electronic circuits. Covers theoretical and practical aspects of important analyses. Topics include circuit formulation methods; large-signal circuit effects; small-signal circuit effects; signal alternating current, and moment-matching transient; sensitivity; and noise. Also discusses recent advances in timing analysis, symbolic analysis, and radio frequency circuit analysis.

EE 214. Single-Electronics and Quantum Computing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 201 or equivalent; graduate standing or consent of instructor. Introduces single-electron devices and their potential use in very large-scale integration applications and quantum computing. Topics include Coulomb blockade, “orthodox” theory of single-electron tunneling, single-electron transistor, shot noise theory superconducting and quantum dot single-electron devices, analog applications, single-electron memory and logic, basic principles of quantum computing, and quantum error correction, and potential solid-state realizations of a quantum computer.

EE 215. Stochastic Processes (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 210 or equivalent; graduate standing or consent of instructor. A study of probability theory and stochastic processes, with a focus on the most fundamental aspect of modern communication, control, and signal processing systems driven by random signal inputs. Topics include random variables and stochastic processes, spectral analysis, Wiener optimum filter, matched filter, and Karhunen-Loeve expansion; mean square estimation theory including smoothing, filtering, and linear prediction; Levinson's
algorithm, lattice filters, and Kalman filters; and the Markov process.

EE 216. Nanoscale Phonon Engineering (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 202. Studies acoustic and optical phonons that affect electrical, thermal, and optical properties of materials. Focuses on the confinement-induced changes of phonon properties in nanostructures and their implications for performance of electronic, thermoelectric, and optoelectronic devices. Explores phonon theory, Raman spectroscopy and other phonon characterization techniques, thermal conductivity, and related measurements.

EE 219. Advanced Complementary Metal Oxide Semiconductor (CMOS) Technology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 203. Introduces advanced complementary metal oxide semiconductor (CMOS) technology. Topics include MOS field effect transistor (MOSFET) scaling, short and narrow channel effects, high field effects, vertical MOSFET transistors, single electron transistors, MOSFET nonvolatile memory devices, and small- and large-signal MOSFET models. Covers CMOS process integration.

EE 220. Applied Ferromagnetism (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 116; consent of instructor. Introduces fundamentals of ferromagnetism necessary to develop next-generation nanomagnetic and spintronics-related devices. Includes basics of magnetism, magnetic circuits, ferromagnetic resonance (FMR), nuclear magnetic resonance (NMR), spintronics, and analyses of applications.

EE 223. Numerical Analysis of Electromagnetic Devices (4) Lecture, 4 hours. Prerequisite(s): EE 117, MATH 151C. Covers in depth the numerical and mathematical foundations of the contemporary computer modeling techniques used in the design and analysis of electromagnetic devices and systems. Provides hands-on experience in modeling systems such as radio frequency devices, magnetic systems, and electromagnetic motors.

EE 224. Digital Communication Theory and Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 115; either the MATH 149A and MATH 149B sequence or the STAT 160A and STAT 160B sequence; or equivalents. Provides an overview of basic communication techniques and an introduction to optimum signal detection and correction. Topics include sampling and bandwidth; pulse code modulation; line coding and pulse shaping; delta modulation; stochastic approach to bandwidth and noise corruption; white Gaussian noise; matched filter; optimum signal detection; Shannon theorem; and error correction.

EE 225. Error-Correcting Codes (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 215 or consent of instructor. Provides an overview of basic error-correcting techniques used in data transmission and storage. Topics include groups and Galois fields, error-correction capability and code design of Hamming codes, cyclic codes, Bose-Chaudhuri-Hocquengem (BCH) codes, and Reed-Solomon codes. Also considers concatenated design and decoding techniques.

EE 226. Wireless Communications (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 215, EE 224. Presentation of fundamental cellular concepts and new techniques in wireless communications. Topics include cellular systems and standards, frequency reuse, system capacity, channel allocation, cellular radio propagation, fading channel modeling and equalization, spread spectrum communications and other multiple access techniques, and wireless networking.

EE 227. Spread Spectrum Communications (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 115, EE 215; or consent of instructor. Provides an overview of spread spectrum communication techniques. Topics include direct sequence, frequency hopping and hybrid spread spectrum, pseudorandom sequence generation, modulation and spreading, code tracking, carrier synchronization, coherent and noncoherent data demodulation over fading channels, direct sequence multiple access, and performance evaluation of various multiuser detectors.

EE 228. Fundamentals of Data Compression (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 215 (may be taken concurrently). Covers the fundamental theory and tools for designing data and signal compression systems. Topics include lossless coding, scalar quantization, predictive and transform coding techniques, vector quantization, and the general trade-off between the reproduction signal quality and the bit-rate of the digital representation. Provides a foundation for further study and research in speech, audio, image, and video compression.

EE 229. Video Processing and Communication (4) Lecture, 3 hours; laboratory, 1 hour; outside reading, 2 hours. Prerequisite(s): EE 150, EE 210. Covers the fundamental principles and techniques in the compression and transmission of coded video streams over wired and wireless networks, including wireless network protocols, compression standards, digital signal processor architectures, network or traffic management, quality of service, rate control schemes, and error resilience.

EE 230. State and Parameter Estimation Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 132, MATH 113. Provides a review of linear algebra. Topics include the mathematical description of linear systems; the solution of state-space equations; controllability and observability; canonical and minimal realization; and state feedback, pole placement, observer design, and compensator design.

EE 231. Linear System Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 132, MATH 113. Provides a review of linear algebra. Topics include the mathematical description of linear systems; the solution of state-space equations; controllability and observability; canonical and minimal realization; and state feedback, pole placement, observer design, and compensator design.

EE 232. Advanced Robotics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 235. Investigates multi-arm cooperative robots, redundant robots, perception-driven action; multiarm cooperation; distributed autonomous robotic systems; programming languages and tools; simulations techniques; and application to mechatronics, manufacturing, and biomorphic systems.

EE 233. Intelligent Transportation Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 152 or consent of instructor. Covers advanced topics in digital image processing. Examines image sampling and quantization, image transforms, stochastic image models, image filtering and restoration, and image data compression.

EE 234. Advanced Computer Vision (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 146 or consent of instructor. A study of three-dimensional computer vision. Topics include projective geometry, modeling and calibrating cameras, representing geometric primitives and their uncertainty, stereo vision, motion analysis and tracking, interpolating and approximating three-dimensional data, and recognition of two-dimensional and three-dimensional objects.

EE 235. Advanced Complementary Metal Oxide Semiconductor (CMOS) Technology (4) Lecture, 4 hours. Prerequisite(s): EE 117, MATH 151C. Covers in depth the numerical and mathematical foundations of the contemporary computer modeling techniques used in the design and analysis of electromagnetic devices and systems. Provides hands-on experience in modeling systems such as radio frequency devices, magnetic systems, and electromagnetic motors.

EE 236. Nonlinear Systems and Control (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 235 or equivalent. Covers nonlinear systems and control. Topics include the mathematical description of linear systems; the solution of state-space equations; controllability and observability; canonical and minimal realization; and state feedback, pole placement, observer design, and compensator design.

EE 237. State and Parameter Estimation Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 132, MATH 113. Provides a review of linear algebra. Topics include the mathematical description of linear systems; the solution of state-space equations; controllability and observability; canonical and minimal realization; and state feedback, pole placement, observer design, and compensator design.

EE 238. Linear Multivariable Control (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 235. Investigates multivariable control systems, stability, performance, uncertainty, and robustness. Topics include analysis and synthesis via matrix factorization, Q-parameterization and all stabilizing controllers; frequency domain methods; and H\text{\textsuperscript{\infty}} design and structured singular value analysis.

EE 239. Optimal Control (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 215, EE 235. Presents the theory of stochastic optimal control systems and methods for their design and analysis. Covers principles of optimization, Lagrange’s equation, linear-quadratic-Gaussian control; certainty-equivalence; the minimum principle; the Hamilton-Jacobi-Bellman equation; and the algebraic Riccati equation.

EE 240. Pattern Recognition (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 141 or consent of instructor. Covers basics of pattern recognition techniques. Topics include hypothesis testing, parametric classifiers, parameter estimation, nonparametric density estimation, nonparametric classifiers, feature selection, discriminant analysis, and clustering.

EE 241. Advanced Digital Image Processing (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 152 or consent of instructor. Covers advanced topics in digital image processing. Examines image sampling and quantization, image transforms, stochastic image models, image filtering and restoration, and image data compression.

EE 242. Intelligent Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces fundamental concepts of design of intelligent systems. Topics include biological versus computational systems, knowledge representation, computational reasoning, computational learning, language and human-machine communication, expert systems, computational vision, and examples of intelligent machines.

EE 243. Advanced Computer Vision (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 146 or consent of instructor. A study of three-dimensional computer vision. Topics include projective geometry, modeling and calibrating cameras, representing geometric primitives and their uncertainty, stereo vision, motion analysis and tracking, interpolating and approximating three-dimensional data, and recognition of two-dimensional and three-dimensional objects.

EE 244. Computational Learning (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores computational learning techniques. Topics include elements of learning systems, inductive learning, analytic learning, case-based learning, genetic learning, connectionist learning, reinforcement learning and integrated learning techniques, and comparison of learning paradigms and applications.

EE 245. Advanced Robotics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 144, EE 235. Topics include robotics, mechatronics, and automation systems; design and analysis; mechanics; sensing and programming; linear and non-linear control; rigid and flexible systems; redundant robots; perception-driven action; multiarm cooperation; distributed autonomous robotic systems; programming languages and tools; simulations techniques; and application to mechatronics, manufacturing, and biomorphic systems.

EE 246. Intelligent Transportation Systems (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. EE 115 and EE 132 are recommended. Focuses on the control, communications, and computer aspects of intelligent transportation systems. Topics include traffic flow theory fundamentals, intelligent transportation system user services, travel and traffic management, advanced vehicle safety systems, intelligent transportation system applications, architectures, standards, strategic needs assessment and deployment, and evaluation.
EE 247. Current Topics in Computer Vision and Pattern Recognition (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): EE 240 or EE 243 or consent of instructor. Explores advanced mathematical techniques of recent research interest. Topics include particle filters, sampling techniques, stochastic optimization, stochastic approximation algorithms, independent component analysis, energy function techniques, nonlinear discriminant analysis, and support vector machines.

EE 250. Information Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): EE 215. An overview of fundamental limitations imposed on communication systems. Topics include Shannon's information measures, weak and strong typicality, lossless data compression, source and channel models and Shannon's coding theorems, channel capacity and the rate-distortion function, Gaussian sources and channels, and limits of communication between multiple terminals.

EE 251. Algorithmic and Combinatorial Coding Theory (4) Seminar, 2 hours; lecture, 2 hours. Prerequisite(s): EE 225 or consent of instructor. Explores combinatorial and algorithmic techniques in coding theory. Covers algebraic design of Bose-Chaudhuri-Hocquenghem (BCH) codes and Reed-Muller codes. Algorithmic topics include gradient-like decoding, split-syndrome techniques, and information-set decoding. Introduces decoding with polynomial complexity based on Bayesian estimation, iterative decoding, and codes on graphs. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

EE 259. Colloquium in Electrical Engineering (1) Colloquium, 1 hour. Prerequisite(s): graduate standing. Lectures on current research topics in electrical engineering presented by faculty members and visiting scientists. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

EE 260. Seminar in Electrical Engineering (4) Seminar, 4 hours. Prerequisite(s): consent of instructor. Seminar on current research topics in electrical engineering, including areas such as signal processing, image processing, control, robotics, intelligent systems, computer vision, and pattern recognition. Course is repeatable to a maximum of 16 units.

EE 290. Directed Studies (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and Graduate Advisor. Individual study, directed by a faculty member, of selected topics in electrical engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

EE 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Research conducted under the supervision of a faculty member on selected problems in electrical engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

EE 298-I. Individual Internship in Electrical Engineering (1-12) Internship, 2-24 hours; written work, 1-12 hours. Prerequisite(s): graduate standing; consent of instructor. Provides the Electrical Engineering graduate student with career experience as an electrical engineer in an industrial or a research unit. Includes fieldwork with an approved professional individual or organization and academic work under the direction of a faculty member. Requires a final report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

EE 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Research in electrical engineering for the M.S. thesis or Ph.D. dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Engineering

Subject abbreviation: ENGR

The Marian and Rosemary Bourns College of Engineering

Advising Office, A159 Bourns Hall (951) 827-ENGR (3647); www.engr.ucr.edu/studentaffairs

Courses in Engineering are a multidisciplinary approach to providing students with training in concepts common to multiple engineering fields. The courses support the undergraduate programs in all disciplines in the Marian and Rosemary Bourns College of Engineering. Refer to these programs in this section of the catalog for information on course application.

Lower-Division Courses

ENGR 001 (E-Z). Professional Development and Mentoring (1) Activity, 30 hours per quarter. Prerequisite(s): freshman standing in the Bourns College of Engineering. Provides freshmen with involvement in professional development activities. Activities to be performed are program-specific, and may include projects, industry interactions, and involvement with professional societies and clubs, team building, career guidance, and coverage of ethics and lifelong learning issues. E. Bioengineering; F. Chemical Engineering; G. Computer Engineering; H. Computer Science; J. Electrical Engineering; K. Environmental Engineering; M. Information Systems.

ENGR 002 (E-Z). Professional Development and Mentoring (1) Activity, 30 hours per quarter. Prerequisite(s): sophomore standing in the Bourns College of Engineering. Provides sophomores with involvement in professional development activities. Activities to be performed are program-specific, and may include projects, industry interactions, and involvement with professional societies and clubs, team building, career guidance, and coverage of ethics and lifelong learning issues. E. Bioengineering; F. Chemical Engineering; G. Computer Engineering; H. Computer Science; J. Electrical Engineering; K. Environmental Engineering; M. Information Systems.

ENGR 010. Introduction to Engineering (2) Discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): none. Introduction to and experience with common everyday engineering and technology devices. Aims to enrich students’ appreciation of technology and the application of simple science and engineering concepts in the design and operation of these devices, and to provide students with an early positive engineering experience and interaction with College of Engineering faculty. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of ENGR 010 or ME 001A.

ENGR 092. First-Year Seminar in Engineering (1) Seminar, 10-15 hours per quarter. Prerequisite(s): freshman standing. Enrollment priority is given to freshmen, but sophomores may enroll on a space-available basis with consent of instructor. Introduction to one of the many areas of study explored by the faculty of the College of Engineering in a small-group, highly interactive format. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as topics change to a maximum of 3 units of any combination of ENGR 092, HASS 092, and NASC 092; students may enroll in only 1 unit of ENGR 092, HASS 092, or NASC 092 per quarter.

Upper-Division Courses

ENGR 101 (E-Z). Professional Development and Mentoring (1) Activity, 30 hours per quarter. Prerequisite(s): junior standing in the Bourns College of Engineering. Provides juniors with involvement in professional development activities. Activities to be performed are program-specific, and may include projects, industry interactions, and involvement with professional societies and clubs, team building, career guidance, and coverage of ethics and lifelong learning issues. E. Bioengineering; F. Chemical Engineering; G. Computer Engineering; H. Computer Science; J. Electrical Engineering; K. Environmental Engineering; M. Information Systems.

ENGR 102 (E-Z). Professional Development and Mentoring (1) Activity, 30 hours per quarter. Prerequisite(s): senior standing in the Bourns College of Engineering. Provides seniors with involvement in professional development activities. Activities to be performed are program-specific, and may include projects, industry interactions, and involvement with professional societies and clubs, team building, career guidance, and coverage of ethics and lifelong learning issues. E. Bioengineering; F. Chemical Engineering; G. Computer Engineering; H. Computer Science; J. Electrical Engineering; K. Environmental Engineering; M. Information Systems.

ENGR 118. Engineering Modeling and Analysis (5) Lecture, 4 hours; discussion, 1 hour. Prerequisite(s): CHEM 001A or CHEM 01HA; CS 010; MATH 046; PHYS 040B; or consent of instructor. Covers the formulation of mathematical models for engineering systems; applying mass, momentum, and energy balances to derive governing differential equations; solving equations with the use of spreadsheets and other software packages; and fitting linear and nonlinear models to experimental data. Credit is awarded for only one of ENGR 118 or ME 118.

ENGR 180. Technical Communications (3) Lecture, 2 hours; workshop, 3 hours. Prerequisite(s): ENGL 001C or ENGL 011C; upper-division standing. Develops oral, written, and graphical communication skills. Involves extensive oral communication and presentations in small groups, and preparing and critiquing reports, proposals, instructions, and business correspondence. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

ENGR 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing or consent of instructor. To be taken with the consent of the chair of the appropriate Engineering program as a means of meeting special curricular problems. Units in this course may not be used to meet requirements for the major unless so designated as a replacement for a requirement not being offered during the student's remaining tenure. Course is repeatable to a maximum of 9 units.

ENGR 191S. Seminar in Sacramento (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor;
admission to the UCR Center at Sacramento Program. Examines aspects of the Sacramento area, including cultural, political, and governmental institutions and the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Sacramento. Required of participants in the UCR Center at Sacramento Program. Cross-listed with HASS 191S and NASC 191S.

**ENGR 191W. Seminar in Washington, D.C. (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Washington Center Program. Examines aspects of the Washington, D.C., area, including cultural, political, and governmental institutions as well as the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Washington, D.C. Required of participants in the UCR Washington Center Program. Cross-listed with HASS 191W and NASC 191W.**

**ENGR 198-L. Individual Internship (1-12) Internship, 3-36 hours. Prerequisite(s): upper-division standing or consent of instructor; consent of off-campus supervisor and appropriate Engineering program chair. Designed to provide experience as a practicing engineer in a governmental, industrial, or research unit. Jointly supervised by an off-campus sponsor and an Engineering faculty member. Requires a written final report. Units may not be used to satisfy major requirements. Course is repeatable to a maximum of 16 units.**

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**English**

**Subject abbreviations: BSWT and ENGL**

**College of Humanities, Arts, and Social Sciences**

Katherine Kinney, Ph.D., Chair
Rise B. Axelrod, Ph.D., Director, English Composition
John C. Briggs, Ph.D., Director, Basic Writing
Jennifer Doyle, Ph.D., Director, Graduate Studies
Tiffany A. Lopez, Ph.D., Director, Graduate Admissions
George E. Haggerty, Ph.D., Director, Undergraduate Studies

Department Office, 1201 Humanities and Social Sciences; (951) 827-5301
Writing Resource Center, 1102 Humanities and Social Sciences; (951) 827-1384; english.ucr.edu

**Professors**

Rise B. Axelrod, Ph.D.
Steven G. Axelrod, Ph.D.
John C. Briggs, Ph.D.
Joseph W. Childers, Ph.D.
Adriana Craciun, Ph.D.
Kimberly J. Devlin, Ph.D.
Emmy B. Elliott, Ph.D., University Professor
Carole Fabricant, Ph.D.
John M. Ganim, Ph.D.
George E. Haggerty, Ph.D.
Stanley N. Stewart, Ph.D.

**Professors Emeriti**

Edwin M. Egner, Ph.D.
Robert N. Essick, Ph.D.
Ralph Hanna, III, Ph.D.
Milton Miller, Ph.D.
John B. Vickery, Ph.D.

**Associate Professors**

Jennifer Doyle, Ph.D.
Heidi Brayman Hackel, Ph.D.
Keith Harris, Ph.D.
Katherine A. Kinney, Ph.D.
Robert Latham, Ph.D.
Tiffany A. Lopez, Ph.D.
Carole-Anne Tyler, Ph.D.
Deborah S. Willis, Ph.D.
Taise Yamamoto, Ph.D.
Susan Ziegler, Ph.D.

**Assistant Professors**

Andrea Denny-Brown, Ph.D.
Erica A. Edwards, Ph.D.
Michelle Hermann Raheja, Ph.D.
Vorris Nunley, Ph.D.
James Tobias, Ph.D.

The English Department offers the university community a range of composition courses that develop the skill of writing effective prose, a skill essential to undergraduate work and to communication in society generally. Students can also enjoy and profit from a broad range of literature courses offered by the department, including a number of lower-division courses designed especially with the non-English major in mind.

**Major**

The English major offers a well-balanced, thought-provoking program for students with a serious interest in the study of literature.

**University Requirements**

See Undergraduate Studies section.

**College Requirements**

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

**Major Requirements**

The major requirements for the B.A. in English are as follows:

1. English 020A, ENGL 020B, and ENGL 020C (15 units). These courses are normally required of all English majors as a prerequisite to upper-division courses.

2. ENGL 102 (4 units). This course should normally be taken prior to or concurrently with the student’s first upper-division English course.

3. Four courses (16 units); one course from each of the following areas:
   a) English Literature to 1660: ENGL 117A, ENGL 117B, ENGL 117C, ENGL 128E, ENGL 128F, ENGL 128G, ENGL 129A, ENGL 148Q, ENGL 149, ENGL 151A, ENGL 151B, ENGL 151T, ENGL 152, ENGL 153, ENGL 154
   c) American Literature to 1900: ENGL 127A, ENGL 127B, ENGL 128B, ENGL 130, ENGL 131, ENGL 132, ENGL 148G, ENGL 148W

4. One 4-unit course on literature and ethnicity, literature and gender, or literature and sexuality chosen from ENGL 121 (E-Z), ENGL 122 (E-Z)/LGBS 122 (E-Z), ENGL 123A, ENGL 123B, ENGL 124A, ENGL 124B, ENGL 136, ENGL 136T, ENGL 137T, ENGL 138A, ENGL 138B, ENGL 138T, ENGL 139, ENGL 139T, ENGL 143 (E-Z)/MCS 143 (E-Z), ENGL 144 (E-Z)/MCS 144 (E-Z)

5. One 4-unit course on literature and related fields, including theory, or a literary theme or genre chosen from ENGL 033/MCS 033, ENGL 100 (E-Z), ENGL 101, ENGL 104/MCS 104, ENGL 140 (E-Z), ENGL 141 (E-Z), ENGL 142 (E-Z), ENGL 143/MCS 143E, ENGL 145 (E-Z)/MCS 145 (E-Z), ENGL 146 (E-Z)/MCS 146 (E-Z)

6. Five additional upper-division English courses (20 units). Only 4 units from ENGL 103 or any upper-division Creative Writing course will be accepted toward the fulfillment of this requirement. Four units of ENGL 190 may be counted toward this requirement. Proposals for ENGL 190 must be approved by a sponsoring faculty member and the department chair. If the student wishes to offer units from ENGL 190 as part of the 20 units, a copy of an approved petition will be placed in the student’s file.

Total units in major: 63 units, of which at least 15 units and no more than 20 units must be at the lower-division level.

Students are encouraged to take at least one of the following as a college breadth requirement or as an elective: CLA 027A, CLA 027B, CLA 040; CPLT 017A, CPLT 017B, CPLT 017C; ETST 114, ETST 120, ETST 124, ETST 138, ETST 170/WRIT 170, ETST 183; or any literature course in a language other than English. Students are also encouraged to take a course in British or American history, such as HIST 017A, HIST 017B, HIST 018, HIST 151, HIST 152.

Each student is assigned a faculty advisor for help in shaping a program and following it through to graduation. Students must see their advisors on a regular basis, normally once per quarter prior to registration. Information about advisors is available in the department office from the undergraduate student affairs officer.
**English Undergraduate Honors Program**

The English Department awards departmental honors to those who complete the following requirements:

1. Maintain a GPA of 3.5 or higher in the English major.
2. Complete 14 additional units of upper division courses in English.
3. Complete English 193A “Senior Seminar” (the units of which may be used toward the additional upper division unit requirement)
4. Complete English 193B “Senior Research,” by submitting a Senior Paper as the result of research begun in 193A “Senior Seminar.”
5. Successfully present their Senior Paper in an undergraduate Honors Research colloquium or conference sponsored by the English Department.

Students may request to participate in the honors track or they may be invited. Students must declare their intention to participate by the end of the fourth quarter prior to graduation.

**Minor**

The English minor is designed to provide an overview of English and American literature, an opportunity for the exercise of disciplined literary analysis, and a varied experience of the best literature in English.

1. Lower-division requirements (14 units)
   a) Two courses chosen from ENGL 020A, ENGL 020B, ENGL 020C
   b) One course chosen from ENGL 012A, ENGL 012B, ENGL 012C, ENGL 012 (E-Z), ENGL 014, ENGL 015, ENGL 017, ENGL 018, ENGL 022, ENGL 033/MCS 033

2. Upper-division requirements (16 units)
   a) Four courses of upper-division English. Only four (4) units from ENGL 103 or ENGL 190 will be accepted toward fulfillment of this requirement. Proposals for ENGL 190 must be approved by a sponsoring faculty member and the department chair. If the student wishes to offer units from ENGL 190 as part of the 16 units, a copy of the approved petition will be placed in the student's file.

   See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

**University of California Entry Level Writing Requirement**

For regulations governing the University of California Entry Level Writing Requirement, see Requirements for the Bachelor’s Degree in the Undergraduate Studies section of this catalog. Students who have fulfilled the requirement may enroll in ENGL 001A. Students who are held for the requirement must take the University of California Analytical Writing Placement Exam. Results determine which course(s) a student should take to satisfy university requirements. Visit [english.ucr.edu/elwr](http://english.ucr.edu/elwr) for more information.

**Teaching Credential Preparation Programs**

Students interested in becoming teachers at the elementary or secondary school level may combine the English major with a program of study leading to the multiple subjects (elementary) or single subject (secondary) credential preparation program. Details and counseling on the Prepare to Teach Program, a preparation program for the multiple subjects credential, are available in the Office of Interdisciplinary Programs, 2417 Humanities and Social Sciences, (951) 827-2743. Details and counseling on other programs are available in the Department of English or the Graduate School of Education.

**Education Abroad Program**

The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at [internationalcenter.ucr.edu](http://internationalcenter.ucr.edu) or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at [eap.ucop.edu/programwizard](http://eap.ucop.edu/programwizard).

**Graduate Program**

The Department of English offers the Ph.D. and M.A. degrees in English.

**Admission**

All domestic and international applicants must supply GRE General Test scores (quantitative and verbal) earned within the past five years.

**Doctoral Degree**

The Department of English offers the Ph.D. degree in English.

The doctoral program in English prepares students to become informed teachers and scholars-capable of significant original literary scholarship.

**Admission**

Admission is open to qualified candidates with a B.A. or M.A. degree, preferably in English. Students with an M.A. in another field will normally be required to take additional course work.

**Course Work**

The candidate entering the program without an M.A. must complete (with a grade of “B” or better) a minimum of 66 units of course work. Prior to taking Qualifier I, students must meet the course work requirement of the M.A. Degree (42 units). Upon successfully passing Qualifier Examination I, students must complete at least an additional six seminars (24 units) in 200-level course work, excluding ENGL 280, ENGL 291, ENGL 292, and ENGL 299. The candidate with an M.A. from another institution must complete a minimum of 36 units of course work in 200-level courses, excluding ENGL 280, ENGL 291, ENGL 292, and ENGL 299. All students, in consultation with the graduate advisor, select primary and secondary fields of study and identify a third, more specialized area related to a dissertation topic. Once course work requirements are satisfied, all students take the Qualifier Examination II and complete a dissertation.

**Language Requirement**

Students entering with a B.A. must demonstrate proficiency in two languages other than English before advancement to candidacy. Students entering with an M.A. from institutions that required proficiency in a language other than English for the master’s degree must demonstrate proficiency in a second language before advancement to candidacy. In lieu of a second language, students from both groups may complete one of three alternatives involving the first language or a related field approved by the Graduate Committee. For details consult the graduate advisor or [english.ucr.edu](http://english.ucr.edu).

Students entering with an M.A. from institutions that did not require proficiency in a language other than English for the master’s degree must demonstrate proficiency in one language other than English. Alternatives described above are not available to these students.

**Qualifying Examinations I and II**

At the end of the sixth quarter, students who have entered the program with a B.A. become eligible to receive an M.A. upon completion of the Qualifying Examination I. For this examination, students submit a portfolio of three essays, one of which has been revised according to the terms of ENGL 296, and a 1000- to 1500-word metacommentary explaining the aims and achievements of the essays and their contributions to a coherent research agenda. The student is then examined orally for one hour on the portfolio and two distinct fields related to at least two of the three essays. Following successful completion of this examination and a review of the entire student file, the graduate committee recommends the awarding of the M.A. degree. (The Qualifying Examination I is waived for students with an M.A. from another institution.) After the completion of all course work, students take the Qualifying Examination II to be advanced to candidacy.

The Qualifying Examination II includes three written examinations, followed by an oral examination of up to three hours, and is designed to prepare the student for work on the dissertation. The oral examination includes a short presentation by the student, which focuses on the written exam just taken and on the student’s plan for the dissertation.
Dissertation The dissertation should be related to the individualized course of study preceding it and should draw out the best research and critical talents of the candidate. For a more detailed description of the requirements for the Ph.D., contact the Graduate Assistant, Department of English.

Normative Time to Degree including UCR M.A.

Work 18 quarters (or 15 quarters for students with an M.A. from another institution)

Master’s Degree The Department of English also offers a terminal M.A. program for a small number of students who have the M.A. as their degree objective.

Admission Admission is open to qualified candidates with a B.A. degree in English or a closely related field of study.

Course Work Each student’s specific program is individually structured in consultation with the graduate advisor. The candidate must complete (with a grade of “B” or better) a minimum of 42 units of course work, including ENGL 200 (Introduction to Graduate Study in English), ENGL 296 (Master’s Portfolio), and at least 36 units in other 200-series courses, excluding ENGL 280, ENGL 291, ENGL 292, and ENGL 299. Eight (8) units of 100-series courses (excluding ENGL 103 and ENGL 190) may be counted toward the 42-unit requirement with the permission of the graduate advisor.

Language Requirement Students must demonstrate proficiency in one language other than English.

M.A. Examination In the sixth quarter of the program, the student completes the Qualifying Examination I as described in the Ph.D. program above. Following successful completion of this examination and a review of the entire student file, the graduate committee recommends awarding the M.A. degree. (Students in the terminal M.A. program who wish to change their degree objective to the Ph.D. must notify the graduate advisor before the end of their fifth quarter to request that reconsideration for the Ph.D. program be a part of the M.A. examination process. The graduate committee then reviews the results of the M.A. examination and the entire student file to determine whether the student may continue into the Ph.D. program. For details, contact the Graduate Assistant, Department of English.

Normative Time to Degree 6 quarters

Basic Writing

Lower-Division Courses

BSWT 003. Basic Writing for Second-Language Students (5) Lecture, 3 hours; workshop, 2 hours. Prerequisite(s): an appropriate score on the University of California Analytical Writing Placement Exam; concurrent enrollment in BSWT 003D or BSWT 003L. An introductory course designed for students who need instruction in English as a second language. Helps to develop writing proficiency by means of regular written assignments and intensive individual interaction between student and instructor. Students who pass the course with a grade of “S” should enroll in ENGL 004. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Graded Satisfactory (S) or No Credit (NC).

ENGL 003D. Basic Writing for Second-Language Students (1) Discussion, 1 hour. Prerequisite(s): concurrent enrollment in BSWT 003. Focuses on reading literature with close attention to grammar and style, organizing essays, honing syntax, and asking and answering academic questions. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Graded Satisfactory (S) or No Credit (NC).

ENGL 003L. Basic Writing for Second-Language Students (1) Laboratory, 3 hours. Prerequisite(s): concurrent enrollment in BSWT 003. Focuses on mastery of principles and applications of English grammar and idiomatic expression, as well as critical reading, which are pertinent to second-language students. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 3 units.

English

Lower-Division Courses

ENGL 001A. Beginning Composition (4) F, W, S Lecture, 3 hours; extra writing and rewriting, 3 hours. Prerequisite(s): fulfillment of the University of California Entry Level Writing Requirement. Introduces students to the strategies of personal writing in a multicultural context. Students must be formally enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class.

ENGL 001B. Intermediate Composition (4) Lecture, 3 hours; extra writing and rewriting, 3 hours. Prerequisite(s): ENGL 001A. Emphasizes the transition from personal to public writing in a multicultural context. Students must be formally enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class.

ENGL 001C. Applied Intermediate Composition (4) Lecture, 3 hours; extra writing and rewriting, 3 hours. Prerequisite(s): ENGL 001B. Addresses the function of writing in a range of contemporary situations, including that of the academy, from a critical and theoretical perspective. Students must be formally enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class. Credit is awarded for only one of ENGL 001C, ENGL 01HC, or ENGL 01SC.

ENGL 002. English Study Group (0) Lecture, 4 hours. Prerequisite(s): concurrent enrollment in the summer Bridge Program, ENGL 004, and ENGL 004D. Provides an intensive review of grammar, training in critical reading of college-level texts, and practice in speed-reading. Carries workload credit equivalent to 1 unit but does not count towards graduation units. Offered in summer only. Graded Satisfactory (S) or No Credit (NC).

ENGL 004. English Writing (4) F, W, S, Summer Lecture, 3 hours; extra reading and writing, 3 hours. Prerequisite(s): an appropriate score on the University of California Analytical Writing Placement Exam or a grade of “S” in BSWT 003; concurrent enrollment in ENGL 004D or ENGL 004L. Covers ground rules of academic inquiry and exchange in English writing. Students who pass the course with a grade of “C” or better have completed the University of California Entry Level Writing Requirement and are eligible to enroll in ENGL 001A. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Satisfactory (S) or No Credit (NC) grading is not available.

ENGL 004D. English Writing (1) Discussion, 1 hour. Prerequisite(s): concurrent enrollment in ENGL 004. Focuses on critical reading of assigned texts, organizing essays, honing syntax, and asking and answering academic questions. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Graded Satisfactory (S) or No Credit (NC).

ENGL 004L. English Writing (1) Laboratory, 3 hours. Prerequisite(s): concurrent enrollment in ENGL 004. Focuses on mastery of principles and applications of English grammar and idiomatic expression, as well as critical reading, for students who do not need, or have advanced beyond, second-language instruction. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 3 units.

ENGL 005. Ideas in Conflict (4) Lecture, 3 hours; extra writing and rewriting, 5 hours. Prerequisite(s): an appropriate score on the University of California Analytical Writing Placement Exam; concurrent enrollment in ENGL 005D or ENGL 005L. Examines elements of academic argument in the context of major, conflicting texts. Particular attention is given to identifying, analyzing, and framing debatable questions and issues; finding and developing appropriate, persuasive arguments; and tapping the syntactic resources of standard English. Includes extensive readings and numerous writing assignments along with formal oral presentations. Students who pass the course with a grade of “C” or better have completed the University of California Entry Level Writing Requirement and are eligible to enroll in ENGL 001A. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Satisfactory (S) or No Credit (NC) grading is not available.

ENGL 005D. Ideas in Conflict (1) Discussion, 1 hour. Prerequisite(s): concurrent enrollment in ENGL 005. Focuses on reading assigned texts with close attention to grammar and style, organizing essays, honing syntax, and asking and answering academic questions. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Satisfactory (S) or No Credit (NC) grading is not available.

ENGL 005L. English Writing (1) Laboratory, 3 hours. Prerequisite(s): concurrent enrollment in ENGL 005. Focuses on advanced mastery of principles and applications of English grammar and idiomatic expression, as well as critical reading. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 3 units.

ENGL 006D. Qualifier Course Adjunct (1 or 2) Discussion, 1-2 hours. Prerequisite(s): concurrent enrollment in a qualifier course. Provides individual and group instruction in support of writing-intensive courses designated as qualifier courses. Focuses on interpreting the qualifier course’s assignments; developing topics; preparing, editing, and revising drafts.
Qualifier courses are offered by various departments to give eligible students an opportunity to meet the University of California Entry Level Writing Requirement while earning baccalaureate credit. Students may obtain information about qualifier courses by contacting the Writing Resource Center. Students should be formally enrolled prior to the beginning of instruction and should attend the first meeting to avoid being dropped from the class. Graded Satisfactory (S) or No Credit (NC).

ENGL 012 (E-Z). Introduction to Literature (4) Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. A study of topics, themes, or types of literature. The texts may be selected from any one, or from a combination, of several periods of English and/or American literature. Intended primarily for nonmajors.

ENGL 012A. Introduction to Poetry (4) Lecture, 3 hours; extra reading, 3 hours. An introductory study of poems selected from various periods, including the modern. Special attention is paid to themes, forms, and kinds. Intended primarily for non-English majors.

ENGL 012B. Introduction to Fiction (4) Lecture, 3 hours; extra reading, 3 hours. An introductory study of novels and short stories selected from various periods, including the modern. Special attention is paid to themes, forms, and kinds. Intended primarily for non-English majors.

ENGL 012C. Introduction to Drama (4) Lecture, 3 hours; extra reading, 3 hours. An introductory study of plays selected from various periods, including the modern. Special attention is paid to themes, forms, and relationships of text to theatrical performance. Intended primarily for non-English majors.

ENGL 012D. Great American Speeches (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. The course focuses on key speeches from American history, including the American Revolution.

ENGL 014. Major American Writers (4) Lecture, 3 hours; extra reading, 3 hours. Explores masterpieces of American literature. Focuses on classic and contemporary works by such writers as Hawthorne, Thoreau, Emily Dickinson, Twain, Hemingway, F. Scott Fitzgerald, Ralph Ellison, and Joyce Carol Oates. Intended primarily for nonmajors.

ENGL 015. Modern Literature (4) Lecture, 3 hours; extra reading, 3 hours. An introductory course designed primarily for nonmajors. Focuses on an important theme or technique in modern and contemporary literature.

ENGL 017. Shakespeare (4) Lecture, 3 hours; consultation/discussion, 1 hour. This course, intended primarily for non-English majors, is designed to provide an understanding of drama as a form of literary art and to encourage a familiarity with Shakespeare's most important works. Plays from each dramatic genre (comedy, history, and tragedy) will be included.

ENGL 018. Shakespeare on Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An examination of cinematic adaptations of Shakespeare's plays, paying particular attention to issues of cinematic theory, historical adaptation, and thematic reconstruction. Credit is awarded for only one of ENGL 018 or THEA 022.

ENGL 018H. Honors Applied Intermediate Composition (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ENGL 001B or equivalent; admission to the University Honors Program or consent of instructor. Honors course corresponding to ENGL 001C and ENGL 015C. A course in extended exposition prose with emphasis on principles of explanation, interpretation, and argument. Special attention is paid to the theoretical implications of various modes of academic inquiry. Students must be formally enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ENGL 018, ENGL 015C, or ENGL 015SC.

ENGL 015C. Applied Intermediate Composition for Science and Engineering Majors (4) Lecture, 3 hours; extra writing and rewriting, 3 hours. Prerequisite(s): ENGL 01B. A course for science and engineering majors corresponding to ENGL 001C and ENGL 01HC. Helps students build the writing skills most relevant to their future work in science or engineering fields. Students must be formally enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class. Credit is awarded for only one of ENGL 001C, ENGL 01HC, or ENGL 015SC.

ENGL 020A. Introduction to British Literary Tradition (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours; written work, 2 hours. Designed for English majors. Introduces British literature from its beginnings, with an emphasis on the history of literature in Britain.

ENGL 020B. Introduction to American Literary Tradition (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours; written work, 2 hours. Designed for English majors. Introduces American literature from its beginnings, with an emphasis on the history of American literature and culture.

ENGL 020C. Introduction to Alternative Critical Perspectives on Literature and Culture (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours; written work, 2 hours. Introduces students to work associated with alternative critical traditions, including Chicano, African, African-American, and Caribbean literature, or feminist, Marxist, and postcolonial perspectives on literature and culture.

ENGL 021. Culture Clash: Studies in Latino Theatre and Film (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to Latino theatre and film from 1965 to the present. Examines the major works of playwrights and important films and videos. Cross-listed with MCS 025 and THEA 021.

ENGL 022. Writing Red: Native American Literature (4) Lecture, 3 hours; extra reading, 3 hours. Acquaints students with a range of Native American literatures. Discusses mass-mediated images of Native Americans and how “Indianness” is constructed, contested, and embodied in poetry, film, autobiography, fiction, and photography.

ENGL 033. Introduction to Comparative Media Studies (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Comparative introduction to the study of two or more media, such as film and television or digital media, and to various critical approaches to the media (formalism, feminism, Marxism, etc.). Special attention is paid to the “rhetoric” of media, media similarities and differences, and cross-media borrowing. Cross-listed with MCS 033.

Upper-Division Courses

ENGL 100 (E-Z). Scriptures, Myths, and Interpretation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. This course focuses on issues of scriptural and mythical analysis. Possible areas covered include: the impact of scripture and myth on literatures written in English; the textual development of the Hebrew Scripture and its analogues, including the development of the King James version; major authors’ uses of scripture and myth; the history of scriptural and mythological exegesis; the place of scripture and myth in current criticism and theory. Course is repeatable as topics change.

ENGL 101. Critical Theory (4) Lecture, 3 hours; consultation, 1 hour. A study of major theoretical issues in representative critical and scholarly works.

ENGL 102. Introduction to Critical Methods (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): a major in English or consent of instructor. Close analysis of formal features of several genres and an introduction to theoretical and critical approaches.

ENGL 103. Advanced Composition (4) Lecture, 3 hours; discussion/consultation, 1 hour. Prerequisite(s): ENGL 001C or the equivalent. Principles of expository prose, with intensive practice. Advanced course in composition, not remedial. May be repeated for credit up to a maximum of 12 units.

ENGL 104. Film and Media Theory (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers different types of film and media theory. Addresses formalist, psychoanalytic, Marxist, feminist, and other approaches to the cinema and other media. Cross-listed with MCS 104.

ENGL 112. History of the English Language (4) Lecture, 3 hours; consultation/discussion, 1 hour. An introductory survey of the history of English, including its Indo-European ancestry, its vocabulary and etymologies, changes in pronunciation, spelling, and grammar, development of dictionaries, and changing attitudes toward the language and usage.

ENGL 117A. Shakespeare: History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A close analytical study of plays selected from one of Shakespeare’s dramatic genres as they are designated in the First Folio.

ENGL 117B. Shakespeare: Comedy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A close analytical study of plays selected from one of Shakespeare’s dramatic genres as they are designated in the First Folio.

ENGL 117C. Shakespeare: Tragedy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A close analytical study of plays selected from one of Shakespeare’s dramatic genres as they are designated in the First Folio.

ENGL 117T. Topics in Shakespeare (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A focused study of plays by Shakespeare selected from different genres.

ENGL 120A. Native American Literature to 1900 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical study of Native American literature from the era of oral narrative to 1900, with special attention to autobiography and fiction, as well as criticism and theory.
ENGL 120B. Native American Literature after 1900 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical study of Native American literature from 1900 to the present, with special attention to poetry, visual culture, fiction, and self-life-narration, as well as criticism and theory.

ENGL 120T. Studies in Native American Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A focused study of a topic, genre, period, or author in Native American literature. Examples might include Native American culture, oral narrative, collaborative autobiography, ethnography, or poetry.

ENGL 121 (E-Z). Postcolonial Literatures of Asia, Africa, and the Caribbean (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. The analysis of colonial discourse and of the postcolonial condition. The following topics, among others, may be addressed: historiography and subalternity; nationalism, gender, and sexuality; neocolonialism and transnationality; theorizing resistance; postcolonial identity politics and the discourses of tradition and modernity; the postcolonial intellectual; and postcolonial filmmaking and Third Cinema.

ENGL 122 (E-Z). Literature and Sexualities (4) Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A study of English and American literature from the perspective of sexuality and sexual identity. Courses cover issues such as gay and lesbian texts and contexts; sexual ideologies and literature; marginalized writers and texts; and the uses of theories of sexuality in the study of literature. Cross-listed with LGBS 122 (E-Z).

ENGL 123A. Women and Literature: Poetry (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of writing by women from the medieval period to the present, examining the effects of race and class as well as gender on literary form and language, and considering questions of literary influence and transmission.

ENGL 123B. Women and Literature: Autobiography (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of writing by women from the medieval period to the present, examining the effects of race and class as well as gender on literary form and language, and considering questions of literary influence and transmission.

ENGL 124A. Female Novelistic Traditions: Eighteenth and Nineteenth Centuries (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A study of the works of women novelists, writing at different historical moments and in different cultural milieus. Attention is given to the psychological, political, and technical features of the tradition; the connections and contrasts within it; and the problems of female literary influence.

ENGL 124B. Female Novelistic Traditions: Twentieth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A study of the works of women novelists, writing at different historical moments and in different cultural milieus. Attention is given to the psychological, political, and technical features of the tradition; the connections and contrasts within it; and the problems of female literary influence.

ENGL 125A. The Development of the English Novel: Eighteenth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of British fiction, with some attention to the criticism and theory of the novel.

ENGL 125B. The Development of the English Novel: Nineteenth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of British fiction, with some attention to the criticism and theory of the novel.

ENGL 125C. The Development of the English Novel: Twentieth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of American long fiction in the nineteenth century, with special attention to such modes as realism, modernism, and postmodernism.

ENGL 126A. The American Novel: Nineteenth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of American long fiction in the nineteenth century, with special attention to such modes as realism, modernism, and postmodernism.

ENGL 126B. The American Novel: Since 1900 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of American long fiction, with some attention to the criticism and theory of the novel.

ENGL 126C. The Development of the American Novel: Present (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. An exploration of U.S. Latina/o literature, with particular attention to the evolution and revolutionary aspects of its forms and themes.

ENGL 127A. American Poetry: Before 1900 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical study of American poetry, focusing on the evolutionary and revolutionary aspects of its forms and themes.

ENGL 127B. American Poetry: Twentieth Century (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical study of American poetry, focusing on the evolutionary and revolutionary aspects of its forms and themes.

ENGL 127C. Studies in American Poetry (4) Lecture, 3 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A focused study of a topic, motif, genre, period, or movement in American poetry. Examples might include political or regional poetry, the epic or lyric, or Beat poetry or Language poetry.

ENGL 128 (E-Z). Major Authors (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Intensive study of a major English or American author. E. Chaucer; F. Spenser; G. Milton; I. Swift; J. Austen; K. Wordsworth; R. Woolf; S. Joyce; T. Faulkner; U. Baldwin; V. Salmon Rushdie; W. Maya Angelou; X. Toni Morrison.

ENGL 129A. English and American Drama: Elizabethan and Jacobean Drama (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of British and American drama. Each segment may be taken independently of the others.

ENGL 129B. English and American Drama: Restoration and Eighteenth-Century Drama (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical study of British and American drama. Each segment may be taken independently of the others.

ENGL 129C. English and American Drama: Modern British and American Drama (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Examination of writing in America of the pre-colonial, colonial, and early national periods, including the work of such writers as Anne Bradstreet, Benjamin Franklin, Susanna Rowson, and Washington Irving.

ENGL 130. American Literature, 1830 to the Civil War (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A focused study of the American Renaissance, as represented in such writers as Emerson, Hawthorne, Poe, Melville, Stowe, Thoreau, Douglass, and Whitman.

ENGL 132. American Literature from the Civil War to 1914 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. New departures in the American literary consciousness as registered in the works of such writers as Emily Dickinson, Mark Twain, Charles W. Chesnutt, Kate Chopin, Henry James, Henry Adams, and Edith Wharton.

ENGL 133. American Literature, 1914-1945 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Modern perspectives and literary innovations in the work of such writers as William Faulkner, F. Scott Fitzgerald, Zora Neale Hurston, Wallace Stevens, William Carlos Williams, Gertrude Stein, and Eugene O’Neill.

ENGL 134. American Literature, 1945 to the Present (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A study of postmodern, contemporary, and multicultural texts by such writers as Toni Morrison, Thomas Pynchon, Maxine Hong Kingston, Robert Lowell, Sylvia Plath, John Ashbery, and Leslie Marmon Silko.

ENGL 135. Modern Irish Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical study of modern Irish literature, set against the background of the political and religious conflicts of Irish history.

ENGL 136. Latina and Latino Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of U.S. Latina/o literature, with particular attention to aesthetic achievements, recurrent forms and themes, and interrelations with other American literatures.
ENGL 136T. Studies in Latina and Latino Literature (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of Latina and Latino literature focusing on issues of identity, culture, and aesthetics.

ENGL 137T. Studies in Comparative Minority Discourses (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A focused study of minority discourse that emphasizes comparative readings. Possible topics include African American and Latino prison narratives, Asian American and Latino immigrant writing, movement literature of the 1960s and 1970s, independent publishing, “growing-up” narratives, and issues of identity, culture, and aesthetics.

ENGL 138A. African American Literature through the Harlem Renaissance (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of African American literature with particular attention to the development of an African American literary tradition and the challenge posed to the traditional canon of American literature.

ENGL 138B. African American Literature since the Harlem Renaissance (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of African American literature with particular attention to the development of an African American literary tradition and the challenge posed to the traditional canon of American literature.

ENGL 138T. Studies in African American Literature (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A focused study of ideas, forms, or movements within the field of minority discourse that emphasizes comparative readings. Possible topics include African American and Latino prison narratives, Asian American and Latino immigrant writing, movement literature of the 1960s and 1970s, independent publishing, “growing-up” narratives, and issues of identity, culture, and aesthetics.

ENGL 139. Asian American Literature (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of Asian American literature, with particular attention to aesthetic achievements, recurrent forms and themes, and interrelations with other American literatures.

ENGL 139T. Studies in Asian American Literature (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A focused study of a genre, motif, or topic in Asian American literature such as poetry, autobiography, woman’s writing, nationalism, mobility narratives, gender, and sexuality.

ENGL 140 (E-Z). Studies in Literary Genres (4)
Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Practical and theoretical study of such literary genres as the lyric, the epic, the romance, tragedy, comedy, and satire.

ENGL 141 (E-Z). Literature and Related Fields (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of the study of literature in relation to other areas: creativity, myth, iconography, society, science, behavior, and translation.

ENGL 142 (E-Z). Cultural Studies (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. The formal, historical, and theoretical development of a methodology in cultural studies that includes the mass media, the market, the mass subject, and the market's role in everyday life. This course may consider two authors with related concerns.

ENGL 142A. African American Literature through the Harlem Renaissance (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of African American literature with particular attention to the development of an African American literary tradition and the challenge posed to the traditional canon of American literature.

ENGL 142B. African American Literature since the Harlem Renaissance (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A critical survey of African American literature with particular attention to the development of an African American literary tradition and the challenge posed to the traditional canon of American literature.

ENGL 143 (E-Z). Gender, Sexuality, and Visual Cultures (4)
Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of race and ethnicity in film, television, and visual culture. Special emphasis on Western cinema, television, and visual culture. Weekly screenings and readings. I. Race and Ethnicity in Film, Television, and Visual Culture: 1600-1960s. F. Film and Gender. G. Screening the Lesbian. Cross-listed with MCS 143 (E-Z).

ENGL 144 (E-Z). Race, Ethnicity, and Visual Culture (4)
Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of race and ethnicity in film, television, and visual culture. Weekly screenings and readings. I. Race and Ethnicity in Film, Television, and Visual Culture: 1600-1960s. F. Film and Gender. G. Screening the Lesbian. Cross-listed with MCS 143 (E-Z).

ENGL 145 (E-Z). Special Topics in Film and Visual Culture (4)
Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of a theme or issue in film, media, television, and visual culture. I. Racial Difference and Visual Culture in the Postcolonial World: Context; J. Film, Race, and Ideology: The Case of the Vietnam War; K. Decolonizing the Screen. Cross-listed with MCS 145 (E-Z).

ENGL 146 (E-Z). Special Topics in Technoculture and Digital Media (4)
Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Advanced study of theories and practices of reader and audience interaction with technologies of cultural production in general and digital media in particular. Includes praxis-oriented composition or research. E. Identities and Intersections; F. Cultures and Technologies of the Visual; G. Cultures and Technologies of the Aural; I. Advanced Composition and Rhetoric for Digital Media Authors. Cross-listed with MCS 146 (E-Z).

ENGL 147 (E-Z). Studies in a Major Work (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Advanced study of works of literature that demonstrate excellence in the interpretation of major works of literature, including the relationship of major works to each other and their place in the tradition of literature. Cross-listed with MCS 147 (E-Z).

ENGL 148 (E-Z). Studies in Major Authors (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Intensive study of a major author not covered under ENGL 128 (E-Z). Some segments of this course may consider two authors with related concerns.

ENGL 149. Old English Literature (4)
Lecture, 3 hours; extra reading, 3 hours. English literature of the Anglo-Saxon period: such works as Beowulf, “The Seafarer,” and “The Wanderer.”

ENGL 151A. Middle English Literature: 1066-1500 (4)
Lecture, 3 hours; outside reading, 3 hours. An introduction to major literary genres—romance, dream vision, lyric, devotional prose, and drama.

ENGL 151B. Middle English Literature: Later Fourteenth Century (4)
Lecture, 3 hours; outside reading, 3 hours. Covers the great works of the later fourteenth century—Chaucer’s Troilus, Plaourc Plowman, and the poems of the Gawain poet.

ENGL 151T. Studies in Medieval Literature (4)
Lecture, 3 hours; consultation or discussion, 1 hour. English literature of the Middle Ages, with attention (where pertinent) to its continental backgrounds (the latter read in translation). Detailed examination of major literary works chosen to illuminate such topics as Christian theology, monasticism, chivalry, and courtly love.

ENGL 152. Renaissance Revolutions (4)
Lecture, 3 hours; outside reading, 3 hours. Studies in some of the major literary works of the period (excluding The Faerie Queene). Topics may center on comparisons with other art forms, on genres like the lyric, the pastoral, the romance, etc., or on ideas or topics of importance as they are reflected in the literary forms of the period.

ENGL 154. Studies in Late Renaissance Literature (4)
Lecture, 3 hours; extra reading, 3 hours. Studies in some of the major literary figures of the period (excluding Milton). Topics may center on major late English renaissance ideas or themes such as the political, philosophical, or religious questions, or on other ideas or topics of importance, as they are reflected in the literary forms of the period (metaphysical or Cavalier poetry, the character, etc.).

ENGL 161A. Restoration and Eighteenth-Century English Literature: 1600-1730 (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Intensive study of the major works of the period: Ben Jonson, Shakespeare, Dryden,Swift, Pope, The Age of Johnson (including Boswell, Voltaire, Burke, etc.) and satire (Dryden, Rochester, Pope, Gay, Swift).

ENGL 161B. Restoration and Eighteenth-Century English Literature: 1730-1790 (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Intensive study of the major works of the period: Voltaire, Swift, Pope, The Age of Johnson (including Boswell, Voltaire, Burke, etc.) and satire (Dryden, Rochester, Pope, Gay, Swift).

ENGL 161T. Studies in Eighteenth-Century Literature (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Intensive study of the major works of the period: Voltaire, Swift, Pope, The Age of Johnson (including Boswell, Voltaire, Burke, etc.) and satire (Dryden, Rochester, Pope, Gay, Swift).
ENGL 166A. Literature of the Romantic Period (4)
Lecture, 3 hours; extra reading, 3 hours.
Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Covers writers such as Byron, Hazlitt, Keats, Scott, Mary Shelley, and Percy Shelley.

ENGL 166B. Literature of the Romantic Period (4)
Lecture, 3 hours; extra reading, 3 hours.
Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A study of the relationship between the literature of the period and intellectual interests such as antiquarianism, primitivism, perfectibility, transcendentalism, and romanticism.

ENGL 172A. Literature of the Early Victorian Period (4)
Lecture, 3 hours; extra reading, 3 hours.
Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. Covers Arnold, Ruskin, Swinburne, Pater, and Hopkins; the Pre-Raphaelites, the Aesthetic Movement, and Decadence.

ENGL 172T. Studies in Victorian Literature (4)
Lecture, 3 hours; extra reading, 3 hours.
Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A team-taught introduction to a range of critical and theoretical issues of concern to entering graduate students, including canon formation, field organization, critical and theoretical assumptions behind the establishment of various fields, and the uses of theory.

ENGL 250. Seminar in Medieval Literature (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Intensive research in medieval literature. May focus on major authors, including Chaucer, Langland, or the Gawain-poet; genres, including romance, prose, or the drama; thematic topics, including gender, literacy, or subjecitivity; or methodology, including textual study, historicism, or literary theory. Course is repeatable as content changes.

ENGL 261. Seminar in Renaissance Literature (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Studies in Renaissance literature and its literary, cultural, or historical contexts. Intensive readings in a major author, historical subperiod, or special topic. Includes critical and theoretical approaches important to the field. Course is repeatable as content changes.

ENGL 264. Seminar in Restoration and Eighteenth-Century Literature (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Intensive research in particular areas of Restoration and eighteenth-century literature and society such as the “rise of the novel; women writers and readers; interactions of “high” and “low” cultures; ideologies of gender and sexuality; capitalism, colonialism, and literature; autobiographical and historical representations of self and others. Course is repeatable as content changes.

ENGL 265. Seminar in Literary Theory (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Research in late eighteenth- and early nineteenth-century literature and its legacy in modern critical configurations of romanticism. Course is repeatable as content changes.

ENGL 266. Seminar in Victorian Literature (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Concentrated research and discussion of topics, issues, and figures in Victorian literature and culture. Rubrics may include, but are not limited to, theoretical approaches to Victorian studies; questions of race, class, gender, and sexuality in Victorian culture; problems of aesthetics and genre; the politics of Empire; as well as author or text focused offerings. Course is repeatable as content changes.

ENGL 268. Seminar in British Literature since 1900 (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Intensive analysis of figures, genres, movements, and issues in twentieth-century British literature and culture. May include topics such as Bloomsbury and the Politics of art; Joyce and Empire; Modernism, Modernity, and Gay Identities; British Postmodernism; Virginia Woolf and Feminist Theory. Course is repeatable as content changes.

ENGL 270. Seminar in American Literature since 1900 (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Courses are repeatable as content changes.

ENGL 271. Seminar in American Literature since 1900 (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Studies in American literature and culture to 1900. Topics may include nineteenth-century novel; slavery and narrative; gender and colonial literary culture; Whitman and Dickinson; or other historical, gender-centered or theoretical issues. Course is repeatable as content changes.

ENGL 272. Seminar in Critical Theory (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Studies in American literature and culture to 1900. Topics may include nineteenth-century novel; slavery and narrative; gender and colonial literary culture; Whitman and Dickinson; or other historical, gender-centered or theoretical issues. Course is repeatable as content changes.

ENGL 273. Seminar in Cultural Studies (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Studies in cultural movements. May emphasize historical or thematic relations among various theorists. Course is repeatable as content changes.

ENGL 274. Seminar in Feminist Discourses (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Courses are repeatable as content changes.

ENGL 275. Seminar in Film and Visual Cultures (4)
Seminar, 3 hours; screening, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Analysis of film, television, and other forms of visually-oriented textuality. Approaches may include cultural criticism; media theory; structural and poststructural analysis; feminist, gender, gay and lesbian theory; semiotics. Course is repeatable as content changes.

ENGL 276. Seminar in Colonialism and Postcoloniality (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. An introduction to the analysis of colonial discourse and the postcolonial condition. Issues addressed include, among others, historiography and subalternity; nationalism, gender, and sexuality; neo-colonialism and transnationality; theorizing resistance; mimicry in colonial discourse; the academy, pedagogy, and the postcolonial intellectual. Course is repeatable as content changes.

ENGL 277. Seminar in Sexualities and Genders (4)
Seminar, 3 hours; outside research, 3 hours.
Prerequisite(s): graduate standing or consent of instructor. Courses are repeatable as content changes.
instructor. Examines representations in a variety of liter- ary, media, and critical genres by or of lesbians, gay men, transgenders, and others marginalized because of their sexuality or gender expression. Topics may include the history of sexuality, camp, posthuman genders and sexualities, queer theory, and lesbian and gay literature and film. Course is repeatable as content changes.

ENGL 278. Seminar in Minority Discourse (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive study and research in the history of questions of identity and the African American novel; border culture; nineteenth-century Black bodies; oral history and literature. Course is repeatable as content changes.

ENGL 279. Seminar in Rhetorical Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive study of two or more ostensibly distinct fields, periods, disciplines, or arts. Course is repeatable as content changes.

ENGL 280. Colloquium in English and American Literature (2) Seminar, 2 hours. Prerequisite(s): graduate standing. Colloquia of both a formal and informal order on current research topics for students, faculty, and visiting scholars. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ENGL 281. Seminar in Comparative Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive study of two or more ostensibly distinct fields, periods, disciplines, or arts. Course is repeatable as content changes.

ENGL 282. Seminar in Bibliography and Textual Criticism (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced research in the history of the book and textual production, including such topics as analytical bibliography, editorial theory and practice, and the economics of textual dissemination. Course is repeatable as content changes.

ENGL 289. Seminar in Genres (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines individual literary genres (poetry, the novel, drama, etc.) and subgenres (epic, romance, lyric, comedy, etc.) in terms of current or historical genre theories. Course is repeatable as content changes.

ENGL 290. Directed Studies (1-4) Consultation, 1-3 hours; individual study, 12 hours. Prerequisite(s): consent of instructor and graduate advisor. Advanced research study culminating in written work. Course is repeatable.

ENGL 291. Individual Study in Coordinated Areas (1-12) outside research, variable. A program of study designed to advise and assist candidates who are preparing for examinations. Repeatable under the following rules: (1) a student may take up to 12 units prior to the award of the M.A.; (2) a student may take up to 24 additional units after award of the M.A. but prior to successful completion of the Ph.D. qualifying examination. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ENGL 292. Concurrent Analytical Studies (1-4) Prerequisite(s): instructor approval, or approval of instructor in the field under whom the work will be carried out. Each 292 course will be taken concurrently with some 100 series course but on an individual basis. It will be devoted to research, criticism, and written work of a graduate order commensurate in amount with the number of units elected. ENGL 101 and ENGL 103 may not be used for this arrangement. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ENGL 296. Master's Portfolio (2) Outside research, 6 hours; consultation, 2-3 hours. Prerequisite(s): completion of five quarters of master's study in English; consent of the Graduate Advisor. Students revise, extend, and develop essays written during their master's program in preparation for the master's portfolio examination. Graded Satisfactory (S) or No Credit (NC).

ENGL 299. Research for Thesis or Dissertation (1-12) Thesis, 3-36 hours. Prerequisite(s): satisfactory completion of the Ph.D. qualifying examination; consent of instructor. Research, under the direction of a faculty member, for preparation of the thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable; students may enroll in a maximum of 12 units per quarter.

Professional Courses

ENGL 301. Introduction to the Teaching of English (1) individual and group conferences, 1 hour. Prerequisite(s): graduate standing. A flexible program of meetings and workshops specifically devoted to orienting apprentices and transfer TAs to the writing program at UC Riverside. Concentrates on the problem of organizing and teaching ENGL 001A, ENGL 001B, and ENGL 001C or its equivalent. Required of all apprentices and transfer TAs. Students must enroll concurrently in ENGL 302. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit for a maximum of 2 units.

ENGL 302. Teaching Practicum (1-4) Seminar, 1-4 hours. Prerequisite(s): graduate standing. A flexible program of meetings and conferences on the problems and techniques of writing instruction most pertinent to Basic Writing or to ENGL 001. Required of all TAs for at least five quarters, after which the TA may, with the permission of the Director of ENGL 001, elect to take ENGL 304 instead. Open to all graduate students. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ENGL 303. Advanced Teaching Practicum (1-2) Discussion, 1 hour, practicum, 1-2 hours. Prerequisite(s): graduate standing or consent of instructor. A flexible program of meetings and conferences on the problems and techniques of teaching literature, cultural studies, film studies, and related courses. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes.

ENGL 304. Professional Research Preparations (4) Seminar, 3 hours; outside research, 3 hours; consultation, 5 hours per quarter. Prerequisite(s): consent of instructor. Covers the procedures, preparation, and presentation of oral and written research materials, including prospectus, with individual direction from instructor. Graded Satisfactory (S) or No Credit (NC).

ENGL 380. The Teaching of Written Composition (4) Summer Seminar, 8 hours. Prerequisite(s): consent of instructor; participation in the Inland Area Writing Project Summer Workshop. A study of research and practice in the teaching of written composition in the elementary and secondary schools. Offered in sum- mer only. Students may receive either a letter grade or Satisfactory (S) or No Credit (NC) grade. See instructor for grading basis; no petition is required.

ENGL 381. Preparing to Teach Teachers (1-4) Seminar, 2-8 hours. Prerequisite(s): consent of instructor; concurrent enrollment in ENGL 380. Participation in the Inland Area Writing Project Summer Workshop. Preparation and presentation of inquiry projects. Emphasis on inquiry into pedagogical assumptions and the way they contribute to expert teaching practices. Offered in summer only. Students may receive either a letter grade or Satisfactory (S) or No Credit (NC) grade. See instructor for grading basis; no petition is required.

Entomology

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Subject abbreviation: ENTM
College of Natural and Agricultural Sciences

Ring T. Cardé, Ph.D., Chair
Richard A. Redak, Ph.D., Vice Chair
Department Office, 175 Entomology
insects.ucr.edu

Graduate Student Affairs
(800) 735-0717 or (951) 827-4116
insects.ucr.edu/programs/graduate.html

Undergraduate Faculty Advisor
(951) 827-4562
insects.ucr.edu/programs/undergraduate.html

Professors
Michael E. Adams, Ph.D. (Entomology/Cell Biology and Neuroscience)
Peter W. Atkinson, Ph.D.
Nancy E. Beckage, Ph.D. (Entomology/Cell Biology and Neuroscience)
Thomas S. Bellows, Jr., Ph.D.
Ring T. Cardé, Ph.D. Alfred M. Boyce Chair in Entomology
Brian A. Federici, Ph.D.
D. J. Daniel Hare, Ph.D.
John M. Heraty, Ph.D.
Robert F. Luck, Ph.D.
Jocelyn G. Miller, Ph.D.
Thomas A. Miller, Ph.D.
Joseph G. Morse, Ph.D.
Bradley A. Mullens, Ph.D.
Timothy D. Paine, Ph.D.
Thomas M. Perring, Ph.D.
Alexander Raikhel, Ph.D.
Richard A. Redak, Ph.D.
Michael K. Rust, Ph.D.
Richard Stouthamer, Ph.D.
S. Nelson Thompson, Ph.D.
John T. Trumble, Ph.D.
William E. Walton, Ph.D.

Professors Emeriti
Leland R. Brown, Ph.D.
Richard D. Goeden, Ph.D.
E. Fred Legner, Ph.D.
James A. McMurtry, Ph.D.
Mir S. Mulia, Ph.D.
Earl R. Oatman, Ph.D.
Richard Stouthamer, Ph.D.
Jocelyn G. Millar, Ph.D.
Robert F. Luck, Ph.D.
Jocelyn G. Miller, Ph.D.
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Michael K. Rust, Ph.D.
Richard Stouthamer, Ph.D.
S. Nelson Thompson, Ph.D.
John T. Trumble, Ph.D.
William E. Walton, Ph.D.

Associate Professors
P. Kirk Visscher, Ph.D.
Gregory P. Walker, Ph.D.

Assistant Professors
Anandasankar Ray, Ph.D.
Weirauch, Christine, Ph.D.
BIOL 151 and BIOL 175 are suggested in order to acquire a background in the life sciences appropriate for an Entomology major.

For students intending to specialize at the graduate level in insect toxicology or insect physiology, biochemistry, and molecular biology, it is recommended that the BCH 110A, BCH 110B, and BCH 110C sequence and BCH 102 be substituted in place of an equal number of upper-division course units in life sciences. Due to course content overlap, credit is not awarded for BCH 110A, BCH 110B, or BCH 110C if it has already been awarded for BCH 100.

Sample Program

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<th>Freshman Year</th>
<th>Fall</th>
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Minor

The Department of Entomology offers a minor in Entomology designed to allow the student the freedom to pursue areas of particular interest. The minor consists of no less than 20 and no more than 28 units of Entomology courses to be selected as follows:

1. ENTM 100/BIOL 100
2. Select from the following upper-division Entomology courses to complete unit requirement: ENTM 106, ENTM 107, ENTM 109, ENTM 112/BIOL 112/BIOL 107, ENTM 111, ENTM 1112/BPSC 112, ENTM 114, ENTM 124, ENTM 126, ENTM 126L, ENTM 127, BIOL 127, ENTM 128, ENTM 129, ENTM 129L, ENTM 133, ENTM 162/BIOL 162, ENTM 173/BIOL 173, ENTM 190, ENTM 197, ENTM 199, ENTM 199H

**Graduate Program**

The Department of Entomology offers programs leading to the M.S. (thesis plan) and Ph.D. degrees with specialization in, but not restricted to, the following areas of study:

- Arthropod vectors of plant pathogens
- Behavior
- Biochemistry and physiology
- Biological control
- Chemical ecology
- Ecology and evolution
- Integrated pest management
- Insect-plant interactions
- Medical and veterinary entomology
- Molecular entomology
- Nematology
- Neuroscience
- Pathology
- Pesticide toxicology
- Systematics
- Urban entomology

Information on participating faculty and their research specialties may be found at insects.ucr.edu. University requirements for the M.S. and Ph.D. degrees are given in the Graduate Studies section of this catalog.

**Admission**

Students must have a bachelor’s degree with a major in Entomology, a biological science, Chemistry, Biochemistry, or a suitable equivalent. Regardless of undergraduate major, students must have had, or complete soon after entering graduate school, the following:

1. One year of course work eah in general biology, general chemistry, and organic chemistry.
2. The equivalent of a one quarter course each in genetics and biochemistry.
3. The equivalent of 30 quarter units of life sciences other than entomology. Students who wish to specialize in insect biochemistry, insect physiology, molecular entomology, neuroscience, or toxicology may substitute additional courses in physical, organic, and biological chemistry; toxicology; and pharmacology for courses in life sciences.

Credit from these courses does not count toward the unit requirement of the M.S. degree.

**University Requirements**

See Undergraduate Studies section.

**College Requirements**

See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college’s breadth requirements. Consult with a department advisor for course planning.

**Major Requirements**

The major requirements for both the B.A. and the B.S. degrees in Entomology are as follows:

1. Lower-division requirements (50–51 units)
   - a) BIOL 005A, BIOL 05LA, BIOL 005B, BIOL 005C
   - b) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC
   - c) MATH 008B or MATH 009A, MATH 009B
   - d) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
2. Upper-division requirements (67 units)
   - a) ENTM 100/BIOL 100, ENTM 107, ENTM 173/BIOL 173, and 4 units in any combination of ENTM 190, ENTM 197, ENTM 199, or ENTM 199H
   - b) Twenty-four (24) additional units of entomology electives, which may include up to 2 additional units of ENTM 190, ENTM 197, or ENTM 199H
   - c) BCH 100
   - d) BIOL 102
   - e) BIOL 107A
   - f) CHEM 112A, CHEM 112B, CHEM 112C
   - g) STAT 100A

2. Select from the following upper-division Entomology courses to complete unit requirement: ENTM 106, ENTM 107, ENTM 109, ENTM 112/BIOL 112/BIOL 107, ENTM 111, ENTM 1112/BPSC 112, ENTM 114, ENTM 124, ENTM 126, ENTM 126L, ENTM 127, BIOL 127, ENTM 128, ENTM 129, ENTM 129L, ENTM 133, ENTM 162/BIOL 162, ENTM 173/BIOL 173, ENTM 190, ENTM 197, ENTM 199, ENTM 199H

3. No more than 4 units of ENTM 190, ENTM 197, ENTM 199, or ENTM 199H, either solely or in combination, may be applied toward the unit requirement.

4. Of the specified upper-division units, a minimum of 16 must be unique to the minor and may not be used to satisfy major requirements.

See Minors under the College of Natural and Agricultural Sciences in the Colleges and Programs section of this catalog for additional information on minors.
The department requires GRE General Test scores (verbal, quantitative, and analytical). All applicants whose first language is not English and do not have an undergraduate or graduate degree from an accredited institution where English is the exclusive language of instruction must submit a recent Test of English as a Foreign Language (TOEFL) and obtain a minimum score on the exam of 550 (paper-based), 213 (computer-based), or 80 (internet-based).

Course Work All students must take ENTM 201, ENTM 202, and ENTM 203.

Normative Time to M.S. 6 quarters
Normative Time to Ph.D. 17 quarters

Opportunities for Interdisciplinary Graduate Study
Faculty from the Department of Entomology also participate in the following additional graduate programs:

- Biochemistry and Molecular Biology
- Cell, Molecular, and Developmental Biology
- Neuroscience
- Chemistry
- Environmental Toxicology
- Evolution, Ecology, and Organismal Biology (EEOB)
- Genetics, Genomics and Bioinformatics

These interdepartmental programs draw on the strengths of distinguished scientists from several units. For further information concerning work in these areas, see the respective program descriptions in the Programs and Courses section of this catalog or contact the Biological Sciences Graduate Student Affairs Center, at (800) 735-0717.

Lower-Division Courses

ENTM 010. Natural History of Insects (4) F, W, S
Lecture, 3 hours; demonstrations, 1 hour. A study of the fascinating world of insects and of their impact on man; designed for non-entomology majors. Living and preserved insects and many other visual aids are used.

ENTM 020. Bees and Beekeeping (4) F, Odd Years
Lecture, 3 hours; discussion, 1 hour. Fundamentals of keeping honey bees, their fascinating social behavior, and their economic importance as pollinators of agricultural crops and as producers of honey and other products. Demonstrations of bee biology and behavior, with colonies of bees, and of beekeeping techniques, equipment, and extraction of honey. Visscher

Upper-Division Courses

ENTM 100. General Entomology (4) F Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, or equivalents; or consent of instructor. Introductory study of insects, Earth’s most diverse group of animals (75 percent of animal species are insects). Lecture covers the anatomy, physiology, ecology, behavior, and diversity of insects. Laboratory focuses on insect identification. Cross-listed with BIOL 100. Walker

ENTM 106. Insect Evolution (3) S Lecture, 2 hours; laboratory, 3 hours. Prerequisite(s): BIOL 100/ENTM 100 or consent of instructor. Introduces principles of insect morphology, with emphasis on characters of phylogenetic and adaptive significance and insect evolution. Topics include the comparative anatomy and phylogenetic relationships of extinct and living insect groups. Laboratory emphasizes principles of comparative morphology and evolutionarily important character complexes.

ENTM 107. Insect Biodiversity (3) W Lecture, 2 hours; laboratory, 3 hours. Prerequisite(s): BIOL 100/ENTM 100 or consent of instructor. Lectures introduce the science of insect systematics, stressing diagnostic characters of the major taxa and insect biodiversity. Laboratories focus on developing skills in insect identification to the family level. Weirauch

ENTM 109. Field Entomology (4) S Laboratory, 4 hours; field, 8 hours. Prerequisite(s): BIOL 100/ENTM 100 or equivalents or consent of instructor. Study and field collection of insects in selected ecological communities from the diversity of life zones comprising Southern California. Students prepare specimens collected to professional standards, identify specimens, and submit their collections for grading and incorporation into the Department of Entomology’s teaching and research collections. Stouthamer

ENTM 112. Systematics (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005C or equivalent. Principles and philosophy of classification: phylogenetic and phenetic methods, species concepts, taxonomic characters, evolution, hierarchy of categories, and nomenclature. Cross-listed with BIOL 112 and BPSC 112. Heraty

ENTM 114. Aquatic Insects (4) S, Even Years Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, or consent of instructor. Investigates aquatic insects as nutrient cyclers, pollution indicators, disease vectors, and food fish. Involves identification of major orders and families, morphological and physiological adaptations, and life history strategies. Laboratory emphasizes identification (collection) and includes a group field ecology project and two weekend field trips. Mullens, Walton

ENTM 124. Agricultural Entomology (4) F, Odd Years Laboratory, 4 hours; field, 8 hours. Prerequisite(s): BIOL 100/ENTM 100 or equivalent or consent of instructor. Identification, life history, ecology, distribution, and management of key pest and beneficial species learned through field observation, discussions with industry representatives, and laboratory study. Detailed notes and collections from field trips to all major growing regions of Southern California form the basis for laboratory discussion. Perrin

ENTM 126. Medical and Veterinary Entomology (3) W, Odd Years Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C; or consent of instructor. Biology, ecology, and management of arthropods affecting human and animal health. Arthropods as direct pests and vectors of important diseases (e.g., malaria, plague). Disease epidemiology and prevention and control of pests and associated diseases are discussed. Mullens

ENTM 126L. Laboratory in Medical and Veterinary Entomology (2) W, Odd Years Laboratory, 6 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C; or consent of instructor. Concurrent or previous enrollment in ENTM 126 is recommended. Identification of arthropods affecting humans and animals. Practical epidemiological exercises, including age-grading, blood meal and pathogen identification in vectors, vector capacity assessment, bioassay procedures, and sampling. Field trips to animal production and mosquito abatement and research facilities are scheduled. Mullens

ENTM 127. Insect Ecology (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 001C or CHEM 01HC, CHEM 112C, MATH 009B or MATH 09HB, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. Introduces principles of insect ecology with examples emphasizing the Arthropoda. Topics include factors governing population growth; ecological and evolutionary interactions with hosts, competitors, and natural enemies; structure of ecological communities; and adaptations to different environments. Cross-listed with BIOL 127. Bellows, Jr., Walton

ENTM 128. Chemistry and Toxicology of Insecticides (3) F, Odd Years Lecture, 3 hours. Prerequisite(s): a course in organic chemistry, BIOL 100/ENTM 100; or consent of instructor. Chemical properties and reactions of insecticides and acaricides and their modes of action and biochemical behavior in animal and plant systems. Miller

ENTM 129. Introduction to Biological Control (2) F Lecture, 2 hours. Prerequisite(s): BIOL 100/ENTM 100 or consent of instructor. Principles and methods of biological control; biology and behavior of entomophagous insects; historical review and critique of important world projects. Bellows

ENTM 129L. Introduction to Biological Control Laboratory (2) F Laboratory, 6 hours. Prerequisite(s): ENTM 129 (it is strongly recommended that ENTM 129L be taken concurrently with ENTM 129). Laboratory identification of entomophagous insects; experiments designed to illustrate various types of parasitism; familiarization with mass rearing and culture techniques for entomophagous insects.

ENTM 133. Urban Entomology (4) S, Even Years Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 100/ENTM 100 or consent of instructor. Biology and management of arthropod pests of the urban-industrial community with an emphasis on structural households, and stored product pests. Exercises on the recognition and identification of these pests, their life histories, and strategies for their control. Rust

ENTM 162. Insect Behavior (4) F Lecture, 4 hours. Prerequisite(s): BIOL 100/ENTM 100; or BIOL 005A, BIOL 005B, and BIOL 005C; or consent of instructor. An analysis of the mechanisms that cause and control behavioral reactions of insects. Emphasis on ethological and physiological knowledge concerning orientation mechanisms, communication systems, learning, and the role of the nervous system in integrating behavior in insects. Cross-listed with BIOL 162. Carde, Visscher

ENTM 173. Insect Physiology (4) S Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 005A and BIOL 005B or equivalents; CHEM 112A, CHEM 112B, CHEM 112C or equivalents; or consent of instructor. Introduction to principles of insect physiology. Subjects include growth, development and hormones, cuticle, nervous system, circulation, respiration, digestion, nutrition, excretion, reproduction, water balance, and temperature relations. Prior knowledge of insects is not assumed. Cross-listed with BIOL 173. Miller, Thompson

ENTM 190. Special Studies (1-3) F, W, S Prerequisite(s): consent of instructor. Directed studies
in specialized fields in entomology such as insects affecting subtropical fruits, deciduous fruits and nuts, floricultural crops and turf, vegetable and field crops, forest and ornamental trees and shrubs, stored products, and households. Course is repeatable.

ENTM 197. Research for Undergraduates (1-4) F, W, S
Prerequisite(s): consent of instructor. Directed original research and preparation of written report. Course is repeatable.

ENTM 199H. Senior Honors Research (1-5) F, W, S
Laboratory, 3-15 hours. Prerequisite(s): senior status and consent of instructor; a GPA of 3.5 or better in entomology courses and 3.2 in all University course work. Research in entomology under supervision of a faculty member in entomology. The student will submit a written report. Course is repeatable.

Graduate Courses

ENTM 201. Structure and Function of Insects (5) F
Lecture, 3 hours; laboratory, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 or BCH 110A; BIOL 100/ENTM 100 (both may be taken concurrently); or consent of instructor. Introduces principles of insect physiology and morphology. Topics include insect development, reproduction, circulation, metabolism and excretion, respiration, digestion, and fundamentals of the nervous system.

ENTM 202. Molecular Biology, Systematics, and Behavior (5) W Lecture, 3 hours; laboratory, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 100 or BCH 110A; ENTM 201; or consent of instructor. Introduces principles of molecular biology, systematics, and insect behavior. Topics include the use of molecular tools in Entomology, the application of systematics in understanding insect evolution, and behavior particular to insects and relevant to insect research in a range of subdisciplines.

ENTM 203. Ecology, Population Genetics, and Pest Management (5) S Lecture, 3 hours; laboratory, 3 hours; discussion, 1 hour. Prerequisite(s): ENTM 202, undergraduate course in ecology; or consent of instructor. Introduces principles of insect ecology, genetics, evolution, and pest management. Topics include insect population dynamics and community interactions, genetics of geographic variation, adaptation of insect populations, and the ecological, behavioral, and genetic basis for management and control of pestiferous species.

ENTM 206. Insect Physiology and Biochemistry (3) S
Lecture, 3 hours. Prerequisite(s): upper-division courses in general entomology and general biochemistry or consent of instructor. Graduate-level introduction to the physiology and biochemistry of insect systems. Topics covered include basics of growth and development, reproduction, digestion, nutrition, metabolism, respiration, circulation, ion and water balance, nervous and muscular systems, circadian rhythms. Adams, Thompson

ENTM 207. Arthropod Vectors in Relation to Plant Disease (4) S, Even Years Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 100/ENTM 100, BIOL 120/MCBL 120/PLPA 120; or consent of instructor. Detailed analysis of interacting mechanisms involved in the transmission of plant pathogens by arthropods. Emphasis on learning through extensive laboratory experimentation. Perino

ENTM 208. Host-Parasite Relationships (3) F, W, S
Lecture, 3 hours. Prerequisite(s): BIOL 100/ENTM 100 or BIOL 157 or consent of instructor. Explores the fundamental biochemical and developmental requirements for “successful” host-parasite relationships in insects. Emphasizes wasp and nematode parasites of insects and vector-parasite interactions involved in transmission of parasites in malaria, trypanosomiasis, and Lyme disease. Cross-listed with BIOL 208. Beckage

ENTM 209. Microtechniques in Insect Morphology (3) W, Even Years Laboratory, 6 hours; outside research, 3 hours. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 100/ENTM 100; or equivalents; or consent of instructor. Development of research techniques and skills used in the study of insect morphology. Covers the principles of and provides hands-on experience with the following: scanning electron microscopy, whole-mount slide preparation techniques, morphometric measurement and analysis, scientific illustration, macrophotography, and histological techniques. Walker

ENTM 210. Molecular Biology of Human Disease Vectors (3) Lecture, 2 hours; seminar, 1 hour. Prerequisite(s): consent of instructor. Covers the molecular aspects of vectors transmitting most dangerous human diseases. Involves lectures and student presentations about current issues in molecular biology and genomics of vector insects and pathogens they transmit. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with CMBD 210 and MCBL 210.

ENTM 212. Ecological Systems in Space and Time (4) F, W, Lecture, 3 hours; field, 30 hours per quarter. Prerequisite(s): BIOL 117 or BIOL 152/GEO 152 or equivalent or consent of instructor. Focuses on how ecological systems are interpreted and reconciled at the community, landscape, and paleontological scales. Addresses the role of extrinsic factors operating at each of these scales. Also examines the historical development of our understanding of ecological systems at various scales. Cross-listed with BIOL 212 and GEO 212.

ENTM 219. Theory of Systematics (4) S, Even Years Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): BIOL 112/BPSC 112/ENTM 112 or equivalent or consent of instructor. Examines topics developed around a series of classical and recent papers on the principles, philosophy, and methodology of modern systematic and phylogenetic methods. Cross-listed with BIOL 219 and GEO 219. Heraty, Springer

ENTM 227. Insect Population Ecology (3) W, Odd Years Lecture, 3 hours. Prerequisite(s): BIOL 127/ENTM 127 or consent of instructor. Recommended: ENTM 129, STAT 100A; STAT 100B or equivalent. Theory of animal population regulation. Factors affecting distribution and abundance of animals with emphasis on examples from the Arthropoda. Luck

ENTM 229. Advanced Biological Control (4) F, Alternate Years Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 127/ENTM 127 or equivalent, or consent of instructor. The lecture explores theory and practices relating to the use of natural enemies in the suppression of insect, weed, pathogen, and vertebrate populations. The laboratory surveys insect and other natural enemies, their attributes, collection, cultivation, quarantine handling, and field use. Normally letter graded, but students may petition the instructor for a Satisfactory (S) or No Credit (NC) grade.

ENTM 230. Entomophagous Insects (4) F, Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 100/ENTM 100 or equivalent, graduate standing; or consent of instructor. Introduces the biology and identification of entomophagous insects. Students collect and rear parasites and prepare specimens according to professional standards. Laboratory identification focuses on the family level for parasitic insects. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Heraty

ENTM 231. Insect Pathology (4) S, Even Years Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 100/ENTM 100, at least one course in microbiology; or consent of instructor. Consideration of the principles of general insect pathology and microbiology. Detailed study of noninfectious and infectious diseases of insects, diagnosis, epizootiology, physiopathology, symptomatology, and the use of microbial agents in the control of insect pests. Federici

ENTM 232. Molecular Biology of Insects (4) S, Even Years Lecture, 3 hours; workshop, 1 hour. Prerequisite(s): BIOL 107A or consent of instructor. Application of molecular biology to entomology and entomological problems. Emphasizes how molecular biological tools are used to understand insect genome organization, pest resistance, transgenic insects, insect behavior, and insect systematics. Atkinson

ENTM 240. Research Methods in Insect Chemical Ecology (4) W, Odd Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 127/ENTM 127 or ENTM 203 or consent of instructor. Seminar that introduces the concepts of research methods in insect chemical ecology. Emphasis on research topic selection, development of hypotheses, and planning of experimental designs. Topics include biochemistry design and execution, and microscale chemical separation and identification techniques.

ENTM 241. Insect-Plant Interactions (4) F, Odd Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 127/ENTM 127 or consent of instructor. Concepts of the development and maintenance of ecological associations between plants and arthropod herbivores in ecological and evolutionary time; organization of arthropod communities on plants; phytochemical basis for the mediation of plant-arthropod associations; coevolution of plants and herbivorous insects; manipulation of plant-arthropod associations in arthropod pest management programs. Hare, Trumble

ENTM 242. Development of Hypotheses and Research Design (3) S Lecture, 1 hour; discussion, 1 hour; written work, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Teaches fundamentals of research topic selection, development of hypotheses, and selection of experimental designs. Students prepare full-length federal grant proposals, then review and mark them in grant panel review format. Millar, Trumble

ENTM 243. Advanced Insect Physiology, Biochemistry, and Molecular Biology (3) W, Even Years Lecture, 2 hours; seminar, 1 hour. Prerequisite(s): BCH 211 or ENTM 232 or both ENTM 202 and ENTM 203; or consent of instructor. Explores the latest key issues of insect physiology, biochemistry, and molecular biology. Raikhel

ENTM 249. Special Topics in Entomology (1-6) Lecture, 1-6 hours; laboratory, 0-15 hours. Prerequisite(s): graduate standing or consent of instructor. Explores topics in the area of specialization of each faculty member. Content emphasizes recent advances in the special topic area and varies accordingly. Students who take examinations or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes.

ENTM 250. Seminar in Entomology (1) F, W, Seminar, 1 hour. A series of lectures by visiting scientists, staff
and advanced graduate students on research topics in entomology and allied fields. Graded Satisfactory (S) or No Credit (NC).

**ENTM 251. Seminar in Insect-Plant Interactions (2) W** Seminar, 2 hours. Prerequisite(s): BIOL 162/ENTM 162 or consent of instructor. Rigorous analysis of recent publications in the area of insect-plant interactions. Subject matter varies from year to year. Course may be taken more than once for credit. Paine, Trumble, Walker

**ENTM 252. Seminar in Insect Behavior (2) S** Seminar, 2 hours. Prerequisite(s): BIOL 127/ENTM 127, ENTD 129; or consent of instructor. Concepts, questions and hypotheses in biological control. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Bellows, Stouthamer

**ENTM 254. Seminar in Biological Control (2) F** Seminar, 2 hours. Prerequisite(s): BIOL 127/ENTM 127, ENTD 129; or consent of instructor. Rigorous examination and interpretation of published experimental data dealing with insect behavior, and an attempt to derive general principles underlying behavior. Subject matter varies from year to year. Course is repeatable as content changes. Carde, Millar, Visscher

**ENTM 255. Seminar in Medical and Veterinary Entomology (2) F** Seminar, 2 hours. Prerequisite(s): ENTD 126 or consent of instructor. Rigorous review and analysis of advanced topics in medical and veterinary entomology and related disciplines. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes. Mullens, Walton

**ENTM 256. Seminar in Systematic Entomology (2) S** Seminar, 2 hours. Prerequisite(s): BIOL 112/BPSC 112/ENTM 112 or consent of instructor. Selected topics in insect systematics. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes. Heraty

**ENTM 258. Seminar in Insect Pest Management (2) W** Seminar, 2 hours. Prerequisite(s): consent of instructor. Selected topics in insect pest management. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes. Perrin

**ENTM 261. Seminar in Genetics, Genomics, and Bioinformatics (1) W, S** Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Oral reports by visiting scholars, faculty, and students on current research topics in Genetics, Genomics, and Bioinformatics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with BCH 261, BIOL 261, BPSC 261, GEN 261, and PLPA 261.

**ENTM 262. Seminar in Molecular Biology and Genomics of Disease Vectors (1) Seminar, 1 hour.** Prerequisite(s): graduate standing or consent of instructor. Seminar series, sponsored by the Center for Disease-Vector Research at the Institute for Integrative Genome Biology, provides an opportunity for graduate students to discuss current issues of molecular biology and genomics of vector insects and pathogens they transmit with guest speakers. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with MCBL 262.

**ENTM 271. Research Seminar in Management of Vegetable Crop Pests (1) W Seminar, 1 hour.** Prerequisite(s): consent of instructor. Seminar and critical discussion emphasizing current research and advances in management of vegetable crop pests. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Trumble

**ENTM 272. Research Seminar in Insect Communication and Behavior (1) F, W, S Seminar, 1 hour.** Prerequisite(s): consent of instructor. Seminar and critical discussion emphasizing current research and advances in insect communication and behavior. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Carde, Millar, Visscher

**ENTM 276. Research Seminar in Medical, Urban, and Veterinary Entomology (1) F Seminar, 1 hour.** Prerequisite(s): consent of instructor. Seminar and critical discussion emphasizing current research and advances in medical, urban, and veterinary entomology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Mullens, Rust, Walton

**ENTM 289. Special Topics in Neuroscience (2) F, W, S Seminar, 2 hours.** Prerequisite(s): graduate standing or consent of instructor. An interdisciplinary seminar consisting of student presentations and discussion of selected topics in neuroscience. Content and instructor(s) vary each time course is offered. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BCH 289, BIOL 289, CHEM 289, NRSC 289, and PSYC 289. Hatton

**ENTM 290. Directed Studies (1-6) F, W, S** Literature studies on special topics under direction of a member of the staff. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**ENTM 291. Individual Study in Coordinated Areas (1-6) F, W, S** Faculty assisted programs of individual study for candidates who are preparing for examinations. The following rules apply: 1) Up to 6 units may be taken prior to award of the Master's degree, such units to be in addition to minimum unit requirements for the degree; 2) Up to 12 additional units may be taken prior to advancement to candidacy for the Ph.D.; 3) The course may be repeated within these limits. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**ENTM 297. Directed Research (1-6) F, W, S** Exploratory research toward the development of the dissertation problem or other research not specifically for thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**ENTM 299. Research for Thesis or Dissertation (1-12) F, W, S** Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**Environmental Engineering Courses**

**ENTM 301. Teaching Entomology at the College Level (1) F, W, S Seminar, 1 hour.** Prerequisite(s): graduate standing in Entomology. A program of weekly meetings and individual formative evaluation required of new entomology Teaching Assistants. Covers instructional methods and classroom/section activities most suitable for teaching Entomology. Conducted by departmental faculty or the Teaching Assistant Development Program. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**Environmental Engineering**

See Chemical and Environmental Engineering

**Environmental Sciences Courses**

**Subject abbreviation: ENSC**

**College of Natural and Agricultural Sciences**

Jianying “Jay” Gan, Chair
Kurt A. Schwabe, Vice-Chair
Program Office, 3428 Pierce
(951) 827-5103; mari.ridgeway@ucr.edu
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Professors
Christopher Arrhime, Ph.D. Soil Chemistry
Janet T. Arey, Ph.D. Atmospheric Chemistry
Roger Atkinson, Ph.D. Atmospheric Chemistry
David E. Crowley, Ph.D. Soil Microbiology
William T. Frankenberger, Jr., Ph.D. Soil Microbiology
Jianying “Jay” Gan, Ph.D. Environmental Chemistry
Robert C. Graham, Ph.D. Soil Mineralogy and Pedology
Keith C. Knapp, Ph.D. Natural Resource Economics
David R. Parker, Ph.D. Soil Biogeochemistry
Roberto Sánchez-Rodriguez, Ph.D. Environmental Policy
Daniel Schlenk, Ph.D. Aquatic Ecotoxicology
Jiri Simunek, Ph.D. Hydrology
Laosheng Wu, Ph.D. Soil Physics
Marylynn V. Yates, Ph.D. Environmental Microbiology
Paul J. Ziemann, Ph.D. Atmospheric Science

Professors Emeriti
Andrew C.-S. Chang, Ph.D. Agricultural Engineering
Walter J. Farmer, Ph.D. Soil Chemistry
William A. Jury, Ph.D. Soil Physics
John Leuty, Jr., Ph.D. Soil Physics
Lanny J. Lund, Ph.D. Soil Morphology, Genesis, and Classification
Albert L. Page, Ph.D. Soil Chemistry
Henry J. Vaux, Jr., Ph.D. Natural Resource Economics

Associate Professors
Michael A. Anderson, Ph.D. Environmental Chemistry
Kenneth A. Baerenklau, Ph.D. Resource and Environmental Economics
David M. Crohn, Ph.D. Biosystems Engineering
Linda Fernandez, Ph.D. Resource and Environmental Economics
Kurt A. Schwabe, Ph.D. Resource and Environmental Economics

**ENTM 302. College Teaching Practicum (1-4) F, W, S** Practicum/consultation, 3-12 hours. Prerequisite(s); graduate standing and consent of instructor. Supervised teaching in college level classes under supervision of the course instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**Environmental Sciences**
Assistant Professors
James Sickman, Ph.D. Watershed Hydrology and Biogeochemistry
**
Adjunct Assistant Professors
W. Bowman Cutter, Ph.D. Resource and Environmental Economics
Brian Lanooi, Ph.D. Environmental Microbiology
Lisa Stein, Ph.D. Environmental Microbiology

Major
The Department of Environmental Sciences offers B.A. and B.S. degrees in Environmental Sciences. Students can choose to concentrate their studies in one of three options: Natural Science, Social Science, or Environmental Toxicology.

The necessity of maintaining an acceptable level of environmental quality is placing increasing demands upon governments and industries locally, nationally, and worldwide. To help meet these demands, the Environmental Sciences program is designed to provide training for students intending to enter environmental professions or for students preparing for graduate study in law, research, or teaching in a capacity that utilizes a background in the science of the human environment.

The structure of the Environmental Sciences curriculum provides a broad scope of instruction that enables students to explore the various disciplines and professions involved with solving environmental problems as well as opportunities for students to focus their training in accordance with their own educational and career objectives. All students majoring in Environmental Sciences must complete a set of "core requirements" consisting of courses that provide a basic understanding of the physical, biological, and social sciences and their application to the analysis of environmental processes and issues. In addition to the core requirements, students must complete the required courses and an appropriate number of elective courses as designated in the option they select. Students are not expected to select an option during the freshman year so that they can be introduced to dimensions of the environmental sciences about which they may have no previous knowledge. Those wishing to change their selection of an option may do so at any time as long as they are able to complete the requirements for the bachelor's degree within the 216-unit limit specified by the College of Natural and Agricultural Sciences.

Joint Degree Program with California State University, Fresno
The B.S. degree in Environmental Sciences can also be earned by enrolling in the Environmental Sciences Joint Degree Program offered by UCR and California State University, Fresno. Students who are eligible for admission to both universities can enter the program by concurrently enrolling at both campuses. The general catalogs of both campuses stipulate the degree requirements. Students based at the CSU Fresno campus must spend two quarters at UCR and complete 24 units. Students based at UCR must spend one semester at CSU Fresno and complete 15 units. To gain the maximum benefit of courses in agriculture and industrial hygiene, which are unique to CSU Fresno, students based at UCR should consult their academic advisor for specific course selection.

Environmental Internship Program
The Environmental Internship Program offers students opportunities to work with government agencies, private firms, and nonprofit organizations involved in environmental affairs. As excursions into professional life, internships provide "hands-on" experience in applying the principles presented in courses. Beyond the highly specialized training associated with on-the-job activities, students can gain insights into their aptitudes, aspirations and work habits that enable them to clarify their academic and career objectives. Professional acquaintances established during internships can continue to serve as important contacts for students after the internship is completed.

Although most internships are part-time (12–15 hours per week) positions in the Riverside area, organizations that host student interns are located throughout the United States and in Washington, D.C. Students working as interns may receive stipends, hourly wages, or serve as volunteers, depending upon the specific appointment. Up to 16 units of credit toward the bachelor's degree may be earned by developing an academic component of the internship in consultation with a faculty supervisor and enrolling in ENSC 198-I.

Undergraduate Research
Students interested in enhancing the status of knowledge about environmental processes or seeking new solutions to environmental problems may gain training and experience as part-time employees in the department's research laboratories and other research facilities, such as the Air Pollution Research Center and the U.S. Department of Agriculture Soil and Water Research Service, located on campus. Those wishing to conduct their own research under faculty supervision may earn academic credit by enrolling in ENSC 197. Expenses for both laboratory and field experiments are eligible for funding by the campus mini-grant program which supports undergraduate research and creative activity.

Environmental Toxicology Option
As a curriculum that emphasizes the chemistry and biochemistry of toxic substances in the environment, this option prepares students for careers dealing with the control of toxics in the environmental media of air, water, soil, and ecosystems and in such related fields as public health and industrial hygiene. Qualified students completing this option may enter UCR's graduate program in Environmental Toxicology without significant deficiencies in their undergraduate curriculum.

Natural Science Option
As a general curriculum emphasizing the natural sciences, this option is suitable for students wishing to maintain a broad range of choices in technically oriented environmental professions such as air and water pollution control, hazardous materials management, public health, natural resource management, and environmental impact analysis. The Natural Science option is also appropriate as background for graduate study in such disciplines as ecology, forestry, air and water science, and environmental engineering. Students may earn either the B.A. or B.S. degree by completing the requirements specified by the College of Natural and Agricultural Sciences.

Social Science Option
Developed for students whose interests are oriented toward the social context of the environmental sciences, this option is appropriate preparation for careers dealing with environmental regulation, land use planning, environmental impact analysis and administration of environmental protection programs. The Social Science option is also suitable for those intending to continue their education in such areas as natural resource economics, urban planning, and environmental law. Both the B.A. and B.S. degrees are available to students in the Social Science option.

California Teach-Science/Mathematics Initiative (CaTEACH-SMI) California Teach-Science Mathematics Initiative (CaTEACH-SMI) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SMI at UCR offers undergraduate students paid/unpaid opportunities to explore STEM teaching as a career option. Through CaTEACH-SMI, students receive advising and mentoring to prepare for entrance into an intern teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SMI Resource Center provides future STEM teachers with material and financial resources to promote planning and professional development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit http://smi.ucr.edu or at the Resource Center at 1104 Pierce Hall.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the College's breadth requirements. Consult with a department advisor for course planning.
Major Requirements
The major requirements for both the B.A. and the B.S. degrees in Environmental Sciences are as follows: Students must fulfill the core courses listed under the lower-division and upper-division requirements with a grade point average of 2.0 or better and no grade lower than a C-. If a grade of D or F is received in 2 or more core courses required for the major, either in separate courses or repetitions of the same course, the student may be dismissed from the major. Students must, under such circumstances, petition to remain in the major. Students are also required to choose one of the options and satisfactorily complete the option requirements.

Note To gain maximum benefit from participating in the Undergraduate Research and Environmental Internship Programs, students intending to enroll in ENSC 197 and ENSC 198-I should contact their advisor during the quarter prior to enrollment in these courses.

Core Requirements
1. Lower-division requirements (33 units)
   a) ENSC 001, ENSC 002
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   c) MATH 005
   d) POSC 010
2. Upper-division requirements (14 units):
   ENSC 100/SWSC 100, ENSC 101, ENSC 102, ENSC 191

Environmental Toxicology Option
(83-92 units)
1. BIOL 005A, BIOL 051A, BIOL 005B
2. CHEM 005 or BIOL 005C; CHEM 112A, CHEM 112B, CHEM 112C
3. ENTX 101, ENTX 154
4. MATH 008B or MATH 009A, MATH 009B
5. PHYS 002A, PHYS 002B, PHYS 002C
6. PHYS 02LA, PHYS 02LB, PHYS 02LC are recommended
7. ENSC 006/ECON 006 or ENSC 143A/ECON 143A (ECON 003 prerequisite)
8. STAT 100A and STAT 100B
9. Elective Courses:
   a) At least one course from BIOL 005C, CHEM 005, CHEM 112C, MATH 009C
   b) A total of at least five courses from the following (at least three must be Environmental Sciences or Soil and Water Sciences)
      ENSC 120/NEM 120/SWSC 120, ENSC 127/SWSC 127, ENSC 133/MCBL 133/SWSC 133, ENSC 135/SWSC 135, ENSC 136/ENTX 136/SWSC 136, ENSC 140/SWSC 140, ENSC 141/MCBL 141/SWSC 141, ENSC 142, ENSC 144/ENVE 144, ENSC 155, ENSC 163, ENSC 172, ENSC 174, ENSC 197, ENSC 198-I, BIOL 117, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BIOL 124/MCBL 124, BIOL 160, BIOL 163, BPSC 104/BPSC 104, CHEM 109, ENTX 101, GEO 157, GEO 162, GEO 167, GEO 168

Social Science Option
(85-90 units)
1. BIOL 002, BIOL 003
2. MATH 022
3. GEO 001 or GEO 002
4. ECON 003
5. ENSC 143A/ECON 143A, ENSC 143B/ECON 143B, ENSC 143C/ECON 143C, ENSC 172, ENSC 174
6. ECON 101 or ECON 107
7. STAT 100A and STAT 100B
8. Elective Courses:
   a) At least one course from ENSC 133/MCBL 133/SWSC 133, ENSC 140/SWSC 140, ENSC 141/MCBL 141/SWSC 141, ENSC 142, ENSC 144/ENVE 144, ENSC 155, ENSC 163, BPSC 134/ENVE 134/SWSC 134, ENSC 104/SWSC 104, ENSC 107/SWSC 107, ENSC 138/GEO 138/SWSC 138, ENSC 197, ENSC 198-I
   b) A total of at least six courses from the following:
      Economics: ECON 102A, ECON 102B, ECON 146, ECON 148, ECON 156, ECON 160/BUS 160
      Society and culture: ANTH 132, ANTH 134, ANTH 135, ANTH 186/LUST 166, PHIL 117, SOC 137, SOC 143/URST 143, SOC 182/URST 182, SOC 184
      Regulation and law: POSC 101, POSC 166, POSC 181, POSC 182, POSC 183
5. Management: BUS 104/STAT 104, BUS 122, GEO 157, GEO 167, MATH 120

Minor
The minor in Environmental Sciences consists of the following.
1. Lower-division requirements (23 units)
   a) ENSC 002 or ENSC 017; ENSC 006/ECON 006
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
2. Upper-division requirements (20 units)
   a) ENSC 100/SWSC 100, ENSC 101, ENSC 102
   b) Eight (8) units of additional upper-division courses in Environmental Sciences, no more than 4 units of which are in courses numbered 190-198

Concentration Areas
Students wishing to specialize in a particular science or discipline may do so by working with an advisor to select an appropriate sequence of elective courses within one of the required options. Sample areas of concentration and suggested courses are:
1. Water science: ENSC 136/CHEM 136/SWSC 136, ENSC 140/SWSC 140, ENSC 141/MCBL 141/SWSC 141, ENSC 142, ENSC 163
2. Environmental chemistry: ENSC 104/SWSC 104, ENSC 135/CHEM 135/ENTX 135, ENSC 136/CHEM 136/ENTX 136, ENSC 137/SWSC 137, CHEM 109, CHEM 125, CHEM 140, GEO 137
3. Soil science: ENSC 104/SWSC 104, ENSC 107/SWSC 107, ENSC 120/SWSC 120/NEM 120, ENSC 127/SWSC 127, ENSC 134/SWSC 134
Admission Entry to the program requires comment and academic research institutions, and at regulatory agencies, consulting firms, government and nation. Potential career opportunities exist in Environmental Sciences Graduate Program can offer the M.S. and Ph.D. degrees in Environmental Sciences.

Advanced training in Environmental Sciences is becoming increasingly necessary to address complex problems involving natural resources and environmental quality. Although this task frequently requires specialized knowledge in various fields of science, it also requires understanding and integration of a wide variety of interacting physical, chemical, biological, and societal influences. This interaction makes graduate study in environmental sciences distinct from many other scientific fields.

We have designed our program to offer advanced training in a number of specialized field areas within environmental sciences, operating within a single graduate degree program administered by the Department of Environmental Sciences. Students trained in the Environmental Sciences Graduate Program can fill many areas of expertise needed in the state and nation. Potential career opportunities exist at regulatory agencies, consulting firms, government and academic research institutions, and industrial research facilities.

Admission Entry to the program requires completion of a baccalaureate degree in a field appropriate as preparation for graduate study in environmental sciences. Students normally will come to the program from an environmental sciences related discipline such as atmospheric science, aquatic science, earth science, environmental chemistry, hydrology, or soil science; a basic science such as biology, chemistry, or physics; or in a social science discipline such as economics, political science, geography, or sociology. Students may conduct research under the supervision of a sponsoring faculty member in any of the following field areas. Students must specify a field area for entry into the program.

In addition to the following requirements, all applicants must meet the general requirements as set forth in this catalog under the Graduate Studies section.

Environmental Chemistry and Ecotoxicology The Environmental Chemistry and Ecotoxicology field area focuses on the sources, physical and chemical transformations, and removal processes of chemicals in soil, water, and air, and their impacts on ecological systems.

Entrance requirements There are no entrance requirements for the Environmental Chemistry field area beyond the general requirements for admission to the ESGP. For Ecotoxicology, prospective students would be expected to have had courses in General Biology/Zoology and Organic Chemistry. Students who do not have sufficient background to take the core course or specific elective courses may, however, need to first take prerequisite courses.

Environmental Microbiology The Environmental Microbiology field area encompasses the study of microbial processes in natural and agricultural ecosystems and the effects of microorganisms on environmental processes and environmental quality. Research topics include fundamental research on microbial physiology, genetics, and ecology as related to the environment, applied research on microbial effects on the fate and transport of pollutants, anthropogenic effects on microbial communities, fate and transport of human pathogenic microorganisms in the environment, and the application of microorganisms and microbial assays as indicators of soil and water quality.

Entrance requirements Students admitted to the Environmental Microbiology field area are expected to have a baccalaureate degree in biology, microbiology, or closely related field or demonstration of extensive background in biology and microbiology. Recommended prior course work includes chemistry (general, organic, and biochemistry), biology (general and advanced course work), microbiology (general), and statistics (general). Deficiencies in these areas must be remedied during the first year of graduate school.

Environmental and Natural Resource Economics and Policy The economics and policy field area focuses on the human aspects of environmental problems. Coursework emphasizes training in the traditional areas of environmental and natural resource economics, including welfare theory, externalities, pollution control, resource extraction, and non-market valuation, but also in sustainability, environmental management, and environmental policy. Research topics could include the environmental impacts of agriculture, transportation and urbanization, land use in poor and industrialized countries, international trade and the environment, climate change, and methodological advances in non-market valuation, to name just a few. Training in this field enables a student to analyze and address a wide variety of environmental policy issues.

Entrance requirements Students admitted to the Environmental and Natural Resource Economics and Policy field area normally will have completed a baccalaureate degree in the natural sciences, social sciences, or engineering. At least two undergraduate courses in economics and statistics are recommended. Students who do not have sufficient background to take the core courses or field courses may need to first take prerequisite courses.

Soil and Water Sciences The Soil and Water Science field area offers comprehensive training in the chemistry, physics, biology, and ecology of soils, surface waters and wetlands. Students can specialize in a variety of areas, including soil and aquatic chemistry, hydrology, limnology, soil-plant relations, biogeochemistry, bioremediation, microbiology, contaminant fate and transport, water resources management, hillslope processes, soil genesis, soil mineralogy and geomorphology, and related areas.

Entrance requirements Admission to the Soil and Water Sciences field area requires a baccalaureate degree with preparation in both physical and life sciences. It is recommended that students have completed one year of general chemistry, as well as courses in general physics, organic chemistry, calculus through integrals, general biology, statistics, and physical geology or physical geography.

Environmental Sciences and Management The Environmental Sciences and Management field area is designed to serve students seeking interdisciplinary training in environmental research. Students enrolled in this field area will be expected to pursue a rigorous research plan that involves research in one or more of the following areas: science, management, or policy. Students will have the opportunity to select study committees from a spectrum of environmental disciplines.

Environmental Microbiology

Environmental and Natural Resource Economics and Policy

Environmental Chemistry and Ecotoxicology

Environmental Sciences and Management

Students focusing on Ecotoxicology must complete: ENTX 201 and ENTX 208 and take at least two electives from the following list of which must be at the graduate level: ENSC 214/SWSC 214, ENSC 217/SWSC 217, ENSC 224/SWSC 224, ENSC 225/SWSC 225, ENSC 232/SWSC 232, ENTX 200L, ENTX 244/CHEM 244, ENTX 245/CHEM 245/SWSC 245, SWSC 203, SWSC 204.

Environmental Microbiology Students must complete the following core courses: MCBL 201, MCBL 221, MCBL 211, and at least 4 elective courses (or 12 credit hours), three of which must be at the graduate level.

Environmental and Natural Resource Economics and Policy Course requirements include: core course sequences consisting of ECON 200A, ECON 200B, ECON 200C and ECON 205A, ECON 205B, ECON 205C; field course sequence consisting of ECON 207, ECON 208, ECON 209; and three elective courses comprised of upper division undergraduate courses and/or graduate courses approved by their advisor. Students must earn a satisfactory score on the doctoral cumulative examination in microeconomic theory, attain a “B” average in each of the core and field course sequences, and pass the doctoral qualifying examination with written and oral components.

No student will be given more than three attempts to achieve a satisfactory grade on the microeconomic theory cumulative examination. Any unexcused absences from the required examinations will be regarded as a failure.

Soil and Water Sciences Students must complete one course in each of the following core course groups.

Chemistry
ENSC 104/SWSC 104
CHEM 136/ENTX 136/SWSC 136

Physics
ENSC 107/SWSC 107
ENSC 163

Biology
ENSC/MCBL/SWSC 133
BPSC 134/ENSC 134/SWSC 134
ENSC 141/MCBL 141/SWSC 141

Natural Structure and Diversity
ENSC 138/GEO 138/SWSC 138
ENSC 140/SWSC 140

Students may have completed these prior to admission or they may take them early in their graduate program. Students must present a departmental seminar summarizing results of their thesis or dissertation or internship during the final quarter of matriculation.

Environmental Sciences and Management Because students enrolled in this field area may carry out interdisciplinary research for their advanced degree, the graduate course plan will be individualized. It is expected that the student and his/her Advisory Committee will design a course plan that includes graduate environmental science, management, and/or policy courses. The student will be required to take 6 courses (24 units), 3 of which must be at the graduate level.

Master’s Degree
The Department of Environmental Sciences offers the M.S. degree in Environmental Sciences under the Plan I (Thesis) and Plan II (Comprehensive Examination) options. The general requirements for the M.S. degree are found in the Graduate Studies section of the General Catalog. All students are required to give a presentation annually at the Environmental Sciences Graduate Program Student Symposium.

Plan I (Thesis) Plan I (Thesis) Students must complete a minimum of 36 quarter units of graduate and upper-division undergraduate courses in, or significantly related to, Environmental Sciences. These must include the course requirements given above for the specific field area. At least 24 of the 36 units must be in graduate courses. A maximum of 12 of these units may be in graduate research for the thesis. No more than 4 units of ENSC 290 and 2 units of graduate seminar courses may be applied toward the degree. A thesis must be written and accepted by the M.S. thesis committee members, and a final oral defense of the thesis must be passed.

Plan II (Comprehensive Examination) Students must complete a minimum of 36 quarter units of graduate and upper-division undergraduate courses in, or significantly related to, Environmental Sciences. These must include the course requirements given above for the specific field area. At least 18 units must be in graduate courses. Students may count no more than 2 units of graduate seminar courses and 6 units of graduate internship courses toward the required 18 units and no units from graduate research for thesis or dissertation. Students must take a comprehensive written examination that covers fundamental topics in environmental sciences. The written examination, which is three to four hours long, is prepared and evaluated by a committee appointed by the field director. The examination is taken during the latter part of the final quarter in the M.S. program. Students must wait at least eight weeks after retaking a failed examination. Students failing the examination twice are dismissed from the program.

Normative Time to Degree 2 years

Doctoral Degree
The Department of Environmental Sciences offers the Ph.D. degree in Environmental Sciences. The general requirements for the Ph.D. degree are found in the Graduate Studies section of the General Catalog.

Course Work Students must complete the course requirements given above for the specific field area. All students are required to give a presentation annually at the Environmental Sciences Graduate Program Student Symposium.

Ph.D. Written Qualifying Examination Following completion of all course work prescribed by the student’s Advisory Committee, a Ph.D. Written Qualifying Examination will be prepared and administered to the student by a Ph.D. Written Qualifying Examination Committee. The Ph.D. Written Qualifying Examination Committee will consist of at least three faculty members with interests in the student’s line of research. The purpose of this examination is to determine that the student has gained sufficient knowledge in the chosen field to perform professionally and competently. This exam may be attempted only twice. If this exam is failed twice, the student may be redirected to the M.S. degree if the student does not already hold an M.S. in Environmental Sciences or terminated from the program.

Ph.D. Oral Qualifying Examination A student who satisfactorily passes the Ph.D. Written Qualifying Examination may proceed with the Ph.D. Oral Qualifying Examination, which will focus on the dissertation proposal. This examination is conducted before the Oral Qualifying Examination Committee, consisting of five faculty members, one of whom must be from outside the ESGP. This examination may be attempted only twice. If this exam is failed twice, the student will be redirected to the M.S. degree if the student does not already hold an M.S. in Environmental Sciences or terminated from the program. The Ph.D. Written and Oral Qualifying Examinations will normally be taken at the end of the second year of graduate study and before the start of the third year.

Dissertation All Ph.D. students must write a doctoral dissertation, which must be read and accepted by all members of the Doctoral Dissertation Committee, comprised of at least three faculty members from the ESGP. A final oral dissertation defense in front of at least three Doctoral Dissertation Committee members may be required.

Relationship between Master’s and Doctoral Programs The M.S. and Ph.D. programs are separate. Students who enter the Ph.D. program do not need to acquire a M.S. degree first, although students may elect to take both.

Normative Time to Degree 5 years
Lower-Division Courses

ENSC 001. Introduction to Environmental Science: Natural Resources (4) F Lecture, 3 hours; discussion, 1 hour. An introduction to environmental science, focusing on natural resource description, management, and conservation. Topics covered include ecosystem characteristics and function; material and energy flows; population dynamics and influence of population on the environment; energy resources and conservation; and mineral and soil resources and their management. Credit is awarded for only one of ENSC 001 or ENSC 001H.

ENSC 001H. Honors Introduction to Environmental Science: Natural Resources (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ENSC 001. An introduction to environmental science, focusing on natural resource description, management, and conservation. Topics covered include ecosystem characteristics and function; material and energy flows; population dynamics and influence of population on the environment; energy resources and conservation; and mineral and soil resources and their management. Credit is awarded for only one of ENSC 001 or ENSC 001H.

ENSC 002. Introduction to Environmental Science: Environmental Quality (4) W Lecture, 3 hours; discussion, 1 hour. An introduction to environmental science, focusing on the impact of human development and technology on the quality of natural resources and living organisms. Topics covered include soil, water, and air pollution; water, land, and food resources; wildlife management and species endangerment; toxicology and risk management; and solid and hazardous waste management. Credit is awarded for only one of ENSC 002 or ENSC 002H. Amrhein

ENSC 002H. Honors Introduction to Environmental Science: Environmental Quality (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ENSC 002. An introduction to environmental science, focusing on the impact of human development and technology on the quality of natural resources and living organisms. Topics covered include soil, water, and air pollution; water, land, and food resources; wildlife management and species endangerment; toxicology and risk management; and solid and hazardous waste management. Credit is awarded for only one of ENSC 002 or ENSC 002H. Amrhein

ENSC 003. Contemporary Issues in the Environmental Sciences (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An issue-oriented approach to understanding the scientific principles behind environmental issues. Case studies of environmental issues appearing in the mass media provide the context for assessing the status of scientific knowledge and its role in human decision making. Credit is awarded for only one of ENSC 003 or ENSC 003H.

ENSC 003H. Honors Contemporary Issues in the Environmental Sciences (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ENSC 003. An issue-oriented approach to understanding the scientific principles behind environmental issues. Case studies of environmental issues appearing in the mass media provide the context for assessing the status of scientific knowledge and its role in human decision making. Credit is awarded for only one of ENSC 003 or ENSC 003H.

ENSC 006. Introduction to Environmental Economics (4) F, S Lecture, 3 hours; discussion, 1 hour. An introduction to the basic principles of economics and their application to problems of environmental quality and natural resource utilization. Emphasis is on the failure of markets as a cause of environmental degradation and the role of government in resolving problems of resource scarcity. Does not satisfy the Natural Science breadth requirement for the College of Humanities, Arts, and Social Sciences. Cross-listed with ECON 006, Knapp

ENSC 017. Environmental Impacts of Urbanization (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): none. Lectures and simulation exercises illustrating applications of principles from the physical and biological sciences to the analysis of urban systems and their impact on air and water quality, ecosystems, and reciprocal impacts at the urban-rural interface. Opportunities and constraints for mitigating the environmental impacts of urbanization.

ENSC 092. Exploring Environmental Sciences (1) F Seminar, 1 hour. Familiarizes students with the fields of environmental science, focusing on the role of technology on the quality of natural resources and living organisms. Topics include soil, water, and air pollution; water, land, and food resources; wildlife management and species endangerment; toxicology and risk management; and solid and hazardous waste management. Credit is awarded for only one of ENSC 001 or ENSC 001H. Amrhein

ENSC 100. Introduction to Soil Science (4) F Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 001C and CHEM 1HLC; GEO 001 is recommended. Explores the fundamental principles of soil science and soils as a natural resource. An introduction to the morphology, physics, chemistry, microbiology, fertility, classification, development, and management of soils in relation to the environment. Cross-listed with SWSC 100. Credit is awarded for only one of ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H. Amrhein

ENSC 100H. Honors Introduction to Soil Science (4) F Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor; both CHEM 001C and CHEM 01LC or both CHEM 001C and CHEM 1HLC; GEO 001 is recommended. Honors course corresponding to ENSC 100. Explores the fundamental principles of soil science and soils as a natural resource. An introduction to the morphology, physics, chemistry, microbiology, fertility, classification, development, and management of soils in relation to the environment. Cross-listed with SWSC 100. Credit is awarded for only one of ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H. Amrhein

ENSC 101. Water Resources (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENSC 001 or ENSC 001H, ENSC 002 or ENSC 002H; or consent of instructor. An introduction to the hydrologic cycle; water sources, distribution, and transfer; and the physical, chemical, and biological properties of water. Discussion of water management and policy issues. Wu

ENSC 102. Introductory Atmospheric Science (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 001C and CHEM 01HC or both CHEM 001H and CHEM 1HLC. Covers the structure of the atmosphere and the impact of humans on it, including the causes and consequences of air pollution, air quality standards, and stratospheric and tropospheric ozone. Introduces the chemistry of air pollution and air pollution control strategies. Ayen

ENSC 104. Environmental Soil Chemistry (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 005 or ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H or consent of instructor. Quantitative study of the chemistry of the solid, liquid, and gas phases in soils and sediments. Topics include solid and solution speciation, mineral solubility, ion exchange and adsorption reactions, oxidation-reduction, and the chemistry of organic contaminants and toxic trace elements in soils. Cross-listed with SWSC 104. Parker

ENSC 107. Soil Physics (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B or MATH 094B; PHYS 002A; or consent of instructor. Topics include physical properties of soils and methods of evaluation. Emphasis is on movement of water, heat, gases, and chemicals through soil. Cross-listed with SWSC 107. Simunek

ENSC 120. Soil Ecology (3) S Lecture, 3 hours. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC; ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H; MATH 094B or MATH 094H. Topics include interactions of environmental conditions with abiotic and biotic transformation and transport of major organic and inorganic contaminants in soil. Cross-listed with SWSC 120. Crowley, DeLey

ENSC 127. Fate and Transport of Contaminants in Soil (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC; ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H; MATH 094B or MATH 094H. Topics include interactions of environmental conditions with abiotic and biotic transformation and transport of major organic and inorganic contaminants in soil. Cross-listed with SWSC 127. Ban

ENSC 133. Environmental Microbiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, or consent of instructor. Introduction to nonpathogenic microorganisms in the environment. Topics include an introduction to microbial biology and microbial and metabolic genetic diversity; methods; symbiotic interactions; biofilms; and geomicrobiology and biogeochemistry. Explores life in extreme environments and the effects of the physical and chemical environment on microbes. Cross-listed with MBCL 133 and SWSC 133.

ENSC 134. Soil Conditions and Plant Growth (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 104/BPSC 104, ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H; or consent of instructor. A study of the chemical, physical, and biological properties of soils and their influence on plant growth and development. Topics include soil-plant water relations, fundamentals of plant mineral nutrition; soil nutrient pools and cycles; soil acidity, alkalinity, salinity, and sodicity; root symbioses and rhizosphere processes. Cross-listed with BPSC 134 and SWSC 134. Crowley

ENSC 135. Chemistry of the Clean and Polluted Atmosphere (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 112A, CHEM 112B, or consent of instructor; ENSC 102 recommended. Structure of the troposphere and stratosphere, formation of atmospheric ozone; tropospheric NOx chem-
istry; methane oxidation cycle; phase distributions of chemicals; wet and dry deposition; chemistry of volatile organic compounds; formation of photochemical air pollution; modeling of air pollution and control strategies; stratospheric ozone depletion and global warming. Cross-listed with CHEM 135 and ENTX 135.

Atkinson

ENSC 136. Chemistry of Natural Waters (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 005 with a grade of "C" or better or ENSC 104/SWSC 104 with a grade of "C" or better or consent of instructor. Introduction to processes controlling the chemical composition of natural waters. Topics include chemical equilibria, acid-base and coordination chemistry, oxidation-reduction reactions, precipitation-dissolution, air-water exchange, and use of equilibrium and kinetic models for describing marine nutrient, trace metal, and sediment chemistry. Cross-listed with CHEM 136, ENTX 136, and SWSC 136. Ziemann

ENSC 138. Soil Morphology and Classification (4) S Lecture, 3 hours; laboratory, normally 3 hours; two 1-day field trips. Prerequisite(s): ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H; GEO 001 or GEO 002, or consent of instructor. The study of soils as they occur in the field and their relations to current and past environmental conditions. Use of field and laboratory data to understand soil genesis, causes of soil variability, fundamentals of soil classification, and land use potentials. Laboratory emphasizes the description and interpretation of soils and landscapes in the field. Cross-listed with GEO 138 and SWSC 138. Graham

ENSC 140. Limnology (4) S Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 11HC; ENSC 101. Study of surface waters. Considers in detail the physical and chemical processes in surface waters, aquatic biology, ecosystem dynamics, and aspects of surface water quality and modeling. Cross-listed with SWSC 140. Anderson

ENSC 141. Public Health Microbiology (4) F Lecture, 4 hours. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 005B or BIOL 005S; upper-division standing or consent of instructor. Introduction to transmission of human pathogenic microorganisms through environmental media, including drinking water, wastewater, and air. Topics include characterization of environmentally transmitted pathogens, microbial risk assessment, sampling and detection methods for microorganisms in environmental samples, waterborne disease outbreaks, recycling or re-use of wastewater, microbial regulations and standards, and indoor air microbiology. Cross-listed with MCBL 141 and SWSC 141. Yates

ENSC 142. Water Quality (4) S Lecture, 4 hours. Prerequisite(s): both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 11HC; ENSC 101; upper-division standing or consent of instructor. Topics include principles and practices of water pollution control; basic concepts of water quality management; and the chemistry and physics of water purification processes.

ENSC 143A. Environmental Economics (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 003 or ECON 004 or equivalent. MATH 022 or equivalent; or consent of instructor. Introduction to economic analysis of natural resources and the environment with emphasis on environmental quality. Topics include environment-economy interactions and social choice theory; source control costs, damage valuation, and efficient pollution control; and design of efficient and equitable environmental policy. Cross-listed with ECON 143A. Schwabe

ENSC 143B. Natural Resource Economics (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 143A/ENSC 143A or consent of instructor. Considers the extraction and use of natural resources. Topics include land use and natural capital economics and valuation; economics of mineral and nonrenewable resources including recycling; and managing biological and renewable resources, including common property, efficient usage, and regulation. Cross-listed with ECON 143B. Fernandez

ENSC 143C. Ecological Economics and Environmental Valuation (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 143A/ENSC 143A or consent of instructor. Survey of environmental valuation and economic-geography, long time-scale issues. Valuation methods covered include hedonic pricing, weak complements, contingent valuation, and ecosystem services. Environmental macroeconomic topics include population growth, biophysical constraints to economic growth, intertemporal welfare and sustainability, and sustainable development. Cross-listed with ECON 143C. Schwabe

ENSC 144. Solid Waste Management (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 005S; CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 11HC; either both ENSC 001 (or ENSC 001H) and ENSC 002 (or ENSC 002H) or ENVE 171; MATH 009B or MATH 090B; MATH 022; or consent of instructor. A study of the characterization, collection, transportation, processing, disposal, recycling, and composting of municipal solid waste. Emphasizes accepted management strategies and design procedures for recovering or disposing solid wastes while protecting public and environmental well-being. Cross-listed with ENVE 144. Cronh

ENSC 155. Principles and Applications of Bioremediation (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 002, BIOL 003, or equivalents; ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H or consent of instructor. Study of the principles, applications, and case histories of biological treatment in the cleanup of hazardous chemicals. Topics include remediation of contaminated soils, sediments, sludges, groundwater, and vapors. Frankenberger

ENSC 163. Hydrology (4) W Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): MATH 009B or MATH 090B; STAT 100B, or consent of instructor. Introduction to the scientific study of the hydrologic cycle. Covers the measurement and evaluation of hydrologic phenomena, including the use of statistical methods. Explores computer techniques in hydrology with applications to water resource development and water quality problems, particularly those in California. The laboratory includes field and computer assignments.

ENSC 170. Workshop in Environmental Management (4) Workshop, 5 hours. Prerequisite(s): upper-division standing or consent of instructor. Training exercise in which students make decisions and interact to influence the simulated physical, political, social, and economic environments of a typical American metropolitan area. Graded Satisfactory (S) or No Credit (NC), but student may petition instructor for letter grade.

ENSC 172. Principles of Environmental Impact Analysis (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 006/ENSC 006; ENSC 001 or ENSC 001H, ENSC 002 or ENSC 002H. Principles and theories of analyzing environmental interactions.
ENSC 201. Environmental Management (4) S, Odd Years
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ECON 003 or consent of instructor. An introduction to economic instruments used to make environmental policy to address pollution and natural resource protection on local and international scales. Investigates public and private incentives for single and multiple polluters to reduce pollution and conserve exhaustible and renewable resources.

Fernandez

Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Introduction to the principles of transport modeling, including mass balance and flow laws, boundary conditions, and rate processes. Discusses and demonstrates the use of compartmental and differential models of specific environmental processes. Also examines case studies and environmental modeling software applications. Required of all teaching assistants in Environmental Sciences under faculty direction.

Simunek

ENSC 205. Functional Diversity of Prokaryotes (3)
Lecture, 3 hours. Prerequisite(s): BCH 110A, BCH 110B, BIOL 121/MCB 121; or equivalents; or consent of instructor. In-depth coverage of bacterial and archaean bioenergetics, cell structure, diversity of metabolism, regulation of metabolism, growth, and biosynthesis, and cell-cell interactions between prokaryotes and eukaryotes. Project involves analysis of metabolic pathways from complete, annotated, prokaryotic genome sequences. Cross-listed with MCB 201 and PPLA 201.

ENSC 206. Environmental Policy and Law (4) S, Even Years
Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing, POSC 010 or POSC 010H, POSC 020 or POSC 020H; or consent of instructor. An introduction to the process and politics of environmental regulation in the United States and the negotiation and implementation of international environmental accords. Uses social scientific methods of analysis to investigate specific issues such as air quality, energy, and biodiversity. Cross-listed with POSC 206. Allison

ENSC 207. Surface Water Quality Modeling (4) W, Odd Years
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Introductions to principles of surface water quality modeling. Explores mathematical representations of surface water systems. Reviews theory and develops analytical and numerical solutions to describe hydrodynamics and mixing in surface waters, surface water quality, eutrophication, and the cycling and fate of contaminants in lake and river ecosystems. May be taken Satisfactory (S) or No Credit (NC) by students advanced to candidacy for the Ph.D. Simunek

ENSC 214. Soil and Water Chemistry Laboratory (2)
Laboratory, 6 hours. Prerequisite(s): concurrent enrollment in ENSC 104/SWSC 104 or consent of instructor. A series of advanced laboratory exercises involving modern analytical methods for soils, sediments, and surface waters. Topics include trace metal speciation, isotope exchange kinetics, mineral solubility, adsorption isotherms, redox couples, and partitioning and biodegradation of organic contaminants. Cross-listed with SWSC 214. Parker

ENSC 217. Vadose Zone Processes (4) W, Even Years
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 090B or MATH 09HB, ENSC 107/SWSC 107; or consent of instructor. A study of physical and mathematical descriptions of transient flow and transport processes in the vadose zone. Emphasis is on numerical solutions to equations describing the movement of water, gas, contaminants and heat, including chemical and biological reactions. Explores mathematical models for direct and inverse solutions, spatial heterogeneity, and determination of soil hydraulic properties. Cross-listed with SWSC 217. Simunek

ENSC 218. Isotopes in Ecology and Environmental Science (4) F, Odd Years
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 1HLC. Explores the principles and techniques of isotope tracer fractionation and mixing commonly used in ecology and environmental science. Introduces isotope notation, mixing models, and kinetic and equilibrium fractionation concepts. Includes case studies involving stable- and radiotopes of carbon, nitrogen, oxygen, and sulfur. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable to a maximum of 4 units. Sickman

ENSC 227. Global Change and the Earth System (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor; ENSC 232/SWSC 232 is recommended. Examines the fundamental principles of earth system science in the context of global change. Emphasizes contemporary research on the relationship between humans and the Earth’s environment. Topics include the earth system prior to human influence; the Anthropocene era (1850 to present); the responses of the Earth’s support machinery to human activities; consequences of global change for human well-being; and pathways towards global sustainability. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Sickman

ENSC 232. Biogeochemistry (4) W, Odd Years
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; consent of instructor. A study of the biogeochemical cycling and exchange of carbon and important nutrients (N, S, base cations) between the lithosphere, hydrosphere, and atmosphere. Quantitatively describes processes at scales ranging from local to global. Addresses modern concerns about water and atmospheric quality, including global climate change. Cross-listed with SWSC 232. Parker

ENSC 265. Special Topics in Earth and Environmental Sciences (1-3) F, W, S
Seminar, 1 hour. Prerequisite(s): COS 105B, ENSC 107/SWSC 107 or MATH 009B or MATH 09HB, ENSC 107/SWSC 107 or consent of instructor and graduate advisor. Course is repeatable.

ENSC 275. Research Seminar in Environmental Sciences (1)
Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Involves presentations and small-group discussions of selected research topics in Environmental Sciences.

Graduated Satisfactory (S) or No Credit (NC). Course is repeatable.

ENSC 290. Directed Studies (1-6)
Consultation, 1-3 hours; individual study, 1-15 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Individual study of selected topics in Environmental Sciences under faculty direction. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

ENSC 297. Directed Research (1-6)
Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Individual research performed under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

ENSC 299. Research for the Thesis or Dissertation (1-12)
Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Research in environmental sciences for the M.S. thesis or Ph.D. dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

ENSC 302. Teaching Practicum (1-4)
Practicum, 3-12 hours. Prerequisite(s): graduate standing. Supervised teaching in Environmental Sciences or related courses. Required of all teaching assistants in Environmental Sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Environmental Toxicology

Subject abbreviation: ENTX
College of Natural and Agricultural Sciences

David A. Eastmond, Ph.D.,
Chair and Program Director
Program Office, 1001 Batchelor Hall North
(800) 735-7017 or (951) 827-4116
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Environmental Sciences (Entomology/Cell Biology and Neuroscience)
Michael F. Allen, Ph.D.
Plant Pathology/Biology (Plant Pathology)
Janet T. Arey, Ph.D.
Atmospheric Chemistry (Environmental Sciences)
Roger Alkinton, Ph.D.
Atmospheric Chemistry (Environmental Sciences)
Nancy E. Beckage, Ph.D.
Biochemistry and Endocrinology (Entomology/Cell Biology and Neuroscience)
Wilfred Chen, Ph.D.
President’s Chair, Chemical Engineering (Chemical and Environmental Engineering)
Carl F. Cranor, Ph.D.
Regulation of Toxic Substances (Philosophy)
David E. Crowley, Ph.D.
Environmental Microbiology (Environmental Sciences)
Marc A. Desthieuxes, Ph.D.
Environmental Biotechnology (Chemical and Environmental Engineering)
David A. Eastmond, Ph.D.
Toxicology (Cell Biology and Neuroscience)
Jianying “Jay” Gan, Ph.D.
Water Quality (Environmental Sciences)

Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
major professor and the Guidance Committee to develop depth in particular areas of specialization.

3. Research training in specific areas of environmental toxicology

The program stresses the importance of innovative and independent laboratory research as the major component of the student’s education.

Admission

Students must have a B.A. or B.S. degree from an accredited institution and an academic record that satisfies the minimum admission standards established by the UCR Graduate Division. In addition, results from the GRE General Test (verbal, quantitative, analytical) must be submitted at the time of application. Although no specific undergraduate degree specialization is required, applicants should have adequate backgrounds in the basic physical sciences such as chemistry, physics, and mathematics as well as in the biological sciences.

Course Work

Normally, students admitted to regular standing have satisfied all prerequisite course work. Under special circumstances, students who have not completed all undergraduate requirements may be admitted provided that these deficiencies are corrected early in their graduate studies. Deficiencies must be corrected by taking the appropriate course work if undergraduate or other previous training has not included equivalent courses to course work if undergraduate or other previous training has not included equivalent courses to the following:

- **BIOL 005A, BIOL 05LA, BIOL 005B**
- **BCH 110A and both BCH 110A and BCH 110B or BCH 110C or BIOL 107A**
- **CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C, CHEM 005, CHEM 112A, CHEM 112B, CHEM 112C**
- **CHEM 109 or CHEM 110A, CHEM 110B, CHEM 109; and BCH 184 (exceptions depend on biochemical or chemical emphasis)**
- **MATH 008B or MATH 009A, MATH 009B, PHYS 002A, PHYS 002B, PHYS 002C, STAT 100A and STAT 100B**

Students who meet all the undergraduate entrance requirements should be able to complete the core Environmental Toxicology requirements in the first year and most electives by the end of the second year.

Laboratory Rotation

All students participate in laboratory rotation through enrollment in ENTX 201L. Students spend time in one laboratory per quarter familiarizing themselves with research techniques utilized in the laboratory of an Environmental Toxicology faculty member. Rotation laboratories are chosen in consultation with the guidance committee and individual faculty members. Students may enroll in up to three quarters of laboratory rotation before declaring a major professor. Students who wish to declare a major professor after one quarter are not required to enroll for additional laboratory rotation. The major professor serves as chair of the student’s Guidance and Dissertation committees.

Guidance Committee

Each graduate student establishes a guidance committee which participates in the annual student progress evaluation procedure and advises the student on curriculum and research. The committee consists of the major professor plus at least two other faculty, one of whom must be a member of the Environmental Toxicology Program. Each student, in consultation with the major professor, nominates the members of the guidance committee. The committee must be named by the end of the quarter in which the student selects a major professor. The composition of the guidance committee must be approved by the curriculum and student affairs committee.

Master’s Degree

The program offers the M.S. degree in Environmental Toxicology.

Students enrolling in the master’s degree program must meet the requirements for Plan I of the UCR Graduate Council, take core courses as described above, and submit an acceptable thesis.

Plan I (Thesis)

Thirty-six (36) units, of which 24 must be in graduate-level courses, are required. No more than 12 units of ENTX 290, ENTX 297, and ENTX 299 may be used to satisfy the unit requirement. All students must enroll in the Environmental Toxicology seminar (ENTX 270 and ENTX 271) each quarter offered, although no more than 3 units from seminar courses can be accrued towards degree credit. A final draft of the thesis is to be given to the thesis committee two weeks before the final oral examination. A final oral examination consists of an open research seminar, presented by the candidate and advertised to all the students and faculty in the Environmental Toxicology Program. Following the seminar, the student is questioned by the guidance committee on the thesis research and on matters related to the general field of the thesis research.

Normative Time to Degree

6 quarters

Doctoral Degree

The program offers the Ph.D. degree in Environmental Toxicology.

Students must meet general university requirements of the Graduate Division as found in the Graduate Studies section of this catalog.

Course Work

Beyond the required core sequence, all students must enroll in the Environmental Toxicology seminar (ENTX 270 and ENTX 271) each quarter offered, and complete a program of courses to be approved by the guidance committee. All course work schedules are submitted to the graduate advisor for approval. The Ph.D. degree is awarded when the student passes the preliminary and qualifying examinations and demonstrates an ability to do original research by preparation and submission of an acceptable dissertation.
### Upper-Division Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Code(s)</th>
<th>Prerequisite(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTX 101</td>
<td>Fundamental Toxicology (W)</td>
<td>4</td>
<td>BIOL 005A, BIOL 005B, CHEM 112A, CHEM 112B, CHEM 112C; or consent of instructor.</td>
<td>Recommended for students interested in toxicology.</td>
<td>Demonstrates the contribution of biotransformation in the development of toxicity.</td>
</tr>
<tr>
<td>ENTX 135</td>
<td>Chemistry of the Clean and Polluted Atmosphere (W)</td>
<td>3</td>
<td>CHEM 112A, CHEM 112B, or consent of instructor; ENSC 102</td>
<td>Structure of the troposphere and stratosphere; formation of atmospheric ozone; tropospheric NOx chemistry; methane oxidation cycle; phase distributions of chemicals; wet and dry deposition; volatility of organic compounds; formation of photochemical air pollution; modeling of air pollution and control strategies; stratospheric ozone depletion and global warming.</td>
<td>Cross-listed with CHEM 135 and ENSC 135.</td>
</tr>
<tr>
<td>ENTX 136</td>
<td>Chemistry of Natural Waters (S)</td>
<td>4</td>
<td>CHEM 005 with a grade of &quot;C-&quot; or better or ENSC 104/WSWC 104 with a grade of &quot;C-&quot; or better or consent of instructor.</td>
<td>Structure of natural waters. Topics include chemical equilibria, acid-base coordinates, and kinetics of chemical reactions.</td>
<td>Acids and bases, acid-base coordinates, and kinetics of chemical reactions.</td>
</tr>
<tr>
<td>ENTX 150</td>
<td>Cancer Biology (S)</td>
<td>4</td>
<td>BCH 110 or BIOL 107A; CBNS 101 is recommended (may be taken concurrently).</td>
<td>Introduction to cancer biology, including molecular mechanisms underlying the development of cancer.</td>
<td>Cross-listed with CBNS 150.</td>
</tr>
<tr>
<td>ENTX 154</td>
<td>Risk Assessment (S)</td>
<td>3</td>
<td>ENTX 101; STAT 100A or equivalent; or consent of instructor.</td>
<td>Introduction to basic principles and statistical methods by which health risks associated with exposure to chemical and physical agents are determined.</td>
<td>Topics include hazard identification, dose response, and exposure assessment.</td>
</tr>
<tr>
<td>ENTX 200</td>
<td>Fate and Transport of Chemicals in the Environment (W)</td>
<td>4</td>
<td>CHEM 109 or CHEM 110B; CHEM 112A, CHEM 112B, CHEM 112C; or consent of instructor.</td>
<td>Covers the identification of toxicants in the environment.</td>
<td>Cross-listed with CHEM 246 and ENSC 200.</td>
</tr>
<tr>
<td>ENTX 200L</td>
<td>Analysis and Identification of Environmental Toxicants (W)</td>
<td>3</td>
<td>CHEM 125 (lecture portion only), CHEM 246/ENSC 200/ENTX 200; or consent of instructor.</td>
<td>Provides laboratory experience in specialized methods of identification and analysis of toxic organic compounds in gaseous, aqueous, and soil media.</td>
<td>Toxins are analyzed by gas chromatography (GC), GC-mass spectrometry, and GC-Fourier transform infrared spectroscopy.</td>
</tr>
<tr>
<td>ENTX 201</td>
<td>Principles of Toxicology (F)</td>
<td>3</td>
<td>CHEM 110A, BCH 110B; or consent of instructor.</td>
<td>Structure and activity of dose-response relationships of environmental toxicants; their absorption, distribution, metabolism, and excretion; and evaluation of their toxicity and factors that influence toxicity.</td>
<td>Quantitative methods in measuring acute and chronic toxicity.</td>
</tr>
<tr>
<td>ENTX 202</td>
<td>Mechanisms of Toxicity (W)</td>
<td>3</td>
<td>CHEM 110C or BIOL 107A; ENTX 201; or consent of instructor.</td>
<td>Biochemical and physiological mechanisms underlying the toxicity of environmental toxicants.</td>
<td>Cross-listed with CHEM 204 and CMDB 204.</td>
</tr>
<tr>
<td>ENTX 204</td>
<td>Genome Maintenance and Stability (S)</td>
<td>4</td>
<td>CHEM 110A or BIOL 110A; BIOL 113 or CHEM 114 or CBNS 101; BIOL 102 is strongly recommended.</td>
<td>Emphasizes mechanisms of chromosome-based processes that maintain genome integrity and ensure accurate genome transmission during cell division.</td>
<td>May be taken with consent of instructor and graduate advisor.</td>
</tr>
<tr>
<td>ENTX 205</td>
<td>Biotransformation of Organic Chemicals (S)</td>
<td>4</td>
<td>CHEM 112A; CHEM 112B; BCH 110A, BCH 110B, BCH 110C, or equivalents; or consent of instructor.</td>
<td>Introductory course to research techniques in biochemical and chemical toxicology.</td>
<td>Cross-listed with BCM 204 and CMDB 204.</td>
</tr>
<tr>
<td>ENTX 206</td>
<td>Ecotoxicology (W)</td>
<td>3</td>
<td>CHEM 112A, CHEM 112B, CHEM 112C; or consent of instructor.</td>
<td>Introduces the impact of chemicals upon ecological systems.</td>
<td>Examination of the fate and effects of environmental chemicals in various hierarchies of biological systems.</td>
</tr>
</tbody>
</table>

### Graduate Courses

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<tr>
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<tr>
<td>ENTX 200L</td>
<td>Analysis and Identification of Environmental Toxicants (W)</td>
<td>3</td>
<td>CHEM 125 (lecture portion only), CHEM 246/ENSC 200/ENTX 200; or consent of instructor.</td>
<td>Provides laboratory experience in specialized methods of identification and analysis of toxic organic compounds in gaseous, aqueous, and soil media.</td>
</tr>
<tr>
<td>ENTX 201</td>
<td>Principles of Toxicology (F)</td>
<td>3</td>
<td>CHEM 110A, BCH 110B; or consent of instructor.</td>
<td>Structure and activity of dose-response relationships of environmental toxicants; their absorption, distribution, metabolism, and excretion; and evaluation of their toxicity and factors that influence toxicity.</td>
</tr>
<tr>
<td>ENTX 202</td>
<td>Mechanisms of Toxicity (W)</td>
<td>3</td>
<td>CHEM 110C or BIOL 107A; ENTX 201; or consent of instructor.</td>
<td>Biochemical and physiological mechanisms underlying the toxicity of environmental toxicants.</td>
</tr>
<tr>
<td>ENTX 204</td>
<td>Genome Maintenance and Stability (S)</td>
<td>4</td>
<td>CHEM 110A or BIOL 110A; BIOL 113 or CHEM 114 or CBNS 101; BIOL 102 is strongly recommended.</td>
<td>Emphasizes mechanisms of chromosome-based processes that maintain genome integrity and ensure accurate genome transmission during cell division.</td>
</tr>
<tr>
<td>ENTX 205</td>
<td>Biotransformation of Organic Chemicals (S)</td>
<td>4</td>
<td>CHEM 112A; CHEM 112B; BCH 110A, BCH 110B, BCH 110C, or equivalents; or consent of instructor.</td>
<td>Introductory course to research techniques in biochemical and chemical toxicology.</td>
</tr>
<tr>
<td>ENTX 206</td>
<td>Ecotoxicology (W)</td>
<td>3</td>
<td>CHEM 112A, CHEM 112B, CHEM 112C; or consent of instructor.</td>
<td>Introduces the impact of chemicals upon ecological systems.</td>
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</tbody>
</table>
logical organization to learn how to carry out precise and accurate assessments of ecological risk. Crosslisted with ENSC 208 and SWSC 208. Schlenk

ENTX 211. Environmental and Molecular Carcinogenesis (3) Lecture, 3 hours. Prerequisite(s): BIOL 107A or equivalent or consent of instructor. Molecular genetics of human cell response to environmental carcinogens. Discussions of DNA repair, mutagenesis, oncogenes, and tumor suppressors. Following presentation of introductory material, emphasis will be placed on student discussion of recent literature.

ENTX 244. Airborne Toxic Chemicals (3) Lecture, 3 hours. Prerequisite(s): CHEM 109 or CHEM 110A, and CHEM 110B, CHEM 135/ENSC 135/ENTX 135; or consent of instructor. Atmospheric chemistry of airborne chemicals. Intermedia partitioning; Structure of the atmosphere. Gas-particle distributions of chemicals, and wet and dry deposition of gases and particles. Atmospheric reactions of organic compounds, with emphasis on toxics. Theoretical and experimental methods for the determination of atmospheric lifetimes and products of chemicals. Cross-listed with CHEM 244. Atkinson

ENTX 245. Chemistry and Physics of Aerosols (3) F, Odd Years Lecture, 3 hours. Prerequisite(s): CHEM 109, CHEM 110B; or consent of instructor. Fundamentals of chemical and physical processes controlling behavior and properties of airborne particles. Topics include particle mechanics; electrical, optical, and thermodynamic properties; nucleation; surface and aqueous-phase chemistry; gas-particle partitioning; sampling; size and chemical analysis; atmospheric aerosols; and environmental effects. Cross-listed with CHEM 245 and SWSC 245. Ziemann

ENTX 252. Special Topics in Environmental Toxicology (1-3) F, W Seminar, 1-3 hours. Prerequisite(s): graduate standing. Involves oral presentations and intensive small-group discussions of selected topics in the area of special competence of each participant. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes to a maximum of 20 units.

ENTX 270. Seminar in Environmental Toxicology (1) F, W Seminar, 1 hour. Prerequisite(s): graduate status in Environmental Toxicology. Lectures by visiting scholars and staff on current research topics in Environmental Toxicology. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit. Eastmond

ENTX 271. Seminar in Environmental Toxicology (2) S Seminar, 15 hours per quarter; individual study, 15-20 hours per quarter. Prerequisite(s): graduate standing in Environmental Toxicology. An interdisciplinary seminar consisting of student presentations of original research and discussion of current research topics in environmental toxicology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes to a maximum of 12 units.

ENTX 290. Directed Studies (1-6) F, W, S Outside research, 3-18 hours. Prerequisite(s): graduate status in Environmental Toxicology. Literature or research topics under direction of the staff. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ENTX 297. Directed Research (1-6) F, W, S Outside research, 3-18 hours. Prerequisite(s): graduate status in Environmental Toxicology. Directed research performed towards the development of a dissertation problem or other research performed under the direction of staff. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

ENTX 299. Research for Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate status in Environmental Toxicology. Research performed under the direction of a faculty member towards a thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

Ethnic Studies

Subject abbreviation: ETST

College of Humanities, Arts, and Social Sciences

Alfredo M. Mirandé, Ph.D., Chair
Department Office, 3606 Humanities and Social Sciences
(951) 827-4577; etstudies.ucr.edu

Professors
Edward T. Chang, Ph.D. Asian American Studies
Alfredo M. Mirandé, Ph.D. Chicano Studies
(Asian American Studies/Sociology)
Armando Navarro, Ph.D. Chicano Studies

Professor Emerita
Edna M. Bonacich, Ph.D. Race, Class, and Gender
(Asian American Studies/Sociology)

Assistant Professor
Ralph L. Crowder, Ph.D. African American Studies
Paul Green, Ph.D. Race, Education, and Law
Dylan Rodriguez, Ph.D. Filipino American Studies
(Prison Industrial Complex)

Assistant Professors
Victoria Bomberry, Ph.D. Native American Studies
Jody Brown, Ph.D. African American Studies
Jodi Kim, Ph.D. Asian American Studies
Anthony Macias, Ph.D. Chicano Studies
Jennifer Najera, Ph.D. Chicano Studies
Robert Perez, Ph.D. Native American Studies

Majors
Ethnic Studies is the systematic and comparative study of the social construction of race, racism, and racial or ethnic subordination, and the history, culture, and contemporary experiences of racial or ethnic groups who have not been fully incorporated into U.S. society. The Department of Ethnic Studies focuses on the experiences of four racial or ethnic groups (African Americans, Asian Americans, Chicana/o and Latinas/os, and Native Americans) whose histories, cultures, and experiences have been neglected by traditional disciplines. Ethnic studies students examine inter- and intra-group differences and commonalities in history, culture, racism, the impact of law, and social inequality in contemporary society. Also examined are conflicts, tensions, and the building of effective inter-group coalitions and alliances among racially subordinated groups.

The Department of Ethnic Studies offers majors leading to a B.A. degree in Ethnic Studies, African American Studies, Asian American Studies, Chicano Studies, and Native American Studies. Students may develop either a general emphasis in Ethnic Studies or a concentration on a specific group. The major enables students to study race and ethnicity in comparative perspective, to gain greater multicultural insight and understanding, and to prepare them to enter the workforce and function effectively and critically as informed citizens in a diverse multicultural society.

With the changing ethnic composition of society there is a growing demand for individuals in education, government, and the private sector with knowledge and expertise in race and ethnic relations. An Ethnic Studies major also helps to prepare students for graduate or professional school and careers in a number of areas including education, corrections, law, human services, social welfare, urban planning, and state and county government.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The Ethnic Studies Department offers a B.A. degree in Ethnic Studies, African American Studies, Asian American Studies, Chicano Studies, or Native American Studies.

Ethnic Studies Major
The major requirements for the B.A. degree in Ethnic Studies are as follows:

Core courses required of all majors
1. Lower-division requirements (12 units)
   a) ETST 001
   b) Two courses chosen from ETST 002, ETST 003, or ETST 005
2. Upper-division requirements (44 units)
   a) ETST 101A, ETST 101B
   b) ETST 191R
   c) Two courses chosen from the following areas of emphasis:
      (1) African American Studies
      (2) Asian American Studies
      (3) Chicano Studies
      (4) Native American Studies
   d) Three courses chosen from Ethnic Studies courses that are comparative in nature
   e) One additional elective course in Ethnic Studies

Note
No internship courses may be counted toward the upper-division electives in Ethnic Studies.

African American Studies Major
The major requirements for the B.A. degree in African American Studies are as follows:

Core courses required of all majors
1. Lower-division requirements (8 units)
   a) ETST 001
   b) ETST 003
2. Upper-division requirements (48 units)
1. Lower-division requirements (8 units):
   a) ETST 100, ETST 131, ETST 191R
   b) ETST 104 and 109-I
   c) Twenty (20) additional upper-division units in Ethnic Studies chosen from courses focusing on the African American experience
   d) A minimum of one Ethnic Studies course chosen from two of the following four areas of emphasis (8 units)
      (1) Asian American Studies
      (2) Chicano Studies
      (3) Native American Studies
      (4) Comparative Issues
   Note No internship courses may be counted toward the upper-division electives in Ethnic Studies.

Asian American Studies Major
The major requirements for the B.A. degree in Asian American Studies are as follows:
Core courses required of all majors
1. Lower-division requirements (8 units)
   a) ETST 001
   b) ETST 005
2. Upper-division requirements (48 units)
   a) ETST 100, ETST 131, ETST 191R
   b) ETST 106
   c) Twenty-four (24) additional upper-division units in Ethnic Studies chosen from courses focusing on the Asian American experience
   d) A minimum of one Ethnic Studies course chosen from two of the following four areas of emphasis (8 units)
      (1) African American Studies
      (2) Chicano Studies
      (3) Native American Studies
      (4) Comparative Issues
   Note No internship courses may be counted toward the upper-division electives in Ethnic Studies.

Chicano Studies Major
The major requirements for the B.A. degree in Chicano Studies are as follows:
Core courses required of all majors
1. Lower-division requirements (8 units):
   ETST 002, ETST 004/HIST 004
2. Upper-division requirements (48–50 units)
   a) ETST 100, ETST 131
   b) ETST 191R
   c) A minimum of three courses selected from two of the following areas of emphasis:
      (1) Law
         (a) ETST 145/SOC 145
      (b) Two additional courses: ETST 126, ETST 128/SOC 128, ETST 185, ETST 108-I
      (2) Politics:
         (a) ETST 123
         (b) ETST 125
      (c) One additional course: ETST 111, ETST 132, ETST 142, ETST 156
      (3) History and Culture:
         (a) ETST 155
      (b) Two additional courses:
      (4) Gender:
         (a) ETST 124
         (b) Two additional courses from ETST 114, ETST 127, ETST 175/WMST 175
         d) One Senior Research Seminar (4 units)
         e) One Internship course (4 units)
         f) One additional elective upper-division course in Ethnic Studies
   Note No internship courses may be counted toward the upper-division electives in Ethnic Studies.

Native American Studies Major
The major requirements for the B.A. degree in Native American Studies are as follows:
Core courses required of all majors
1. Lower-division requirements (8 units)
   a) ETST 001
   b) ETST 007
2. Upper-division requirements (48 units)
   a) ETST 100, ETST 131, ETST 191R
   b) ETST 157 and 158
   c) Twenty (20) additional upper-division units in Ethnic Studies chosen from courses focusing on the Native American experience
   d) A minimum of one Ethnic Studies course chosen from two of the following four areas of emphasis (8 units)
      (1) African American Studies
      (2) Asian American Studies
      (3) Chicano Studies
      (4) Comparative Issues
   Note No internship courses may be counted toward the upper-division electives in Ethnic Studies.

Minors
The Ethnic Studies minor consists of 4 lower-division units, 20 upper-division units, and appropriate prerequisites as needed.
1. Lower-division requirement (4 units):
   ETST 001
2. Upper-division requirements (20 units)
   a) ETST 100, ETST 131
   b) Twelve (12) additional upper-division units in Ethnic Studies courses that are either comparative in nature or focus on African Americans, Asian Americans, Chicanos, or Native Americans (Courses must be approved by Ethnic Studies advisor.)

Asian American Studies Minor
The Asian American Studies minor consists of 4 lower-division units, 20 upper-division units, and appropriate prerequisites as needed.
1. Lower-division requirement (4 units):
   ETST 003
2. Upper-division requirements: 20 additional upper-division units in Ethnic Studies chosen from courses focusing on African Americans

African American Studies Minor
The African American Studies minor consists of 4 lower-division units, 20 upper-division units, and appropriate prerequisites as needed.
1. Lower-division requirement (4 units):
   ETST 005
2. Upper-division requirements: 20 additional upper-division units in Ethnic Studies chosen from courses focusing on Asian Americans

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Native American Studies Minor
The Native American Studies minor consists of 4 lower-division units, 20 upper-division units, and appropriate prerequisites as needed.
1. Lower-division requirement (4 units):
   ETST 005
2. Upper-division requirements: 20 additional upper-division units in Ethnic Studies chosen from courses focusing on Native Americans

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Chicano Studies Minor
The Chicano Studies minor consists of 4 lower-division units, 20 upper-division units, and appropriate prerequisites as needed.
1. Lower-division requirement (4 units):
   ETST 002 or ETST 004/HIST 004
2. Upper-division requirements: 20 additional upper-division units in Ethnic Studies chosen from courses focusing on Chicanos

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.
Native American Studies Minor
The Native American Studies minor consists of 4 lower-division units, 20 upper-division units, and appropriate prerequisites as needed.

1. Lower-division requirement (4 units):
   ETST 007
2. Upper-division requirements: 20 additional upper-division units in Ethnic Studies chosen from courses focusing on Native Americans

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR's International Education Center at inter nationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program
The Department of Ethnic Studies is developing a graduate program (M.A. and Ph.D.). For more information, contact the department.

Lower-Division Courses

ETST 001. Introduction to the Study of Race and Ethnicity (4) Lecture, 3 hours; discussion, 1 hour. ETST 001 will introduce students to major concepts and controversial issues in the study of race and ethnicity and shall provide a general overview of topics to be covered in more specialized Ethnic Studies courses. Credit is awarded for only one of ETST 001 or ETST 001H. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 001H. Honors Introduction to the Study of Race and Ethnicity (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ETST 001. Introduces students to major concepts and controversial issues in the study of race and ethnicity. Provides a general overview of topics covered in more specialized Ethnic Studies courses as well as an introduction to the methodology of scholarly research. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ETST 001 or ETST 001H. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 002. Introduction to Chicano Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. Provides an overview of the Chicano experience from 1848 to the present, comparing and contrasting with the experiences of the dominant society and those of other racial and ethnic groups. Credit is awarded for only one of ETST 002 or ETST 002H. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 002H. Honors Introduction to Chicano Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ETST 002. Provides an overview of the Chicano experience from 1848 to the present, comparing and contrasting with the experiences of the dominant society and those of other racial and ethnic groups. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ETST 002 or ETST 002H. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 003. Introduction to African American Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. This course is designed to provide an overview of the African American experience in the United States from antiquity to the present. It employs comparative and interdisciplinary perspectives. Emphasis is placed on examining the African American experience in a world context and comparing the African American experience to the experiences of other racial and ethnic groups. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 004. Introduction to Chicano History (4) Lecture, 3 hours; extra reading, 3 hours. The historical heritage of the Chicano from Spanish and Indian origins to the Chicano movement, with an emphasis on the period since 1845. Cross-listed with HIST 004. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 005. Introduction to Asian American Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. This course provides an overview of the Asian experience in the United States from antiquity to the present, comparing and contrasted with the experiences of the dominant society and those of other racial and ethnic groups. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 005H. Honors Introduction to Asian American Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ETST 005. Introduces students to major concepts and controversial issues in Asian American Studies. Provides a general overview of topics covered in more specialized Ethnic Studies courses as well as an introduction to the methodology of scholarly research. Satisfactory (S) or No Credit (NC) grading is not available. Cross-listed with RLST 012H. Credit is awarded for only one of ETST 005 or ETST 005H. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 006. Introduction to Native American Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. This course provides an overview of the Native American experience in the United States from antiquity to the present. The Native American experience is compared and contrasted with the experiences of the dominant society and those of other racial and ethnic groups. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 007H. Honors Introduction to Native American Studies in Comparative Perspective (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to ETST 007. Provides an overview of the Native American experience in the United States from antiquity to the present. Compares and contrasts the Native American experience with the experiences of the dominant society and those of other racial and ethnic groups. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ETST 007 or ETST 007H. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 008. Introduction to Chicano Cultural Studies (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): none. Identifies the cultural process of the Chicano experience, beginning with the Chicano Movement, and discusses the ideas, beliefs, values, and the forms of consciousness that shaped this process. Introduces literary and cultural works such as essay, film, theatre, music, poetry, and art. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 012. Religious Myths and Rituals (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the meanings, origins, and functions of religion, the roles of myths, rituals, and symbols; and images of transcendence. Religious beliefs and expressions are examined from diverse cultural perspectives. Source materials are drawn from indigenous Native (North and South) American, African American, and/or Asian American religions. Cross-listed with RLST 012. Credit is awarded for only one of ETST 012H or RLST 012 or ETST 012H. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 012H. Honors Religious Myths and Rituals (4) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. An introduction to the meanings, origins, and functions of religion, the roles of myths, rituals, and symbols; and images of transcendence. Religious beliefs and expressions are examined from diverse cultural perspectives. Source materials are drawn from indigenous Native (North and South) American, African American, and/or Asian American religions. Satisfactory (S) or No Credit (NC) grading is not available. Cross-listed with RLST 012H. Credit is awarded for only one of ETST 012H or RLST 012 or ETST 012H. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 014. Popular Musics of the World (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to issues surrounding popular and urban musics of the world, focusing on three major geocultural areas: Africa, Asia, and the Americas. Emphasizes the relationship between mass-mediated music and issues of cultural hegemony, resistance, and subversion. Analyzes the cultural impact of media technology on music performance and reception. Cross-listed with MUS 014 and URST 014. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.
ETST 061. Martin Luther King, Jr (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 001, HIST 060, or consent of instructor. A study of the life of Martin Luther King, Jr. with emphasis on the civil rights campaigns he led in the period, 1955-1968 and on the social and political philosophies he taught and espoused. Cross-listed with HIST 061. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 091. Freshman Research Seminar (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): freshman standing or consent of instructor. A focused research seminar designed uniquely each time it is taught. Instructors emphasize their field and area of research. Students work in small groups. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

Upper-Division Courses

ETST 100. Race and Ethnicity in a Comparative Perspective (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 001. Explores the interrelationships between race, class, ethnicity, and the operation of social processes. Accordingly, readings for this course center on the comparative well-being of African Americans, Hispanics (especially Chicanos), Native Americans, and Asian Americans. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 101A. Historical Development of Race, Racism, and White Supremacy (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 001 or ETST 001H; two additional lower-division Ethnic Studies courses; upper-division standing or consent of instructor. First of a two-course interdisciplinary sequence on theories of race and ethnicity. Focus is on a critical historical charting of the political, economic, and cultural development of race, racism, and white supremacy. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 101B. Theories of Race and Resistance (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 101A or consent of instructor. Second of a two-course interdisciplinary sequence on theories of race and ethnicity. Focus is on specific theories of race, dominance and resistance, recognizing the central structuring debates about social formation and social change. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 102. The Political Economy of Race and Class (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. This course explores the interrelationships among race, class, ethnicity, and the operation of market processes. Readings for this course will center on the comparative economic well-being of African Americans, Chicanos, Asian Americans, and Native Americans. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 104. Introduction to African Civilization (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to African studies from an interdisciplinary perspective. Describes the dynamics of African society. Examines the Black diaspora's interaction with and influence upon the political and historical developments on the continent of Africa.

ETST 105A. History of Black Americans: West African Backgrounds to 1877 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The study of the experiences of Black people in the United States with emphasis on the ideas and institutions that have shaped those experiences from the period of slave trading in West Africa to 1877. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 105B. History of Black Americans: 1877-1965 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on the experiences of Black people in the United States with emphasis on the ideas and institutions that have shaped those experiences from 1877 to 1965. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 106. Theory in American Studies (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines major themes that influenced current theory in American Studies: the racial nature of political, social and legal institutions, labor markets, the popular culture; contemporary feminist theory and politics; criticism of the assimilation paradigm which predicted eventual political and economic integration into mainstream American life. Explores how Asian American communities were viewed as sites for political mobilization, the building of alternative institutions, and the creation of an oppositional culture. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 107. Blacks in America: Assimilation versus Separation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analytical survey of the themes of assimilation and separation in the history of Blacks in the United States. Involves lecture, discussion, readings, and audio-visual presentations. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 108 (E-Z). Special Topics in Chicano Studies (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Selected topics in: E. Culture, Ethnicity, and Social Change; F. The Conditions of Education for Chicanos; I. Mexican Immigration and the Chicano Community; L. The Labor and Legal History of the Chicano; P. Chicano Poetry and Theatre; E. F, and I fulfill the Social Sciences requirement; L fulfills the Humanities or Social Sciences requirement, but not both; P fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 109 (E-Z). Special Topics in African American Studies (1-4) Lecture, 1-3 hours; extra reading, 3 hours. Prerequisite(s): ETST 003, upper-division standing, or consent of instructor. Selected topics addressing the issues of the African American experience. Reading, research, and discussion on the African American experience. G. Community Research: African American Community; K. Foreign Policy and Asian Americans. G and K fulfill the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 110. Ethnic Politics: Practicum in Political Change (4) Lecture, 3 hours; practicum, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Studies theories and practices of comparative ethnic political change. Examines topics intrinsic to the understanding of how to effect political change within the Chicano, African American, Asian American, Native American, and other ethnic communities, as well as the dominant societies. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 112. The Civil Rights Movement, 1950-1970 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 003, upper-division standing, or consent of instructor. The Civil Rights Movement of the 1950s and 1960s. The main focus will be on the "grass roots." African
American aspects of “The Movement,” as it was popularly known, from school desegregation to voting rights and beyond. Cross-listed with HISA 135. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 113. African American Women (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers the writings and collective organizational strategies of African American women intellectuals and activists developed in response to the ways racial, sexual, and economic oppression work interdependently and are institutionalized. Beginning with early women’s slave narratives, follows black women’s agendas for social change in America throughout history. Cross-listed with HISA 134. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 114. Contemporary Latina Writing in the U.S. (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Critical readings of Chicana, Puerto Rican, and Cuban American authors. Overview of contemporary literature (1970 onward) written by Latinas who reside permanently in the United States. Theatre, poetry, and narrative is closely examined and compared. Focuses on the political, historical, social, and cultural processes that give rise to this literature. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 115 (E-Z). Topics in Native American History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Select topics addressing the issues of the Native American. Includes reading, research, and discussion on the Native American experience. F. Early America: Emerging Interpretations. Cross-listed with HISA 144 (E-Z). Segments fulfill the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 116. Medicine Ways of Native Americans (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the medical history of Native Americans. Focuses on traditional Native American medicine and how Western diseases, medical practices, health care, and policies influenced American Indian health. Topics include medicine people, rituals, ceremonies, smallpox, measles, influenza, anomic, accidents, diabetes, venereal disease, and mental illness. Cross-listed with HISA 147. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 117 (E-Z). Themes and Topics in African History (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A thematic and topical approach to the study of African history from the early Niles Valley civilizations to the twentieth century. Examines the temporal and spatial development of African societies—including their social, political, economic, and ideological systems—during the precolonial, colonial, and postcolonial periods. F. West African History to 1800: I. Nineteenth- and Twentieth-Century Africa and European Imperialism; J. Ancient Africa; K. Africa from 1800 to 1880; M. Twentieth-Century Africa. Cross-listed with HST 137 (E-Z). See the Student Affairs Office in the College of Humanities, Arts, and Social Sciences for breadth requirement information.

ETST 118. Music Cultures of Africa (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of African performance, addressing the large culture areas of the continent. Emphasizes African aesthetics. Special attention is paid to contemporary popular music, its roots in older genres, and its ongoing role in postcolonial politics and culture. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 119. The Black Indian Experience: African Americans and Native Americans (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigates growth and evolution of the relationship between African Americans and Native Americans. Focuses on selected Native American nations and their relationship with transplanted Africans, blended communities of blacks and Indians, the process of transculturalization, black Indians as outlaws, and blacks and Indians in a modern educational experiment. Fulfills the Social Science requirement of the College of Humanities, Arts, and Social Sciences.

ETST 120. Contemporary Native American Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on selected Native American nations and their relationship with transplanted Africans, blended communities of blacks and Indians, the process of transculturalization, black Indians as outlaws, and blacks and Indians in a modern educational experiment. Fulfills the Social Science requirement of the College of Humanities, Arts, and Social Sciences.

ETST 121. Street Gangs in Comparative Perspective (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of the emergence and development of street gangs as a historical and contemporary phenomenon. Special emphasis is given to alternative conceptions, definitions, and theories of gang formation. The approach is comparative, focusing on African American, Asian American, Chicano, and White street gangs. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 122. Family, Sex Roles, and the Chicano (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A systematic analysis of Chicano family and sex roles, with special emphasis on the functions of the Chicano family in contemporary society. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 123. Chicano Politics in Comparative Perspective (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of contemporary Chicano politics, political movements, ideologies, relations with intergovernmental agencies, political attitudes, and participation in the political process. Comparison of the Chicano political experience to that of other racial and ethnic groups in the representative political system. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 124. The Chicana (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The unique experience of the Chicana viewed from social, intellectual, historical, and artistic perspectives. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 125. Chicano Political History: Nineteenth and Twentieth Centuries (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 002 or ETST 002H or ETST 004/HIST 004; upper-division standing. Surveys the history of Chicano politics in the United States from Mexican independence in 1821 to the present. Assesses the continuity of the Chicano political tradition through a comparison of the Chicano political experience before and after the establishment of American sovereignty. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 126. The Chicano and the Law (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of the relationship of the Chicano to the U.S. legal and judicial system. Topics include traditional sociological and criminological theories, history of the Chicano and the law, as well as focus on the role of police and correctional institutions. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 127. Latino Men and Masculinity (5) Lecture, 3 hours; term paper, 3 hours; written work, 3 hours. Prerequisite(s): ETST 001 or ETST 001H or ETST 002 or ETST 002H or ETST 004 or ETST 005H or ETST 007 or ETST 007H or consent of instructor. Analysis of Chicano/Mexican-American politics and masculinity in historical and comparative perspective. Examines social construction and expression of manhood and masculinity in a cross-national context and the range and varieties of masculinities in Latin America. Critically evaluates and deconstructs common myths, stereotypes, and misconceptions about men, machismo, and masculinity. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 128. Chicano Sociology (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of the experience of Mexicans in U.S. society; history as a minority; mass immigration in the twentieth century, relationships with American institutions, present socioeconomic status, variations in social status from region to region; political emergence and variations in values, social relations and integration with non-Mexicans. Cross-listed with SOC 128. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 129. Theories in Chicano Studies (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 001 or ETST 001H; ETST 002 or ETST 002H; ETST 004/HIST 004; upper-division standing or consent of instructor. Analyzes prevailing and emerging theories, paradigms, and perspectives in Chicano Studies. Examines and applies traditional social science theories of race and ethnicity such as the order/pluralistic, assimilationist, and functionalist models, as well as Marxism, internal colonialism, feminism, postmodernism, and critical race theory to the experiences of Chicanos and other Latinos. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 131. Race, Class, and Gender (4) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. This course will compare and contrast race, class, and gender as basis of social inequality and oppression. It will focus especially on the intersection of all three, examining the experiences of poor and working-class women of color. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 132. Chicano Contemporary Issues (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Provides
students with demographic and historical overview of the status of Latinos in the United States today, and of the salient issues plaguing them. Utilizing an interdisciplinary approach, analyzes strategies, tactics, and policies that may effectively deal with these issues.

Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 133. Asian Diaspora: Historical, Contemporary, and Comparative Perspectives (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the dispersal, transplantation, and transformation of Asian populations in selected regions of the world—the Americas, Europe, the Middle East, and Asia Pacific—as viewed from a wide range of contemporary and historical experiences of the Chinese, Japanese, Filipinos, Koreans, Vietnamese, and other Asian groups in the contexts of colonization, cultural and political domination, and an emerging global economy. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 134. Asian American History (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Overview of the Asian American experience in the United States before World War II. Describes how the racialization of Asians as “non-White” and nonassimilable shaped the experiences of Chinese, Japanese, Koreans, Filipinos, and South Asians in America. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 135. The Mass Incarceration of Japanese Americans (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Overview of mass incarceration of Japanese Americans within their overall experience in the United States. Emphasis is on variables that generated similarities and internal diversity within the broader ethnic group. Also explores the broad relevance of mass incarceration for understanding our post-9/11 world. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 136. The Korean American Experience (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the history of Koreans in the United States to analyze a wide range of contemporary social and identity issues. Students are encouraged to do original research, develop writing and communication skills, and devise research projects that address the immigrant Korean community’s needs. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 137. The Vietnamese Americans: The Refugee and Immigrant Experience (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. This course will focus on the Vietnamese American experience in contemporary society. Special emphasis will be placed on the relationship of Vietnamese Americans to the larger society and on intergenerational strains and conflicts. Among the topics addressed are: 1) socioeconomic and educational problems; 2) the family; 3) religion; and 4) the relationship between Vietnamese Americans and other racial ethnic groups (African Americans, Native Americans, Anglos, and Chicanos). Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 138. Asian American Literature: A Historical Survey (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Survey of the historical development of Asian American literature. Special emphasis placed on the origin and growth of Asian American novels, autobiographies, poetry, short stories, and plays that focus on socioeconomic and political struggles of Asian American communities. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 139. Contemporary Issues in the Asian American Community (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Addresses the shifting role of Asian American women in the United States as they struggle to define their identities between and within diverse and often opposing cultures. The myths and realities of being an Asian American woman are explored and analyzed through literature, art, documents, films, and first-person accounts. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 140. Asian American Women (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the significant Black American writers and literary movements in the nineteenth and early twentieth centuries (the folk period of Black literature). Attention is on slave narratives, protest literature, and the Harlem Renaissance. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 141A. A Survey of Black Literature: The Folk Period (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the significant Black American writers and literary movements in the nineteenth and early twentieth centuries (the folk period of Black literature). Attention is on slave narratives, protest literature, and the Harlem Renaissance. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 141B. A Survey of Black Literature: 1930 to the Present (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 141A. A survey of the significant Black American writers and literary movements from 1930 to the present. Attention will focus on the work of literary movements represented by such writers as Wright, Ellison, Brooks, Baldwin, Baraka, and others. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 142. Organizations, Institutions, and the Chicano (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The study of organizations and institutions, focusing on their effect on the Chicano. Special emphasis will be placed on the processes of participation within institutions and of dealing with complex organizational concepts to be studied include conflict, role identity, and socialization. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 143A. Critical Filipino(a) Studies: Interrogating the Filipino American Present (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 143A; upper-division standing or consent of instructor. Critically analyzes the emergence of Filipino American community and identity discourses in relation to the U.S. emancipation of the Philippines and the complex restructuring of a neocolonial and imperial relation. Examines the theoretical and conceptual premises of Filipino Americanism through counterhegemonic social movements, cultural production, and identity formation. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 144. Race and Ethnicity in Hawaii (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ETST 001 or ETST 005. A comparative and historical survey of the racial dynamics of Hawaii’s multicultural community and the intersections between Hawaii’s ethnic groups: the native Hawaiians, the white (“haole”) population, and the plantation immigrant groups, especially the Chinese, Japanese, Filipinos, and Portuguese. Includes a discussion of the Pacific Islander population in contemporary Hawaii. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 145. Law and Subordination (5) Lecture, 3 hours; field, 6 hours. Prerequisite(s): upper-division standing in Ethnic Studies or Sociology; ETST 128/SOC 128. A comparative and historical analysis of subordinated communities and law with special emphasis on integrating theoretical understanding of racial, class, and gender subordination. Field experience working directly with groups that have traditionally lacked equal access to the legal and judicial system. Cross-listed with SOC 145. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 146. Educational Perspectives on the Chicano (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of educational policy issues concerning Chicano students, such as testing and testing procedures, learning styles, socialization, and language acquisition. Other topics will deal with the impact of significant legislative acts related to the education of Chicanos. Cross-listed with EDUC 146. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 147. History of Black Education (4) Lecture, 3 hours; individual study, 4 hours. Prerequisite(s): upper-division standing. This course examines major themes in Black education: the education of slave and free Blacks; role of missionaries and philanthropists in Black education; the growth of Black colleges; curricular debates; and the NAACP challenge of the “separate but equal” doctrine. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 148. Caribbean Culture and Society (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of the Caribbean region from a historical, cultural, and political perspective. Emphasis on contemporary issues affecting the Caribbean, and the struggle of its people to maintain their identities. Cross-listed with ANTH 168 and LNST 168. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.
ETST 149. Street Scholars: Struggles and Contributions of Self-Trained Black Historians and Stepladder Radicals (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the growth and evolution of self-trained African American intellectuals and activists from the late nineteenth century to the 1980s. Analyzes ideas, contributions, and worldviews of selected street scholars pertaining to the destiny and direction of race struggle in America, the Caribbean and Africa. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 150. Asian American Family and Culture (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 005 or consent of instructor. Examines the influence of cultural legacy, ethnic background, immigration history, community structure, racism, class, and economic status on the sociological and psychological dynamics of the Asian American family and personality. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 151. Contemporary Asian American Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Survey of contemporary Asian American literature and culture. Explores identity politics, cultural nationalism, feminism, sexuality, postmodernism, postcolonialism, diaspora, and transnationalism. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 152. Contemporary Latin American and Chicano Novels (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): ETST 001 or ETST 001H, upper-division standing or consent of instructor. Survey and analysis of cinematic works by and/or about Asian Americans. Topics include stories of forms and genres; viewing and interpretive practices; the conditions of production, distribution, and reception, as well as thematic concerns such as identity, community, social justice, gender, and sexuality. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 153. Contemporary Latin American and Chicano History (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examination of the various aspects of the politics of the Chicano movement from 1965 to 1975. Focuses on in-depth analysis of the movement's historical genesis, leadership, ideology, organizations, strategy, and tactics, as well as the issues that brought it into being. Also examines the forces that contributed to its demise. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 155. Californio/a California: A Social and Cultural History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examination of the historical evolution of Mexican and Mexican American social and cultural experience in California from the Spanish colonial period through the late twentieth century. Analysis of the Chicano/a impact on regional culture and American society as a whole. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 156. Politics of the Chicano Movement (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the various aspects of the politics of the Chicano movement from 1965 to 1975. Focuses on in-depth analysis of the movement's historical genesis, leadership, ideology, organizations, strategy, and tactics, as well as the issues that brought it into being. Also examines the forces that contributed to its demise. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 157. Native American Diaspora (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 007, upper-division standing, or consent of instructor. Analyzes the Native American migration experience involuntarily Native American diaspora throughout America forced by interaction with Spanish, French, Dutch, and English colonists. Examines nineteenth- and twentieth-century reservations and forced and voluntary removals and relocations. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 158. Roots of American Indian Tradition (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes selected spiritual beliefs of America's native peoples. Examines sacred beliefs, oral histories, ceremonies, customs, and the historical significance of selected tribes and bands. Explores the conditions and forces which shaped American Indians and influence them today. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 159. Texas Indian History (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): ETST 007 or ETST 007H or HIST 035 or HIST 036 or HIST 037 or consent of instructor. History of the aboriginal peoples of Texas from the earliest times to the present. Examines pre-colonial era, European invasion, and colonialism under Mexico, the Republic of Texas, and the United States. Discusses the effects of treaties, laws, federal and state policies on modern Texas Indians. Emphasizes the survival and adaptation of native peoples of Texas. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 161. U.S. Latinos: Crossing Borders, Crossing Cultures (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes selected spiritual beliefs of America's native peoples. Examines sacred beliefs, oral histories, ceremonies, customs, and the historical significance of selected tribes and bands. Explores the conditions and forces which shaped American Indians and influence them today. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 165. Sociolinguistics and the Chicano Community (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the regional and social variables of language use within the Chicano community. Specific issues addressed are the maintenance of Spanish language use, private versus language use, the need for bilingual social services, language as a human right versus language as a constitutional right, and the political economy context of language. General sociolinguistic theory and methodology are also addressed. Cross-listed with SOC 165. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 166. Issues in Bilingual/Bicultural Education (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): bilingual facility and consent of instructor. An intensive analysis of issues involved in developing and implementing bicultural/bilingual programs for Chicanos. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 167. Psychological Development of Black Children (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 002. This course will analyze both the traditional theoretical approaches to the study of Black children and innovative approaches that are currently being developed by Black psychologists. The course will cover topics in the areas of cognitive, social, and personality development. Cross-listed with PSYC 167. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 168. Psychological Aspects of the Black Experience (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 002. This course examines the interdependence between personal characteristics. African American culture, and the social conditions which foster the Black experience. Group membership, life styles, role factors, and situational settings as social norms will be explored in order to understand the uniqueness of the Black experience. Cross-listed with PSYC 168. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 169. The Politics of Race and Performance (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers the complex practice of dance, music, and performance art by expressive artists of color and asks questions about address, audience, white uses of black performance techniques, dance in relation to self-conscious historical memory, and the politics of authenticity and commodification. Investigates performances from different locations, from explicitly politicized to heavily commercialized. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 170. Third World Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of some major works associated with Third World literature and film. Emphasis on African, Latin American, Caribbean, African American, and Chicano Literature. Cross-listed with WRLT 170. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 171. Rap, Hip-Hop, and Popular Culture (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing. Examines the various aspects of the history, purpose, functions, and culture of the rap and hip-hop movement. Topics include the origins.
of rap in African culture; the Griots; various elements of rap in slave songs, jazz, the blues, poetry, and rhythm and blues; and the evolution of gangsta rap and hip-hop from 1970 to the present. Focuses on the impact of popular culture and social problems. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 172. Music Cultures of Southeast Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in the Philippines, Indonesia, Malaysia, Thailand, Myanmar (Burma), Laos, Cambodia, and Vietnam. Designed for the student interested in the performing arts and cultures of mainland and insular Southeast Asia. No Western music background is required. Cross-listed with ANTH 176, AST 127, DNCE 127, and MUS 127. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

ETST 173. Black Art in America (4) Lecture, 3 hours; field, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Discusses Black artists in the visual arts from slavery to postmodernism. Explores the themes of gender and race play in the historical violence of the nation-state. Examines how integral violence is to roles gender and race play in the historical violence of the black family but are also examples of the interplay of gender and ethnicity is the special focus. Cross-listed with WMST 175. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 175. Gender, Ethnicity, and Borders (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 001 or WMST 010 or upper-division standing. Examines literary, theatrical, and visual sites where the “in-between” space of border cultures is mapped. Materials include autobiographies, testimonial literature, films, novels, performance scripts, and art. The interplay of gender and ethnicity is the special focus. Cross-listed with WMST 175. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 176. Geographies of Pain: Black Women, Trauma, and Survival (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ETST 001 or WMST 010 or upper-division standing. Examines literary, theatrical, and visual sites where the “in-between” space of border cultures is mapped. Materials include autobiographies, testimonial literature, films, novels, performance scripts, and art. The interplay of gender and ethnicity is the special focus. Cross-listed with WMST 175. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 177. The U.S. Prison Industrial Complex: Race, Gender, and Citizenship (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the racialized and gendered information of U.S. jurisprudence, policing, and punishment practices. Explores the connections between prison expansion, corporate investment in prison as a new technology, exploitation of prison labor, and deployment of prison-building initiatives as pork barrels for elected officials. Also analyzes anti-prison, prison reform, and penal abolitionist discourses. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 178. Imprisoned Radical Intellectuals and U.S. Liberation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examination of the work of imprisoned writers of color as well as white intellectuals/activists who have influenced the formation of social movements in the United States since the 1970s as prisons and jails have become primary sites of political and racial con-

ETST 198-I. Individual Internship (1-12) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): junior standing or consent of instructor. Advanced research in varied fields of faculty interest. Students are required to complete a research paper utilizing primary and secondary documents and other sources. Seminar focus varies from year to year. Course is repeatable to a maximum of 12 units. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 192H. Junior Honors Seminar (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): junior standing or consent of instructor. Advanced research in various fields of faculty interest. Students are required to complete a research paper and present their results in the seminar. Topics vary from year to year. Course is repeatable to a maximum of 8 units. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 193. Senior Research Seminar (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): senior standing or consent of instructor. Advanced research in various fields of faculty interest. Students are required to complete a research paper and present their results in the seminar. Topics vary from year to year. Course is repeatable to a maximum of 12 units. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

ETST 198G. Group Internship (1-12) Internship, 2-24 hours; outside research, 1-12 hours. Prerequisite(s): upper-division standing; consent of instructor. On- or off-campus internship related to the interests of core ethnic-group students under the joint direction of an on- or off-campus supervisor and an Ethnic Studies faculty member. Course is repeatable to a maximum of 16 units. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 198L-1. Individual Internship (1-12) Internship, 2-24 hours; outside research, 1-12 hours. Prerequisite(s): upper-division standing; consent of instructor. On- or off-campus internship related to the community, conducted under the joint direction of an on- or off-campus supervisor and an Ethnic Studies faculty member. Requires a report based on the experience. Course is repeatable to a maximum of 16 units. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

ETST 202. Sociocultural Theories in Ethnic Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Examines theoretical approaches to the study of race and ethnicity in the United States. Assesses the relative strengths and weaknesses of key theoretical paradigms. Instructor will select from symbolic interaction, phenomenology, class analysis, sovereignty, literary criticism, feminism, psychoanalysis, racial formation, critical race theory, postmodernism, or global or transnational perspectives. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

ETST 255. Critical Issues in Asian American Studies (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Examines and seeks to develop a critical appreciation of research literature on Asians in America and to develop alternative interpretations of the Asian American experience. Topics include Asian American history, economic, political, social, and psychological issues.

ETST 256. Critical Issues in Asian Pacific American Communities (4) Seminar, 3 hours; practicum, 3 hours. Prerequisite(s): graduate standing. Examines contemporary issues facing Asian Pacific American communities. Students engage in active research in these communities.

ETST 280. Colloquium in Ethnic Studies (1) Colloquium, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Lectures and discussions by students, faculty, and invited scholars on selected topics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.

ETST 290. Directed Studies (1-6) Practicum, 3-12 hours. Prerequisite(s): limited to teaching assistants; graduate standing. Supervised teaching in lower- and upper-division courses. Required of all Ethnic Studies teaching assistants. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

ETST 302. Teaching Practicum (1-4) Practicum, 3-12 hours. Prerequisite(s): limited to teaching assistants; graduate standing. Supervised teaching in lower- and upper-division courses. Required of all Ethnic Studies teaching assistants. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Evolution, Ecology, and Organismal Biology

See Biology (Graduate Program)

Genetics, Genomics, and Bioinformatics

Subject abbreviation: GEN
College of Natural and Agricultural Sciences

Isgouhi Kaloshian, Ph.D., Director
Program Office, 1140 Batchelor Hall
(800) 735-0717 or (951) 827-5688
www.ggb.ucr.edu

Professors

Daniel F. Atkinson, Ph.D. (Entomology)
Julia N. Bailey-Serres, Ph.D. (Botany and Plant Sciences)
Nancy E. Beckage, Ph.D. (Entomology)
Katherine A. Borkovich, Ph.D. (Plant Pathology)
James Boronan, Ph.D. (Plant Pathology)
Timothy J. Brown, Ph.D. (Botany and Plant Sciences)
Donald A. Cooksey, Ph.D. (Plant Pathology)
David E. Crowley, Ph.D. (Environmental Sciences)
Darleen A. DeMason, Ph.D. (Botany and Plant Sciences)
Shou-Wei Ding, Ph.D. (Plant Pathology)
David A. Eastmond, Ph.D. (Cell Biology and Neuroscience)

Norman C. Elstrund, Ph.D. (Botany and Plant Sciences)
Brian A. Federici, Ph.D. (Entomology)
Daniel R. Galile, Ph.D. (Biochemistry)
Theodore Garland, Ph.D. (Biology)
Sarjeet S. Gill, Ph.D. (Cell Biology and Neuroscience)
Manuela Martins-Green, Ph.D. (Cell Biology and Neuroscience)
Cheryl Hayashi, Ph.D. (Biology)
John M. Heraty, Ph.D. (Biology)
Jodie S. Holt, Ph.D. (Botany and Plant Sciences)
Anthony H. C. Huang, Ph.D. (Botany and Plant Sciences)
Bradley C. Hyman, Ph.D. (Biology)
Tao Jiang, Ph.D. (President’s Chair (Computer Science)
Howard S. Judelson, Ph.D. (Plant Pathology)
Bai-Lian “Larry” Li, Ph.D. (Botany and Plant Sciences)
Keh-Shin Lii, Ph.D. (Statistics)
Xuan Liu, Ph.D. (Biochemistry)
Dmitri A. Maslov, Ph.D. (Biology)
Leonard F. Nunney, Ph.D. (Biology)
Alexander S. Raikhy, Ph.D. (Entomology)
Natalie Rakhiel, Ph.D. (Botany and Plant Sciences)
A.L.N. Rao, Ph.D. (Plant Pathology)
David Reznick, Ph.D. (Biology)
Mikael L. Roos, Ph.D. (Botany and Plant Sciences)
Neal L. Schiller, Ph.D. (Biomedical Sciences)
Frances M. Siskind, Ph.D. (Cell Biology and Neuroscience)
Stephen R. Spindler, Ph.D. (Biochemistry)
Mark S. Springer, Ph.D. (Biology)
Daniel S. Straus, Ph.D. (Biomedical Sciences)
Jolinda A. Traugh, Ph.D. (Biochemistry)
J. Giles Waines, Ph.D. (Botany and Plant Sciences)
Linda L. Waring, Ph.D. (Botany and Plant Sciences)
Shizhong Xu, Ph.D. (Botany and Plant Sciences)
Zhenbiao Yang, Ph.D. (Botany and Plant Sciences)
Jian-Kang Zhu, Ph.D. (President’s Chair (Botany and Plant Sciences)

Associate Professors

Xuemei Chen, Ph.D. (Botany and Plant Sciences)
Isgouhi Kaloshian, Ph.D. (Nematology)
Paul B. Larson, Ph.D. (Biochemistry)
Stefano Lonardi, Ph.D. (Computer Science)
Morris F. Maduro, Ph.D. (Biology)
Ernest Martinez, Ph.D. (Biochemistry)
Frank Sauer, Ph.D. (Biochemistry)
Patricia S. Springer, Ph.D. (Botany and Plant Sciences)

Assistant Professors

Jeffrey B. Bachant, Ph.D. (Cell Biology and Neuroscience)
Chia-en Angelina Chang, Ph.D. (Chemistry)
Xingqing Cui, Ph.D. (Statistics)
Sean Cutler, Ph.D. (Botany and Plant Sciences)
Greg W. Downham, Ph.D. (Plant Pathology)
Thomas Eulgem, Ph.D. (Botany and Plant Sciences)
Thomas Girke, Ph.D. (Botany and Plant Sciences)
Venugopala R. Gonehal, Ph.D. (Botany and Plant Sciences)
Hailing Jin, Ph.D. (Plant Pathology)
Seung-Chul Kim, Ph.D. (Botany and Plant Sciences)
Karine G. Le Roch, Ph.D. (Cell Biology and Neuroscience)
Renyi Lui, Ph.D. (Botany and Plant Sciences)
Wenbo Ma, Ph.D. (Plant Pathology)
Changxuan Mao, Ph.D. (Statistics)
James Ng, Ph.D. (Plant Pathology)
Constance I. Nugent, Ph.D. (Cell Biology and Neuroscience)
Anandasanar Ray, Ph.D., (Entomology)
Joel Sachs, Ph.D., (Biology)
Harley Smith, Ph.D. (Botany and Plant Sciences)
Graduate Program

The Genetics, Genomics, and Bioinformatics Program (GGB) administers a program leading to the Ph.D. in Genetics, Genomics, and Bioinformatics. The GGB is an interdisciplinary program that includes faculty from the departments of Biochemistry, Biology, Botany and Plant Sciences, Cell Biology and Neuroscience, Computer Science and Engineering, Entomology, Environmental Sciences, Nematology, Plant Pathology and Microbiology, and Statistics, as well as the Division of Biomedical Sciences.

The three fields of specialization (subdisciplines) are as follows:
1. Molecular genetics
2. Evolution and population genetics
3. Genomics and bioinformatics

The program is structured to allow maximum flexibility in the design of an individual student course program and research goals. A primary objective is to allow students to develop a capability in research as rapidly as possible, consistent with the student's initial preparation.

Students are expected to meet all general requirements of the Graduate Division as printed in the Graduate Studies section of this catalog.

Admission

Submission of GRE scores (verbal, quantitative and analytical) is mandatory for admission. Applicants with any B.A. or B.S. degree and an adequate background in the biological and physical sciences will be considered. The specific entry requirements for the three areas of specialization (Molecular Genetics, Evolution and Population Genetics, and Genomics and Bioinformatics) vary somewhat but include courses in genetics, biology, chemistry, calculus, computer science, and statistics. Please refer to the Program Guidelines for details. The GGB evaluates applications on a continual basis from October to May; however, it normally considers applications for teaching and research assistantships at the same time as fellowships; therefore, students are strongly encouraged to complete their applications for admission and support as early as possible. Normally, fellowships are awarded in January, for students entering the following fall quarter.

The GGB has been identified as the graduate training "home" for UCR's Institute for Integrative Genome Biology. The GGB faculty, partnering with colleagues in UCR's Computer Science and Statistics departments, has developed a contemporary curriculum in the broad area of genomics, proteomics, and bioinformatics. Unique to this curriculum is the melding of microbial, animal, and plant genomics and bioinformatics within a single program. The curriculum was designed to interface with the molecular genetics and evolution and population genetics tracks.

Doctoral Degree

The program offers the Ph.D. degree in Genetics, Genomics, and Bioinformatics.

Course Work

All students choose a genetics subdiscipline for specialization (either molecular genetics, evolution and population genetics, or genomics and bioinformatics). Specific course requirements are selected on the basis of the subdiscipline and the student's particular needs and objectives. The Ph.D. is a research degree, and, accordingly, the goal of the program is to train students in the theoretical and experimental foundations of modern genetics. Students are strongly encouraged to participate in lab rotations, select a major professor and begin research work early in their training (during the first year of residence).

Written and Oral Qualifying Examinations

Students are advanced to candidacy following successful completion of a written preliminary examination and an oral qualifying examination.

Dissertation and Final Oral Examination

Successful completion of a final oral dissertation defense is also required.

Foreign Language Requirement

None

Teaching Requirement

Each student must have at least one quarter of teaching experience. This requirement may be satisfied by serving as a teaching assistant in a genetics-related course.

Normative Time to Degree

15 quarters

Graduate Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Units</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN 205</td>
<td>Signal Transduction Pathways in Microbes and Plants (4)</td>
<td>W Lecture, 3 hours; discussion, 1 hour.</td>
<td>Prerequisite(s): graduate standing in the biological sciences; BIOL 107A or BIOL 113 or BIOL 114 or CBNS 101; consent of instructor.</td>
</tr>
<tr>
<td>GEN 206</td>
<td>Gene Silencing (3)</td>
<td>Lecture, 2 hours; discussion, 1 hour.</td>
<td>Prerequisite(s): graduate standing, BIOL 107A or CBNS 101; consent of instructor.</td>
</tr>
<tr>
<td>GEN 230</td>
<td>Molecular Plant-Microbial Interactions (3)</td>
<td>Lecture, 2 hours; discussion, 1 hour.</td>
<td>Prerequisite(s): BIH 100, BIOL 120/MBL 120/PLPA 120, or equivalents.</td>
</tr>
<tr>
<td>GEN 240A</td>
<td>Advances in Bioinformatics and Genomics (4)</td>
<td>S Lecture, 4 hours.</td>
<td>Prerequisite(s): BCH 110C or BIOL 107A; BIOL 102.</td>
</tr>
</tbody>
</table>

Global Studies

Subject abbreviation: GBST

College of Humanities, Arts, and Social Sciences

Susan Ossman, Ph.D., Director
Committee Office, 3116 CHASS
Interdisciplinary Building South (951) 827-5524

Committee in Charge

Anne Sutherland, Ph.D. (Anthropology)
Veronica Benet-Martinez, Ph.D. (Psychology)
David Biggs, Ph.D. (History)
Christopher Chase-Dunn, Ph.D. (Sociology)
Feryal Cherd, Ph.D. (Political Science)
Lucille Chia, Ph.D. (History)
Peter J. Graham, Ph.D. (Philosophy)
Steven Helfand, Ph.D. (Economics)
Miriam Beevi-Lam, Ph.D. (Comparative Literature and Foreign Languages)
Bronwyn Leebaw, Ph.D. (Political Science)
Rene Lystoff, Ph.D. (Music)
Justin McDaniel, Ph.D. (Religious Studies)
Toby Miller, Ph.D. (English/Sociology/Women's Studies)
Global Studies / 275

Major
Global Studies is a broad-based study of processes and problems that transcend national boundaries, preparing students to become global thinkers and problem solvers for the twenty-first century. Global Studies crosses disciplines, as well as contemporary issues of global politics, violence, security, global migrations, travel, social movements, global literature, arts and media, the global economic system of trade, finance and labor, global health and disease, and environmental change and sustainability. Students are grounded in two disciplines, as well as a single geographic area of study and a foreign language.

Global Studies is a way to give powerful support to re-conceptualize the meaning of place in the contemporary world and to retool faculty and students to become global thinkers. It focuses on transnational processes rather than relations among nations.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
1. Lower-division requirements (6 courses [at least 24 units] plus foreign language):
   a) GBST 001, GBST 002
   b) Two introductory courses (courses numbered 001–099) in each of two different disciplines.
   c) Proficiency in a foreign language at the sixth-quarter level
   d) Two courses in world history

2. Upper-division requirements (10 courses [at least 40 units])
   Students must select eight courses with significant global content in at least two different disciplines and two courses in a single area.

   ANTH 149/WMST 149, ANTH 158, ANTH 159, ANTH 160, ANTH 161/LNST 161, ANTH 162, ANTH 163, ANTH 164/LNST 164/WMST 164, ANTH 168/ETST 148/LNST 168, ANTH 170/BSPC 170
   ART 135/MCS 135
   AHS 102/ANTH 102, AHS 113, AHS 115/LNST 115, AHS 182, AHS 186/MCS 186, AHS 187/MCS 187
   BPS 170
   BUS 153/ECON 153, BUS 158/ANTH 105
   CHE 171
   CPAC 131/AST 131/CHN 131/CLA 131, CPAC 141/CLA 141/AST 145/CHN 141/POS 140/CPLT 141, CPLT 143/FREN 143, CPLT 163/AST 163, CPLT 173 (E-Z)/MCS 173 (E-Z), CPLT 187/CRWT 187
   DNCE 128/ANTH 128/AST 128/MUS 128/THEA 176, DNCE 130/ANTH 130, DNCE 172 (E-Z), DNCE 173 (E-Z)
   GEO 157, GEO 167
   ECON 124, ECON 143A/ENSC 143A, ECON 143B/ENSC 143B, ECON 143C/ENSC 143C, ECON 146/URST 146, ECON 153/BSAD 153, ECON 156, ECON 171, ECON 175, ECON 178/BSAD 178, ECON 180, ECON 181, ECON 182, ECON 185/LNST 185, ECON 187/LNST 187
   EDUC 114
   ENGL 121 (E-Z), ENGL 142 (E-Z), ENGL 144 (E-Z)/MCS 144 (E-Z)
   ENSC 101, ENSC 143A/ECON 143A, ENSC 143B/ECON 143B, ENSC 143C/ECON 143C, ENSC 146/URST 146
   MCS 103/ANTH 103, MCS 144 (E-Z)/ENGL 144 (E-Z), MCS 173 (E-Z)/CLPT 173 (E-Z)
   HIST 108, HIST 109, HIST 137 (E-Z)/ETST 117 (E-Z), HIST 181, HIST 182, HISA 161/LNST 171, HISA 162/LNST 172, HISA 164A, HISA 164B, HISE 145, HISE 146
   LNST 164/ANTH 164/WMST 164, LNST 168/ANTH 168/ETST 148, LNST 185/ECON 185, LNST 187/ECON 187
   MATH 121
   ME 100A, ME 100B
   MUS 120, MUS 124/AST 124, MUS 125, MUS 126/ANTH 177/WMST 126, MUS 128/ANTH 128/AST 128/DNCE 128/THEA 176, MUS 129/ETST 118
   POSC 109/RLST 173, POSC 110, POSC 111, POSC 116, POSC 120, POSC 124, POSC 125, POSC 126, POSC 127, POSC 129, POSC 150, POSC 152, POSC 153, POSC 154, POSC 155, POSC 157, POSC 158/LNST 148, POSC 159, POSC 160, POSC 162/LNST 142, POSC 169, POSC 182
   PSYC 140, PSYC 165
   RLST 111, RLST 116, RLST 118, RLST 124 (E-Z), RLST 138/LNST 138, RLST 139, RLST 150, RLST 151, RLST 160/WMST 160, RLST 170, RLST 174, RLST 175
   SOC 120, SOC 122, SOC 123, SOC 133, SOC 134, SOC 135, SOC 137, SOC 139/MCS 139, SOC 143/URST 143, SOC 150, SOC 151, SOC 156, SOC 157, SOC 161, SOC 181, SOC 182/USTR 182, SOC 184
   STAT 100A, STAT 100B, ECON 101
   THEA 176/ANTH 170, ETST 170/DNCE 128/MUS 128
   WRLT 170/ETST 170

3. Capstone requirement (at least 4 units)
   Students must complete a capstone experience consisting of an advanced seminar in a topic of global significance, a major research paper supervised by a Global Studies faculty member or a study abroad program approved by the Chair of Global Studies.

Minor
1. Lower-division requirements (4 courses [at least 16 units])
   a) GBST 001, GBST 002
   b) Two courses in world history

2. Upper-division requirements (6 courses)
   a) Six upper-division courses with significant global content in at least two different disciplines and two in a single geographic area.

S. Karthick Ramakrishnan, Ph.D. (Political Science)
Freya Schiwy, Ph.D. (Hispanic Studies)
Kurt Schwabe, Ph.D. (Environmental Sciences)
Kiri Tomoffs, Ph.D. (History)
Charles Whitney, Ph.D. (Creative Writing)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio
Lower-Division Courses

GBST 001. Global History, Culture, and Ideas (5)
Lecture, 3 hours; discussion, 1 hour, extra reading, 3 hours. A survey of the historical and cultural processes that have made the world more interconnected.

GBST 002. Global Socioeconomic and Political Processes (5)
Lecture, 3 hours; discussion, 1 hour, extra reading, 3 hours. Prerequisite(s): GBST 001 with a grade of "B" or better is recommended for freshmen. A survey of the economic, political, and physical processes that have made the world more interconnected.

GBST 090. Special Studies (1-3)
Individual study, 3-9 hours. Prerequisite(s): consent of program chair. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable to a maximum of 8 units.

Upper-Division Courses

BST 110. Global Migrations and Movements (4)
Lecture, 3 hours; field, 3 hours. Prerequisite(s): GBST 001 or GBST 002. Examines migration and mobility (both global and interregional). Also addresses economic development and displacement of populations and issues of identity and subjectivity in the context of recent theories of mobility and globalization to understand how migration is reshaping borders, ideas of self, political and social entities, and transnational issues.

BST 169. From the Maghreb to the Middle East (4)
Lecture, 3 hours; written work, 1 hour; individual study, 1 hour; extra reading, 1 hour. Prerequisite(s): ANTH 001 or ANTH 001H or GBST 001 or GBST 002 or consent of instructor. An introduction to the people and societies of North Africa and the Middle East. Follows the travels of Ibn Battutah, Ibn Khaldun, and Rafik al Tahtawi. Topics include religion, migration, gender, political organization, the global Middle East, Orientalism, and cultural production. Cross-listed with ANTH 169.

BST 190. Special Studies (1-5)
Individual study, 3-15 hours. Prerequisite(s): consent of program chair. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable to a maximum of 15 units.

BST 191. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 190. Seminar in Global Studies (4) is connected.

BST 192. Global Processes (5)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 191. A survey of the historical and cultural processes that have made the world more interconnected.

BST 197. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 192. A survey of the historical and cultural processes that have made the world more interconnected.

BST 198. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 197. A survey of the historical and cultural processes that have made the world more interconnected.

BST 199. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 198. A survey of the historical and cultural processes that have made the world more interconnected.

BST 200. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 199. A survey of the historical and cultural processes that have made the world more interconnected.

BST 201. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 200. Seminar in Global Studies (4) is connected.

BST 202. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 201. A survey of the historical and cultural processes that have made the world more interconnected.

BST 203. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 202. Seminar in Global Studies (4) is connected.

BST 204. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 203. A survey of the historical and cultural processes that have made the world more interconnected.

BST 205. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 204. Seminar in Global Studies (4) is connected.

BST 206. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 205. A survey of the historical and cultural processes that have made the world more interconnected.

BST 207. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 206. Seminar in Global Studies (4) is connected.

BST 208. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 207. A survey of the historical and cultural processes that have made the world more interconnected.

BST 209. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 208. Seminar in Global Studies (4) is connected.

BST 210. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 209. A survey of the historical and cultural processes that have made the world more interconnected.

BST 211. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 210. Seminar in Global Studies (4) is connected.

BST 212. Global Studies (4)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): GBST 211. A survey of the historical and cultural processes that have made the world more interconnected.

BST 213. Seminar in Global Studies (4)
Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): GBST 212. Seminar in Global Studies (4) is connected.
The **Linguistics Option** is designed for students who are especially interested in the Spanish language or Hispanic linguistics. Students follow this option as preparation for elementary, middle school, or high school language teaching, as a second major in fields where bilingualism is useful, and as preparation for advanced study in Hispanic linguistics.

The **Cultural Studies Option** is intended for students with an interest in the intersections of society, power, and culture. It offers a unique opportunity to acquire critical interdisciplinary skills in cultural analysis from a Hispanic perspective. It explores numerous forms of Spanish, Latin American and transatlantic cultural practices including film, television, music, visual arts, performance, literature, testimonials, essays, and cultural critique. The Cultural Studies Option is relevant for students considering careers in high school teaching, media work, advertising, creative arts, multimedia projects, international studies, and graduate studies.

All of the above options should be considered with double majors, particularly majors such as Anthropology, Classics, English, History, Latin American Studies, Linguistics, or Media and Cultural Studies.

Students with college-level course credit for Spanish foreign language cannot take the Spanish placement exam.

**University Requirements**
See Undergraduate Studies section.

**College Requirements**
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

**Major Requirements**
The major requirements for the B.A. degree in Spanish are as follows:

**Option Requirements — Choose one option**

**Cultural Studies Option**
Upper-division requirements (11 courses [at least 44 units]):

1. SPN 101A and SPN 101B or SPN 109A and SPN 109B
2. SPN 110 (prerequisite for all upper-division literature courses)
3. SPN 102A, SPN 102B or SPN 103
4. One course from SPN 120A, SPN 120B, SPN 120C/LNST 120
5. Two courses from SPN 120A, SPN 120B, SPN 120C/LNST 120
6. Three courses from the following survey courses: SPN 180A, SPN 180B, SPN 181A, SPN 181B
7. One additional course in Spanish or Latin American literature
8. SPN 102A, SPN 102B or SPN 103
9. SPN 193
10. SPN 193

**Literature Option**
Upper-division requirements (11 courses [at least 44 units]):

1. SPN 101A and SPN 101B or SPN 109A and SPN 109B
2. SPN 110 (prerequisite for all upper-division literature courses)
3. Two courses from SPN 120A, SPN 120B, SPN 120C/LNST 120
4. One course from SPN 120A, SPN 120B, SPN 120C/LNST 120
5. One additional course in Spanish or Latin American literature
6. SPN 102A, SPN 102B or SPN 103
7. SPN 193

**Minor**
Requirements for the minor in Spanish are as follows:

1. SPN 101A and SPN 101B or SPN 109A and SPN 109B
2. SPN 102A, SPN 102B or SPN 103
3. SPN 110
4. Eight (8) units from SPN 120A, SPN 120B, SPN 120C/LNST 120C, SPN 105, SPN 106A

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Portuguese
The Department of Hispanic Studies offers Portuguese language classes according to student demand and the availability of the faculty.

Education Abroad Program
The EAP is an excellent opportunity for the student to be immersed in the languages and culture of the Hispanic or Luso-Brazilian worlds while earning units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program
The Department of Hispanic Studies offers the M.A. and Ph.D. degrees in Spanish.

The graduate program in Spanish is designed to prepare scholars for teaching and research in Spanish and Latin American literature and cultural studies. It is organized primarily for students seeking the Ph.D. degree, although the M.A. degree is awarded in the course of a student’s progress. A small number of students are admitted who intend to complete the M.A. only as advanced study for teaching in high schools or community colleges.

The faculty in Hispanic Studies offers a wide and diverse group of graduate courses in literary and cultural studies, as well as a core group of courses in linguistics. Research and teaching interests include all areas of Spanish literature beginning with the fifteenth century, and Latin American literature from its origins to the present. Faculty also have strong research and teaching profiles in cultural studies, including Latin American film, gender studies, theories of the body, historiography and fiction, and culture and power.

Admission All domestic applicants to the graduate programs must supply GRE scores for the verbal, analytical, and quantitative tests.

Master’s Degree
The Department of Hispanic Studies offers the M.A. in Spanish.

The M.A. in Spanish is designed for students who hold the B.A. in Spanish and who seek to broaden their knowledge of Hispanic literary and cultural traditions through advanced study. The M.A. is generally intended for students who plan to pursue the Ph.D. at UCR. As part of their preparation in Hispanic literary and cultural studies, students are introduced to advanced concepts of literary theory and current debates in cultural studies. Students can also take seminars in areas such as Hispanic linguistics and Brazilian literature.

Admission Applicants normally have a B.A. in Spanish that includes at least five courses in the literature and culture of Spain and Latin America.

Teaching Assistantships
Most students in the program are Teaching Assistants in the Department of Hispanic Studies; their normal workload includes language teaching and taking three graduate courses per quarter. Teaching Assistants receive training in language instruction as part of their graduate study and teaching duties (and must take a teaching methods course during their first quarter of assuming their duties as Teaching Assistants).

Course Work
Candidates complete a minimum of 48 graduate units in literature and linguistics, with at least five graduate courses in Spanish Peninsular literature and at least five courses in Latin American literature. The Latin American literature courses SPN 257, SPN 273A, SPN 273B, SPN 273C can be substituted for Spanish Literature courses. In addition to Spanish and Latin American literature, students may fulfill their 48-unit requirement by taking courses approved by the graduate advisor in Linguistics or Comparative Literature.

M.A. Examination
Near the end of this two-year program, students take a four-hour written examination, followed by a one-hour oral examination administered one or two weeks after the written examination. This M.A. examination (written and oral) is based on the texts on the M.A. reading list and course work. The M.A. reading list consists of approximately 60 major works of Spanish and Latin American literatures.

Foreign Language Requirement
Candidates must demonstrate a reading knowledge of another foreign language by satisfactorily completing a graduate course in Brazilian literature offered in the Department of Hispanic Studies, an upper-division literature course in the target language or a departmental foreign language exam.

Doctoral Degree
The Department of Hispanic Studies offers the Ph.D. in Spanish to train students for academic positions as scholars and teachers.

The program emphasizes advanced course work and independent research, culminating in the doctoral dissertation. It is designed to provide in-depth coverage of the student’s primary area of study, while also assuring ample coverage of the broad field of Hispanic Studies.

Admission
Students admitted with the M.A. from other institutions must take an examination at the end of the first year for diagnostic purposes. Candidates who hold the M.A. from UCR must be recommended by the faculty to continue for the Ph.D.

Course Work
There is a minimum course requirement of two units beyond the M.A. In practice, doctoral students usually find that more than the minimum is advisable for doctoral training.

Long Paper
As part of their preparation in their major area of specialization, students present a paper of 40 to 50 pages in length, representing scholarly research and analysis in their chosen field of study. The long paper forms the basis of the doctoral dissertation.

Written and Oral Qualifying Examinations
Students choose two areas of concentration as examination areas. One area is the field of major emphasis; a second area or topic is selected in consultation with the chair of the guidance committee.

The area of specialization is defined by the long paper and dissertation topic. The doctoral examination consists of a five-hour written examination (three hours in the major field and two hours in the secondary field or topic), followed by an oral examination of approximately two hours. The oral examination deals with the major and secondary examinations and the long paper. The written and oral examinations are conducted by the qualifying committee nominated by the graduate advisor in consultation with the student and appointed by the graduate dean. Upon the successful completion of the written and oral qualifying examinations, the student is recommended to the graduate dean for advancement to candidacy.

Language Requirements
In addition to Spanish and English, the candidate must demonstrate a reading knowledge of one other language. Students specializing in Latin American literature must select Portuguese as this language. This requirement may be fulfilled by departmental examination or by satisfactory completion of one Brazilian literature class.

Dissertation and Final Oral Examination
Students prepare a dissertation presented as prescribed by the Graduate Division under the direction of the candidate's dissertation committee. After completion of the dissertation, the candidate is examined by the dissertation committee. This examination normally takes the form of a public presentation by the candidate followed by questions from the committee.

Normative Time to Degree
9 quarters (15 quarters for students without an M.A.)
Spanish

Lower-Division Courses

SPN 001. Elementary Spanish (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): Student is required to take Spanish placement examination. An introduction to the sound system and grammar of Spanish, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in Spanish insofar as possible. Audio-lingual and computer-based learning materials are available in the language laboratory.

SPN 002. Elementary Spanish (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): SPN 001 with a grade of "C-" or better or equivalent. An introduction to the sound system and grammar of Spanish, with attention to the development of the four skills: understanding, speaking, reading, and writing. Classes conducted in Spanish insofar as possible. Audio-lingual and computer-based learning materials are available in the language laboratory.

SPN 003. Elementary Spanish (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): SPN 002 with a grade of "C-" or better or equivalent. A comprehensive review of the basic grammatical structures of Spanish, vocabulary building, development of conversation and composition skills, and readings of literary and social interest. Classes conducted in Spanish.

SPN 004. Intermediate Spanish (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): SPN 003 with a grade of "C-" or better or equivalent. A comprehensive review of the basic grammatical structures of Spanish, vocabulary building, development of conversation and composition skills, and readings of literary and social interest. Classes conducted in Spanish.

SPN 006. Intermediate Spanish (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): SPN 005 with a grade of "C-" or better or equivalent. A comprehensive review of the basic grammatical structures of Spanish, vocabulary building, development of conversation and composition skills, and readings of literary and social interest. Classes conducted in Spanish.

SPN 012. Myths and Cultures of Latin America, the Caribbean, and Spain: Transatlantic Currents (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Examines cultural themes from a transatlantic perspective, through study of literature, film, and visual arts. Topics include chronicles of the conquest, cultures of the baroque, religious traditions and conflicts, the incorporation of popular culture into the literary tradition, contemporary writers, and cinema. Course is conducted in English.

SPN 046. Introduction to Latin American Film (5) Lecture, 3 hours; screening, 3 hours; discussion, 1 hour. Provides an historical overview of Latin American film production. Introduces students to film industries, revolutionary cinema, the role of television, and recent international co-productions. Cross-listed with MCS 046.

Upper-Division Courses

SPN 101A. Advanced Oral and Written Composition (4) Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): SPN 006. Designed for nonnative speakers to practice speaking and writing in Spanish and to review basic grammar. Emphasis is on composition, editing, and conversation practice. Class is conducted in Spanish. Native speakers without knowledge of college-level grammar should take SPN 109A. Credit is awarded for only one of SPN 101A or SPN 109A.

SPN 101B. Advanced Oral and Written Composition (4) Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): SPN 101A. Designed for nonnative speakers to practice speaking and writing in Spanish and to review basic grammar. Emphasis is on composition, editing, and conversation practice. Class is conducted in Spanish. Native speakers without knowledge of college-level grammar should take SPN 109A. Credit is awarded for only one of SPN 101B or SPN 109B.

SPN 102A. Introduction to Spanish Culture (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 101B or SPN 109B or equivalent. Introduction to Spanish culture and civilization from the Roman times to the present. Readings cover history, art, architecture, literature, and other aspects of culture and civilization. Provides background for courses on the literature of Spain. Course is taught in Spanish.

SPN 102B. Introduction to Latin American Culture (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 101B or SPN 109B or equivalent. Introduction to Latin American culture and civilization from pre-Columbian times to the present. Emphasis is on the period from postcolonial independence to the present. Readings cover history, art, architecture, literature, and other aspects of culture and civilization. Provides background for courses on the literature of Latin America. Course is taught in Spanish.

SPN 103. Spanish Culture and Civilization in Spain (4) Lecture, 60 hours per quarter; discussion, 20 hours per quarter. Prerequisite(s): SPN 101B or SPN 109B; consent of instructor. Provides intensive study of Spain within its European and New-World contexts. Emphasizes expansion and retraction, as well as the roles of religion and authority. Course taught in Spanish. Offered in summer only.

SPN 105. The Phonology of the Spanish Language (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): LING 020; either the SPN 101A and SPN 101B sequence or the SPN 109A and SPN 109B sequence. A descriptive and normative analysis of the phonological system of the Spanish language, with attention given to the phonetic characteristics of contemporary peninsular and Hispano American Spanish.

SPN 106A. Structure of the Spanish Language (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 105. An introduction to descriptive and applied techniques in morphology and morphophonemics of the Spanish language as found in Spain and Spanish America.

SPN 106B. Structure of the Spanish Language (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 106A. An introduction to descriptive and applied techniques in the morphosyntax of the Spanish language as found in Spain and Spanish America.

SPN 109A. Spanish for the Native Speaker (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): a sufficiently high test score on the Spanish placement examination, as determined by the Hispanic Studies faculty. Designed for the native speaker with little or no experience with Spanish grammar and composition. Emphasis is on basic grammar, written accents, orthography, and composition. The class is conducted in Spanish. Credit is awarded for only one of SPN 101A or SPN 109A.

SPN 109B. Spanish for the Native Speaker (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 109A. Designed for the native speaker with little or no experience with Spanish grammar and composition. Emphasis is on basic grammar, written accents, orthography, and composition. The class is conducted in Spanish. Credit is awarded for only one of SPN 101B or SPN 109B.

SPN 110. Introduction to Literary Criticism and Analysis (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): the SPN 101A and SPN 101B sequence or the SPN 109A and SPN 109B sequence. An introduction to the methods and techniques of literary analysis. Practice in textual explication, with regular writing assignments.

SPN 111 (E-Z). Hispanic Literature in Translation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Reading and discussion of works of major Spanish and Spanish American writers. Topic will vary from quarter to quarter. F. Latin American Literature and Film; M. Masterpieces in Spanish American Modernism; Q. Don Quijote; R. The Theatre of the Spanish Golden Age; T. Latin American Theatre in Translation; W. Women in Latin American Literature. No knowledge of Spanish required. May be counted toward the Spanish major with consent of instructor.

SPN 120A. Major Topics in Hispanic Literature (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. Reading and analysis of short texts of authors from Spain, Latin America, and the United States.

SPN 120B. Major Topics in Hispanic Literature: Spain (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. Reading and analysis of major texts of authors from Spain.

SPN 120C. Major Topics in Hispanic Literature: Latin America (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. Reading and analysis of major texts of authors from Latin America. Cross-listed with LNST 120.

SPN 121 (E-Z). Hispanic Thought: Major Essayists (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. A study of major essayists, with emphasis on the modern period. E. Three Twentieth-Century Latin American Essayists.

SPN 122A. Introduction to Hispanic Cultural Studies (4) Lecture, 3 hours; extra reading, 2.5 hours; screening, 6 hours per quarter. Prerequisite(s): SPN 110. An introduction to cultural studies in Latin America and Spain. Explores the relation between high and popular culture, mass media and subcultures, social history, narrative and memory, representation and gender, and technology and the notion of "alterity."
SPN 128. Transatlantic Cultural Studies (4) Lecture, 3 hours; extra reading, 2.5 hours; screening, 6 hours per quarter. Prerequisite(s): SPN 110. Offers a transatlantic cultural studies perspective that explores the shared histories of Spain, the Caribbean, and Latin America. Examines issues such as the legacies of the conquest of America and the slave trade, the nation-building process, theories of mestizaje and transculturation, and transatlantic exile.

SPN 124. Myths of Origin (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110; concurrent or previous enrollment in one of the following courses: SPN 120A, 120B, 120C. Looks at narrative, poetry, history and other art to explore the need to search for human origins. Examines how this need can influence mythologies and serve as a way to organize the world, explain the present, and define identity. Readings are from Spain, Latin America, and North America.

SPN 125 (E-Z). Topics in Latin American Film and Media (5) Lecture, 3 hours; screening, 3 hours; extra reading, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of a theme or issue in Latin American film and media. E. Indigenous Video and Latin America. Cross-listed with LNST 125 (E-Z) and MCS 125 (E-Z).

SPN 140 (E-Z). Renaissance and Baroque Literatures (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. A concentrated study of a genre, movement, author, or outstanding work of Spanish literature of the sixteenth or seventeenth century. E. Renaissance and Baroque Literature; H. La Celestina; J. Golden Age of Poetry; P. La Novela Picaresca; T. Spanish Theatre of the Golden Age.

SPN 141. Cervantes (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110. An overview of Cervantes’ texts within their time and place; discussion of his importance in the development of the novel; and close reading of Don Quijote.

SPN 142. Continuities of the Spanish Golden Age in Modern Latin America (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110. Introduces the relationship of key golden age and Spanish colonial texts to modern Latin American narrative and essay. Explores questions of literary genealogy as well as issues of cultural identity and the reclamation of history.

SPN 143. Hispanic Literature in New York City (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110. Survey of prose, poetry, drama, fiction, film, and visual arts on the Hispanic experience in New York City. Includes writers from Latin America (Martí, Burgos, Cardenal), Spain (Jiménez, Lorca, Aylea), and the United States (Pietri, Santiago, Alvarez). Taught in Spanish.

SPN 145. Performative Expression in Contemporary Latin American Culture (4) Lecture, 3 hours; screening, 5 hours; individual study, 2.5 hours. Prerequisite(s): SPN 110; at least one additional upper-division Spanish course numbered above SPN 110. Addresses divisions and continuities between word and action, art and politics, in Latin American short stories, films, and Web projects. Explores performative language that questions separations between saying and doing, and performance art as the disruption—or reiteration—of frameworks dividing artistic production from “reality.” Conducted in Spanish.

SPN 155. The Generation of 1898 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. A study of the major writers constituting the generation emerging from the national conflict produced in Spain as a consequence of the defeat in the Spanish American War. Readings and discussion of essays, fiction, and poetry of writers such as Unamuno, Baroja, Valles-Inclán, Antonio Machado, Azorín, and Benavente.


SPN 165. Spanish and Latin American Cultural Studies: Violence and Representation (4) Lecture, 3 hours; screening, 1 hour; extra reading, 2 hours. Prerequisite(s): SPN 110. Introduces students to a cultural studies approach to Latin American and Spanish texts and theorists. Covers the Southern Cone dictatorships, post-Franco Spain, and emerging urban imaginaries. Involves readings and discussions of cultural criticism, films, urban chronicles, and literary texts.


SPN 171. Reel to Real: Latin American Film and Social Change (4) Seminar, 3 hours; individual study, 1 hour; screening, 1.5 hours; term paper, 5 pages. Prerequisite(s): SPN 110. Introduces Latin American film as it articulates with contemporary history and current events. Cross-listed with MCS 171.

SPN 172. The Testimonio and Cultural History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110. Explores the relation between the testimonial genre and the emergence of Latin American cultural studies, subaltern studies, and postcolonial studies. Involves readings and discussions of a representative sample of testimonial literature and criticism.

SPN 179. Gender, Media, and Latin America (5) Lecture, 3 hours; screening, 3 hours; outside research, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Explores the way Latin Americans have thought of and represented gender across a variety of media, including essays, film, novel or short story, and performance. Compares the possibilities and limitations of these media for representing gender in the Latin American context. Cross-listed with LNST 109, MCS 179, and WMST 179.

SPN 180A. Survey of Spanish Literature, Middle Ages-1609 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. Survey of literary movements and trends and major writers of medieval and Golden Age Spanish literature. Covers writers such as Cervantes, Lope de Vega, Tirso de Molina, Quevedo, and Gongora.

SPN 180B. Survey of Spanish Literature, 1700-Present (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110. Survey of literary movements and trends and major writers of eighteenth-, nineteenth-, and twentieth-century Spanish literature. Readings in fiction, poetry, drama, and essay. Covers writers such as Sor Juana Inés de la Cruz, Echeverría, Sarmiento, and Martí.

SPN 181B. Survey of Spanish American Literature, Modernismo to the Present (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 110. Survey of literary movements and trends and major Spanish American writers from the modernismo to the present. Readings are in fiction, poetry, drama, and essay. Covers writers such as Darío, Azuela, Vallejo, Huidobro, García Márquez, Fuentes, Paz, Buenaventura, and Elena Poniatowska.

SPN 185. Imagining the Nation: Film and Media in Latin America (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Study of the role of media and film in creating a national imaginary in Latin America. Focus is on one region or nation—such as the Andes, the Caribbean, Mexico, Argentina, or Chile—relating local history to the global context. Course is repeatable as topics change to a maximum of 8 units. Cross-listed with LNST 105 and MCS 185.

SPN 187. Latin American Science Fiction (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SPN 110; concurrent or previous enrollment in LNST 120/SPN 120C, SPN 120A, or SPN 120B. Focuses on intersections between literature and scientific discourse and considers how popular notions of science inform the production and reading of the literary text. Topics may include the function of power in scientific discourse, the politics or alternative universities, and science and gender. Course is repeatable as content changes to a maximum of 8 units.

SPN 188 (E-Z). Interdisciplinary Studies: Latin America (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): SPN 110. Reading, research, and discussion on particular Latin American problems that relate themselves to interdisciplinary analysis. I. Indigenous Cultures and Representation; U. The Spiritual Conquest of Mexico.

SPN 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): SPN 110; consent of Department Chair. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable.

SPN 192. Tutorial Activities (2) Activity, 6 hours. Prerequisite(s): SPN 110; senior standing; consent of Department Chair. Under faculty supervision, students conduct discussion sections of elementary Spanish courses. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as topics change to a maximum of 6 units.

SPN 193. Senior Seminar in the Literatures and Cultures of the Hispanic World (4) Seminar, 3 hours; extra reading, 2 hours; outside research, 1 hour. Prerequisite(s): eight upper-division Spanish courses or consent of instructor. Introduction to research methods and documentation necessary for completion of a long final project. Specific topics vary depending on the instructor. Intended for Spanish majors. Course is repeatable as topics change to a maximum of 8 units.

SPN 199H. Senior Honors Research (1-5) Course is repeatable.
### Graduate Courses

**SPN 203. Problems in Spanish Linguistics (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. An introduction to the historical and theoretical evolution of Spanish linguistics as a scholarly discipline. Major topics will include perennial problems, schools, and history of linguistics.

**SPN 207. History of the Spanish Language (4)** Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing; SPN 105, SPN 106A, SPN 106B, or equivalents. The development of the Spanish language from its origins to modern times.

**SPN 208. Linguistic Approaches to Literature (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. Presentation and discussion of semantics, speech acts, and speech genres, and discourse analyses in the framework of contemporary linguistic studies. Topics of inquiry include speech act theory, fiction and nonfiction discourse, pragmatics, syntax, frames of reference, and narrative tenses. Other linguistic levels (i.e., phonology, morphology) are also discussed.

**SPN 220. Criticism and Critical Documentation (4)** Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. Covers strategies of reading and analysis. Topics may include critical approaches such as formalism, new criticism, structuralism, deconstruction, and new historicism; psychoanalysis; gender studies; performance studies; and cultural studies. Also may include practice in Modern Language Association (MLA) documentation. Course is repeatable.

**SPN 231. Seminar in the Literature of the Middle Ages and Early Renaissance (4)** Seminar, 3 hours, consultation, 1 hour. Prerequisite(s): graduate standing. Intensive study of selected topics in Spanish literature through the fifteenth century. Topics may vary. May be repeated for credit.

**SPN 257. Seminar in Hispanic Civilization (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Intensive study of special topics in Hispanic civilization. Topics vary. Course is repeatable to a maximum of 12 units.

**SPN 258 (E-Z). Genres of Hispanic Literature (4)** Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Close reading, analysis, and discussion of the major Hispanic texts, plays, and poems. E. Hispanic Literature and the Art of Poetry; S. The Satric Tradition in Hispanic Letters.

**SPN 261 (E-Z). Studies in Golden Age Literature (4)** Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Intensive study of topics in Spanish literature of the sixteenth and seventeenth centuries. G. The Spanish Comedia; I. Spain and the Western Tradition.

**SPN 262. Seminar in Don Quijote (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Critical and theoretical perspectives on Cervantes’ masterpiece; assumes prior close reading of the text. Emphasis on narratology and genre, pointing toward a deconstructive/reconstructive reading.

**SPN 264. Seminar in Spanish Literature of the Nineteenth Century (4)** Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Study of a genre, movement, or outstanding author of this period.

**Topics may vary. May be repeated for credit.**

**SPN 269 (E-Z). Studies in Twentieth-Century Spanish Literature (4)** Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Study of authors, movements, or genres from the Generation of ‘98 to the present. E. Spanish Comedia; I. Spain and the Western Tradition; T. Latin American Theatre: Sixteenth through Twentieth Centuries; X. Twentieth-Century Spanish American Poetry; Y. The Latin American Avant-Garde. Segments are repeatable.

**SPN 270 (E-Z). Latin American Literature (4)** Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Study of the main authors and schools in Latin American literature. F. Latin American Film; K. The Mexican Novel; O. The Modern Novel in Colombia; Q. The Postmodern Novel in Latin America (1968-Present); T. Latin American Theatre: Sixteenth through Twentieth Centuries; X. Twentieth-Century Spanish American Poetry; Y. The Latin American Avant-Garde. Segments are repeatable.

**SPN 272. Seminar in the Literature of a Specific Latin American Country (4)** Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. The in-depth study of the most important literary achievements of a single country such as Mexico, Argentina, Chile, or Peru, varying each time the course is offered. May be repeated for credit.

**SPN 273A. Literature and Culture of Colonial Latin America: The Colonial Period and Its Interpreters (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. A panoramic introduction to colonial literature from pre-Columbian times to the eighteenth century. Explores the major texts in their historical and literary contexts. Approaches specific passages from several theoretical perspectives. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

**SPN 273B. Literature and Culture of Colonial Latin America: Spain and the New World (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Examines the interrelationship between key Golden Age and Spanish colonial texts and modern Latin American narrative and essay. Explores issues of literary genealogy, cultural identity, and the reclamation of history. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

**SPN 273C. Literature and Culture of Colonial Latin America: Foundational Narratives of Latin America (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Examines how narrative, history, and the formation of collective consciousness intertwine in Latin America. Considers various periods and their respective mythologies, especially creation myths, with an eye towards teasing out the foundational archetypes and master narratives. Also addresses the purposes of such myths and archetypes. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

**SPN 275. Seminar in Literary Criticism (4)** Seminar, 3 hours. Prerequisite(s): graduate standing.

**SPN 276. American Exceptionalisms, North and South (4)** Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. Explores points of contact between the literary histories of the entire Americas, studying ways American self-definition has evolved from the colonial period to the twentieth century. Scrutinizes claims of distinction and particularity made by and about key texts. Examines readings from the north and south that share historical, thematic, and formal aspects.

**SPN 277. Poetry and Translation (4)** Workshop, 3 hours; extra reading, 1.5 hours; outside research, 1.5 hours. Prerequisite(s): graduate standing; reading proficiency in Spanish. Discusses the efficacy and difficulty of translating poetry from the Spanish language into English. Students read twentieth- and twenty-first century major Spanish language poets. Provides a forum to render and compare translations. Cross-listed with CRWT 276.

**SPN 278. Studies in Latin American Literature and Culture (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores a specific topic in Latin American literature and/or cultural studies. Topics vary. Course is repeatable as content changes.

**SPN 279. Studies in Spanish Literature and Culture (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing; SPN 105, SPN 106A, SPN 106B, or equivalents. Explores a specific topic in Spanish literature and/or cultural studies. Topics vary. Course is repeatable as topics change.

**SPN 290. Directed Studies (1-6)** Prerequisite(s): graduate standing. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**SPN 291. Individual Studies in Coordinated Areas (1-6)** variable hours. Prerequisite(s): graduate standing. A program of studies designed to advise and assist candidates who are preparing for examinations. Open to M.A. and Ph.D. candidates. Does not count toward the unit requirement for the M.A. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**SPN 292. Concurrent Analytical Studies (2)** Outside research, 6 hours. Prerequisite(s): consent of instructor; concurrent enrollment in a SPN-100 series course. To be taken on an individual basis. Students complete a graduate paper based on research related to the SPN-100-series course. Course is repeatable as topics change. Neither SPN 105 nor the sequences SPN 101A and SPN 101B, SPN 105, SPN 106B, and SPN 120A, SPN 120B, and LNST 120S/SPN 120C may be used for SPN 292.

**SPN 299. Research for Thesis or Dissertation (1-12)** Prerequisite(s): graduate standing. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

### Professional Courses

**SPN 301. Teaching Spanish at the College Level (2)** Seminar, 2 hours. Prerequisite(s): graduate standing. Theories of language and language acquisition which underlie modern methods of Spanish language teaching at the college level. Practical experience in grading, test construction, lesson planning, teaching techniques, effective aspects of teaching, and creativity in teaching. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**SPN 302. Practicum (1-4)** Practicum, 3-12 hours. Prerequisite(s): CPTL 301 or equivalent; graduate standing; employment as a teaching assistant or associate in. Supervised teaching in lower-division courses. Required of all teaching assistants in Spanish. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
Portuguese

Lower-Division Course

PORT 090. Special Studies (1-3) Prerequisite(s): To be taken with the consent of the Chair of the Department as a means of meeting special curricular problems. Course is repeatable.

Upper-Division Courses

PORT 101A. Intensive Brazilian Portuguese for Speakers of Spanish (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SPN 101A or equivalent. An introduction to Brazilian Portuguese for students knowing Spanish. Emphasis is on comparing and contrasting grammatical constructions. Examples are taken from Brazilian literature.

PORT 101B. Intensive Brazilian Portuguese for Speakers of Spanish (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): PORT 101A or equivalent. Continuation of PORT 101A. Covers advanced language through conversation, composition, and readings. Meggenney

PORT 101C. Intensive Brazilian Portuguese for Speakers of Spanish (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): PORT 101B or equivalent. Completes the study of structures of oral and written Portuguese, builds vocabulary, and hone the skills necessary to read Brazilian literature, discuss its content and importance, and write short essays explaining its nature.

PORT 162 (E-Z). Survey in Brazilian Fiction (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PORT 101B or consent of instructor. Reading and analysis of selected works of major Brazilian prose writers. Topics may vary each time course is offered. E. Jorge Amado and Machado de Assis; F. Graciliano Ramos, Rego, Queiroz, Azevedo, Amado; G. Verissimo, Amado. Course to be taught in the original language.

PORT 190. Special Studies (1-5) variable hours. Prerequisite(s): consent of chair of the department. Course is repeatable.

Graduate Courses

PORT 201. Brazilian Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. A survey of Brazilian literature from the colonial period to present, including chronicles, poetry, the short story, and the novel. Selected works from the several historical literary periods are read and analyzed. All readings and lectures are done in Portuguese; class discussion is in Portuguese, Spanish, or English.

PORT 202. The Brazilian Novel (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. Reading and discussion of selected Brazilian novels from the nineteenth and twentieth centuries, with emphasis on the most important authors (e.g., Joaquin Manuel de Macedo, Aluisio Azevedo, Machado de Assis). Reading and lectures are in Portuguese; class discussion is in Portuguese, Spanish, or English.

History

Subject abbreviations: HISA, HISE, HIST

College of Humanities, Arts, and Social Sciences

Robert W. Patch, Ph.D., Chair
Department Office, 1212 Humanities and Social Sciences (951) 827-5401; history.ucr.edu

Professors
Catherine Allgor, Ph.D.
Thomas Cogswell, Ph.D.
V.P. Franklin, Ph.D. President’s Chair
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Pier S. Gorecki, Ph.D.
Randolph C. Head, Ph.D.
Ray A. Kea, Ph.D.
Dale V. Kent, Ph.D.
George B. Michels, Ph.D.
Robert W. Patch, Ph.D.
Michele R. Salzmann, Ph.D.
Clifford E. Truffer, Ph.D.
Rupert C. Costo Chair in American Indian Affairs

Professors Emeriti
Kenneth D. Barkin, Ph.D.
Hal Bridges, Ph.D.
Carlos E. Cortes, Ph.D.
Edwin S. Gaustad, Ph.D.
(History/Religious Studies)
Nathan G. Hale, Jr., Ph.D.
Robert V. Hine, Jr., Ph.D.
James B. Parsons, Jr., Ph.D.
Van L. Perkins, Ph.D.
Roger L. Ransom, Ph.D.
Norman Ravitch, Ph.D.
Henry L. Snyder, Ph.D.
P. Sterling Stuckey, Ph.D.
Mack E. Thompson, Ph.D.
Ronald C. Tobey, Ph.D.
Irwin M. Wall, Ph.D.
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Associate Professors
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Ann E. Goldberg, Ph.D.
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Steven W. Hackel, Ph.D.
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Molly McGarry, Ph.D.
Kiril Tomoff, Ph.D.
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Juliette Levy, Ph.D.
Dana Simmons, Ph.D.
Fariba Zarinebaf, Ph.D.

Lecturer Emeritus
Robert B. Henschler, M.A.

Adjunct Professor
Larry E. Burgess, Ph.D.

Majors

History plays a central role in general education for all undergraduate students. History stresses an understanding of changes that take place in society over time. It also provides a meaning to the past that has many implications for the future. Since we learn from experience, through history we can greatly broaden our learning through the experience of others, removed in time and distant in space from our immediate world. The study of history is as useful as it is fascinating. History majors develop an ability to communicate well, both orally and in writing, and the capacity to think clearly and analytically. Whatever one's goals, it makes good sense to include history in any degree program.

The History Department offers B.A. degrees in History, in History/Administrative Studies, and in History/Law and Society.

Career Opportunities

Many students planning graduate work find history an excellent preparation for professional schools such as law and business administration. For those planning a legal career, a strong background in Western institutions and values can be obtained in a variety of courses in the department. Those planning a career in public school teaching should be aware that the department's program has been officially approved for the secondary (single-subject) credential program, which exempts graduates from the statewide examination required in this field. And, of course, a major in history prepares the student for graduate study in this field as well as a broad range of general careers in business, government work and foreign affairs that ask for written and verbal skills developed in the major.

History/Administrative Studies Major

The History/Administrative Studies major is designed to combine the discipline of History, with its emphasis on changes in society over time, with the study of administrative behavior, the development of public policy, and the tools of decision making. The addition of an Administrative Studies component provides History majors with analytical administrative skills as well as familiarity with the theories and policies of public administration. The concepts of organizational behavior and decision making, when combined with the perspectives provided through the History major, ought to be of particular value to those planning to enter careers in business; federal, state, or local levels of public or private administration; government work or to those planning to attend a professional school of administration or to those utilizing the major in a variety of positions in the public or private sector. (See also the Public History Program, which outlines public sector careers in History.)
History/Law and Society Major
The History/Law and Society major is designed to offer students the opportunity to combine the study of history, with its emphasis on the changes over time in society, politics, the economy, and culture, with the study of legal and law-like relationships and institutions. The coherent series of courses included in this major ought to be of particular value to those intending to study law or to enter other graduate fields as well as to those planning professional careers in government, public administration, business, or other areas where the relationship between history and the law is of significance.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The History Department offers B.A. degrees in History, History/Administrative Studies, and History/Law and Society.

History Major
To receive a B.A. degree in History, students must take 48 units (twelve courses). At least 8 units (two courses) must be at the lower-division level; at least 36 units (nine courses) must be at the upper-division level.

Majors must take:
1. At least one World History course and at least one other lower-division course
2. At least four courses in one of the following areas of concentration, including a seminar (HIST 191 [E-Z]):
   a) Ancient and Medieval
   b) Europe
   c) United States
   d) Latin America
   e) Asia and Africa

   The seminar HIST 191 (E-Z) is required and must be taken in the student's area of concentration.
3. At least four courses in at least three other of the above fields.

Students who choose United States as their area of concentration are strongly advised to take HIST 017A, HIST 017B as preparation for upper-division courses in American history.

Lower-division courses taken elsewhere may be counted toward the lower-division requirement, and advance placement units earned in high school may count toward its fulfillment as well. Please consult with the academic advisors for further details.

Each History major is urged to consult with the academic advisors for quarterly advising and to meet with the Undergraduate Advisor at least one time each year. Appointments can be made through the academic advisors.

History/Administrative Studies Major
The major requirements for the B.A. degree in History/Administrative Studies are as follows:

History requirements (48 units):
All requirements for the B.A. in History

Administrative Studies requirements (37 units)
1. Lower-division courses (17 units)
   a) BUS 010, BSAD 020A
   b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
   c) CS 008 (may be used to satisfy breadth requirements)
2. Upper-division requirements (20 units)
   a) Two courses (8 units) from the list below:
      (1) ECON 102A or ECON 130 or ECON 162/BSAD 162
      (2) PSYC 140 or PSYC 142
      (3) SOC 150 or SOC 151 or SOC 171
      (4) POCS 181 or POCS 182 or POCS 183
      (5) ANTH 127 or ANTH 131
   b) A three-course track (12 units) in Business Administration courses from one of the following:
      (1) Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
      (2) Human Resources Management/ Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
      (3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186
      (4) Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
      (5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
      (7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
      (8) Management Information Systems: BUS 101, BUS 171, BUS 173
      (9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 122, BUS 127/STAT 127

Note
In filling the dual requirements of the selected major, students may not count more than two courses toward both parts of their total requirements (History requirements and Administrative Studies requirements).

History/Law and Society Major
The major requirements for the B.A. degree in History/Law and Society are as follows:

1. History requirements (48 units):
   All requirements for the B.A. in History
2. Law and Society requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWSO 100
   c) One course chosen from ECON 111, PSOC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
   d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
   e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, POSC 186, SOC 147, SOC 149, SOC 180
   f) LWSO 193, Senior Seminar

Note
For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (History requirements and Law and Society requirements). The History courses that may fill the dual requirements include HISE 153 (History of the Common Law), and HISA 120A and HISA 120B (The Supreme Court and the Constitution).

Minor
The History Department also offers a minor in History. In order to receive a minor, students must take 28 units (seven courses), including

1. At least one World History course and at least one other lower-division course
2. At least three courses in one of the following areas of concentration, including a seminar (HIST 191 [E-Z]):
   a) Ancient and Medieval
   b) Europe
   c) United States
   d) Latin America
   e) Asia and Africa

   History of Science and Technology
   Please note that the seminar HIST 191 (E-Z) is required and must be taken in the student's area of concentration.
3. At least two courses from two of the above fields, one in each.

Students who choose United States as their area of concentration are strongly advised to
Graduate Program

The Department of History offers the M.A. in History, the M.A. in History through the public history program, and the Ph.D. in History.

Admission

The department accepts applications from students intending to earn each of these degrees. Applications for admission to the graduate programs in History are normally accepted for the fall quarter only. Scores for the aptitude sections of the GRE are required of all applicants, and applicants must submit a writing sample. Students entering the Ph.D. program without an M.A. may also earn the M.A. in History, as described below. Students admitted to one of the M.A. programs may later request admission to the Ph.D. program.

Entering students choose a faculty advisor, who works closely with the graduate advisor in approving the student’s course of study. Detailed rules for each program are contained in the departmental protocols.

Master's Degree

The Department of History offers three programs of study leading to the M.A. degree: the Regular Program (Plan I and Plan II) and the Public History Program.

Regular Program (M.A.)

Students seeking the M.A. degree choose a historical field, a professional specialty, and a subspecialty, consisting of courses related to the student’s area of specialization. The student’s curriculum must include the following:

1. At least one course in historical theory and methods
2. At least one two-quarter research seminar, preferably in the student’s area of specialization
3. At least 4 units in courses outside the student’s area of specialization
4. Twelve (12) units of thesis preparation, HIST 299

The purpose of the additional required course work is to prepare the student for examinations, and should include relevant materials courses. See below for areas of specialization and language requirement.

Students prepare in three areas:

1. United States
2. Native American
3. Ancient Mediterranean
4. Ancient/Modern Europe
5. Latin American
6. Southeast Asia

Language Requirement

Candidates must demonstrate an ability to read one foreign language.

Public History Program (M.A.)

This program provides education in history as well as technical training for historical careers in archives, historic preservation, museums, and other positions in the public sector.

Admission

Applicants must either have a B.A. in History or the baccalaureate in another field and be able to demonstrate a satisfactory knowledge of history.

Students prepare in three areas:

1. A historical field, in which the student is trained and be able to demonstrate a satisfactory knowledge of history.
2. A professional specialty: archival management, historic preservation, or museum curatorship
3. A subspecialty, consisting of courses related to the professional specialty

Course Work

Candidates must complete a minimum of 40 units of courses as follows:

1. One two-quarter graduate history research seminar.
2. Two History courses chosen from HIST 200–250 and 254.
3. HIST 260, HIST 262, or HIST 263, chosen according to the student’s subspecialty. The accompanying practicum must also be taken if offered.
4. Four upper-division undergraduate or graduate courses related to the subspecialty. Two should be outside the History department; additional courses outside the department must be approved by the Public History advisor.
5. Four units of HIST 290 while writing the internship field report.

Education Abroad Program

EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental academic advisors for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.
All students must also complete HIST 398-I and HIST 402, which do not count toward the 40-unit requirement.

**Internship** The candidate must complete a ten-week internship, coincident with an academic quarter or summer session, at a cooperating institution, for training under professional supervision in a field of the candidate's choice. The internship is registered with a History Department faculty advisor as HIST 398-I. The internship requires a written field report.

When the candidate's advisor and the Committee on Public History judge that an additional skill, particularly in the subspecialty, is needed, then a defined level of competency in that skill is required for the degree.

**Oral Examination** Candidates must pass two-part oral examination: one part on the field-report-in-progress and a second part on the candidate’s field of history and subspecialty.

**Normative Time to Degree** 6 quarters. M.A. students who wish to transfer to the Ph.D. program must apply for a sixth-quarter review as described in the Ph.D. program. No student may enroll in these M.A. programs for more than 9 quarters.

**Doctoral Degree**

The Department of History offers the Ph.D. in History. The Ph.D. program in History prepares graduates for careers as university teachers, public historians, and professional researchers and analysts.

**Admission** Students may prepare for entry into the Ph.D. program by earning a B.A. or an M.A. degree in History or by earning a degree in a closely related field that involves significant study of history. Students holding a degree in another field are evaluated by the graduate studies committee on a case-by-case basis to determine the level of the graduate program at which they should commence their studies.

**Course Work** Candidates for the Ph.D. degree entering with a baccalaureate degree complete a minimum of 56 units of required coursework, 44 of which must be at the graduate level. Students who enter with an M.A. degree complete a minimum of 28 units, 20 of which must be at the graduate level, and may be able to waive certain course requirements listed below. The student's curriculum during the entire graduate career must include the following:

1. At least two two-quarter graduate research seminars
2. At least two graduate-level courses in theory and methods
3. At least three Materials courses or equivalent courses, chosen from the student's fields
4. At least three courses approved by the graduate advisor for the teaching field requirement, of which two must be at the graduate level

All Ph.D. students must also complete HIST 301. Students whose research or complementary field is Public History must complete HIST 402. These courses do not count towards unit requirements.

Courses should be chosen in consultation with the student's faculty advisor and the graduate advisor; suitable courses are described in the departmental protocols. HIST 290 may be used towards the specific requirements above only with the permission of the graduate advisor.

**Ph.D. Fields** Students prepare three fields: a research field, a complementary field, and a teaching field. The research fields that the department offers are listed below; complementary and teaching fields may be chosen from among the research fields or from the list of additional fields. In special cases, students may petition to replace the complementary field with a custom field designed by the student in consultation with two faculty members who agree to administer the written examination in the field. Students may not offer three fields that all deal with a single country or region.

**Research Fields:**

- Early America
- Nineteenth-Century United States
- Twentieth-Century United States
- American West
- Native American History
- Ancient Mediterranean
- Early Modern Europe
- Modern Europe
- Early Modern England
- Modern England
- Modern Russia
- Colonial Latin America
- Modern Latin America
- Southeast Asia
- Public History

**Additional Fields**

- Early Modern World History
- Modern World History
- Gender History

**Sixth-Quarter Review** All Ph.D. students undergo a comprehensive review no later than the sixth quarter of enrollment in the program based on a portfolio selected by the student and advisor. The graduate studies committee reviews the student's record and makes one of the following recommendations: proceed, hold, or terminate. Students receiving a hold may reapply once, within three quarters. Students receiving a terminate may continue enrolling for no more than three quarters to complete MA requirements.

Only under extraordinary circumstances may a student continue enrolling for more than 9 quarters (including enrollment while an M.A. student at UCR) without permission to proceed to examinations.

**M.A. in History degree for Ph.D. Students**

Students enrolled in the Ph.D. program may apply for the M.A. degree in History once they have completed the requirements for the degree.

**Requirements for completing the Ph.D. degree**

**Examinations** Students are examined in their research and complementary fields by written examinations and at the Ph.D. oral examination. To take the Ph.D. oral qualifying examination, the student must submit a preliminary draft of the dissertation proposal. The teaching field is satisfied by course work.

**Language Requirement** Students must demonstrate reading proficiency in at least one language other than English. In certain research fields, students may be required to demonstrate a higher level of proficiency or to demonstrate proficiency in additional languages. Consult the departmental protocols for specific requirements.

**Candidacy** Students advance to candidacy after completing all examinations, the teaching field, and the language requirement. By the end of the following academic quarter, each student must submit to the graduate study committee a dissertation proposal approved by the student's faculty advisor.

**Dissertation** Candidates must submit a dissertation that demonstrates scholarly, original, and independent investigation of a subject in the student's research field chosen with the advice and approval of the dissertation committee.

**Normative Time to Degree** 17 quarters (including M.A. work).

**History**

**Lower-Division Courses**

The History Department offers these lower-division courses for the benefit of the entire campus, not specifically for history majors. HIST 010, HIST 015, HIST 017A, HIST 017B, and HIST 020 are appropriate preparation for upper-division work in the department.

**HIST 001. The Historian as Detective** (4) Lecture, 3 hours; discussion, 1 hour. Introduces several approaches to the methods and processes historians use to reach conclusions about the past. Provides the student with an opportunity to work creatively with historical materials and become the historian as detective. Topics vary and are listed in the Schedule of Classes. Course is repeatable as topics change.

**HIST 004. Introduction to Chicanx History** (4) Lecture, 3 hours, extra reading, 3 hours. The historical heritage of the Chicanx from Spanish and Indian origins to the Chicano movement, with emphasis on the period since 1845. Cross-listed with ETST 004.

**HIST 010. World History: Prehistory to 1500** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A comparative introduction to the development of cultures in Europe, the Americas, Africa, and Asia. Topics covered are the origins of world civilizations; the classical world, or bronze age, from a global perspective; and the evolution of complex political systems throughout the medieval world. Includes a com-
parative discussion of world religions, West and East. Credit is awarded for only one of HIST 010 or HIST 010H.

HIST 010H. Honors World History: Prehistory to 1500 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to HIST 010. A comparative introduction to the development of cultures in Europe, the Americas, Africa, and Asia. Topics covered are the origins of world civilizations; the classical world, or bronze age, from a global perspective; and the evolution of complex political systems throughout the medieval world. Includes a comparative discussion of world religions, West and East. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of HIST 010 or HIST 010H.

HIST 015. World History: 1500 to 1900 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Emphasis on the unique characteristics of world cultures as they entered into a critical period of increasing interaction, a process that led to the shaping of the modern world order. Specific themes include religious, economic, and political revolution; the development of modern science; continuity and change in agrarian societies; industrialism; imperialism; and changes in the patterns of everyday life. Credit is awarded for only one of HIST 015 or HIST 015H.

HIST 015H. Honors World History: 1500 to 1900 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to HIST 015. Emphasis on the unique characteristics of world cultures as they entered into a critical period of increasing interaction, a process that led to the shaping of the modern world order. Specific themes include religious, economic, and political revolution; the development of modern science; continuity and change in agrarian societies; industrialism; imperialism; and changes in the patterns of everyday life. Credit is awarded for only one of HIST 015 or HIST 015H.

HIST 017A. Introduction to United States History (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the major themes and issues in the history of the United States from colonialization to the middle of the nineteenth century.

HIST 017B. Introduction to United States History (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the major themes and issues in the history of the United States from colonialization to the middle of the nineteenth century.

HIST 020. World History: Twentieth Century (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to world cultures, political systems, war, and revolution in the twentieth century. Topics include the rise and fall of the superpowers, colonization and decolonization, boom and bust, fascism and communism, world wars, and contemporary history. Credit is awarded for only one of HIST 020 or HIST 020H.

HIST 020H. Honors World History: Twentieth Century (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to HIST 020. An introduction to world cultures, political systems, war, and revolution in the twentieth century. Topics include the rise and fall of the superpowers, colonization and decolonization, boom and bust, fascism and communism, world wars, and contemporary history. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of HIST 020 or HIST 020H.

HIST 024. Ancient Israel and Its Near Eastern Context (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduces biblical archaeology and its historical interpretation. Focuses on the Old Testament and its historical and cultural setting in the ancient Near East. Explores biblical and non-biblical literature to illustrate further the contacts and interconnections among all the peoples of the ancient Near East.

HIST 025. The Ancient Mediterranean (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): none. Surveys the political history of the ancient Mediterranean world from the Bronze Age (3000 B.C.) to the beginning of the Common era. Focuses on the Near East (Sumer, Babylon, Assyria, Egypt, Israel, Persia), Greece, and Rome. Provides a coherent background for advanced study in ancient Near Eastern, biblical, or classical history.

HIST 026. Civilization before Greece and Rome (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): none. An introduction to the history of the ancient Near East, focusing on Mesopotamia and Egypt, but also including the Syro-Palestinian, Anatolian, and Aegean regions. Covers the history and culture of the world from circa 3000 to 300 B.C. that formed the backdrop to the Hebrew Bible and the Hellenic epic tradition. Provides a background for further study of the ancient Mediterranean, Near Eastern, or biblical worlds.

HIST 027. Rome: The Ancient City (4) Lecture, 3 hours; extra reading, 3 hours. Traces the development of the city of ancient Rome. By studying the literary and historical evidence alongside the physical remains of the city—its monuments, art, and historical and archaeological remains—this course seeks to introduce students to the Romans and to their importance for later ages. Cross-listed with AHS 030 and CLA 017.

HIST 030. Themes and Personalities in History (4) Lecture, 3 hours; consultation, 1 hour. Enduring themes and great personalities in the history of man selected from Western and non-Western traditions. Concentration will vary from particular subtopics to be announced in the Schedule of Classes. Course is repeatable as topics change to a maximum of 24 units.

HIST 032. Disease and Society (4) Lecture, 3 hours; extra reading, 3 hours. The history of disease is a history of massive population change, cultural shocks, and globalization. Aims to grasp the complex and reciprocal relationship between society and disease. Analyzes how cultures, states, and individuals shape the spread of contagious disease, and how disease affects societies.

HIST 033. Witchcraft in Colonial America (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduces the history of witchcraft beliefs and witch-hunting in colonial America. Explores witchcraft in its many dimensions: religious, cultural, psychological, political, legal, social, and economic. Students read original documents and study recent scholarly interpretations of early American events and attitudes.

HIST 034. Introduction to Native American Culture and Religion (4) Lecture, 3 hours; discussion, 1 hour. Interdisciplinary study of contemporary and historic Native American efforts to resist colonialism, with a strong emphasis on land matters, identity issues, and religious forms. Promotes critical reflection on historic and contemporary culture and politics. Cross-listed with RLST 024.

HIST 035. History of North American Indians, 1491-1799 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Examines North American Indian history from 1491 through Handsome Lake's Revitalization Movement, highlighting the experiences of selected Native groups during the colonial era. Special attention is given to the importance of Native American perspectives of historical issues and events.


HIST 037. History of North American Indians, 1900-Present (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Examines North American Indian history during the twentieth century and early twenty-first century. Topics include allotment, the Indian New Deal, World War II, termination, self-determination, and tribal sovereignty. Students read original documents, study new interpretations, and learn about contemporary Native people.

HIST 038. The Maya from Ancient to Modern Times (4) Lecture, 3 hours; individual study, 3 hours. Examination of the Maya of Mexico, Guatemala, and Honduras from the rise of civilization to the present day. Topics to be discussed include the nature of Maya civilization; the Preclassic, Classic, and Postclassic Maya; the Spanish conquest; the Maya under Spanish colonialism; the impact of liberal policies in the nineteenth century; revolution and repres- sion in the twentieth century. Videos and slides used to illustrate important themes and concepts.

HIST 044. Gods, Ghosts, and Grandparents (4) Lecture, 3 hours; discussion, 1 hour. Considers some of the different ways the Chinese regarded—and still regard—gods, ghosts, and ancestors. Nearly all the readings are primary sources spanning almost four thousand years of Chinese history and include texts on oracle bones, philosophical arguments for and against the existence of spirits, tomb contracts for the dead, a sutra promoting the goddess Guanyin as Giver of Sons, ghost stories, and eyewitness accounts of funeral rituals. Cross-listed with RLST 044.

HIST 045 (E-Z). Topics in Asian History (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): none. An introduction to regional histories and cultures of Asia. E. Premodern China and Japan; F. Contemporary China; G. India in the Western Imaginacion. Cross-listed with AST 045 (E-Z).

HIST 046. Introduction to Southeast Asian History (4) Lecture, 3 hours; extra reading, 3 hours. Introduces major themes and events in Southeast Asian history, beginning with pre-history and ending with contempo- rary events in the region. Aims to develop basic historical approaches to understanding contemporary trends, such as the spread of world religions, regional differences and connections, trading patterns, cultural forms, and historically important sites.

HIST 051. Europe from Plague to Revolution, 1400-1799 (4) Lecture, 3 hours; term paper, 3 hours. A survey of European history from the aftermath of the Black Death until the French Revolution. Introduces the geographic, demographic, and economic conditions underlying early modern European society, and examines cultural, political, and intellectual forms as they changed. Special attention is given to the historical experience of individuals, including commoners and elites.
HIST 052. Europe from the Enlightenment to 1968 (4) Lecture, 3 hours; extra reading, 3 hours. A survey of European history from the mid-eighteenth century to 1968. Focuses on the political and social revolutions in France, division standing or consent of instructor. The consequences of rapid industrialization. Examines the emergence of a large middle class, the transformation of women's roles, and changing perceptions of the outside world.

HIST 060. Years of Protest: America, 1960-1975 (4) Lecture, 3 hours; consultation, 1 hour. A close examination of the intellectual and cultural trends in the period from 1960-1975, with emphasis on the rise of the New Left, the Counterculture and the growing militancy of Blacks, Native Americans, Chicanos, and women.

HIST 061. Martin Luther King, Jr (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 001, HIST 060, or consent of instructor. A study of the life of Martin Luther King, Jr. With emphasis on the civil rights campaigns he led in the period, 1955-1968, and on the social and political philosophies he taught and espoused. Cross-listed with ETST 061.

HIST 075. Introduction to Latin America (4) Lecture, 3 hours; consultation, 1 hour. The historical heritage of Latin America from its Indian, Spanish, and African origins to the present, including the related Latin American experience in the United States. Contemporary and historical themes will range from poverty, revolution, race relations, and imperialism to music, art, sports, popular culture, and social mores.

Upper-Division Courses

HIST 103. History of Science from Antiquity to Copernicus (4) Lecture, 3 hours; outside research, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to ancient and medieval science focusing on the development of mathematical description of nature in astronomy. Secondarily, the early histories of physics and mechanics as they relate to the history of astronomy are covered.

HIST 104. The Scientific Revolution (4) Lecture, 3 hours; online discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. History of science in the sixteenth and early seventeenth centuries, stressing the rise of the Darwinian world view, the genetic revolution and its social consequences, and the romantic rejection of science.

HIST 105. Science in the Modern World (4) Lecture, 3 hours; online discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. History of science in the twentieth century with attention to the revolutions in physics and biology, the role of science in the world wars, the social responsibility debate, and the rise of the United States as a scientific power.

HIST 108. Technology in Premodern Civilizations (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines relations between society, machine, and state in ancient China, Greece, and Rome, and in medieval Europe. Focuses on key mechanical and civil technologies and the role of the state in determining their development between the four historic civilizations. A major theme concerns the relationship of craft and state technologies to abstract natural reasoning as a historical background to scientific revolution in Europe.

HIST 109. Technology in Modern Europe and America, 1700-Present (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the emergence of modernity in Europe, the first and second industrial revolutions in Europe and America, the development of device commodities as the typical form of consumer technology in the nineteenth and twentieth centuries, philosophical issues in understanding technology, and whether or not the technological social structures in the United States are an exception to those developed in Europe.

HIST 110. History of Ancient Astronomy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the origins and history of ancient astronomy from Mesopotamia to the Greco-Roman world. Topics include the problems of the calendar and planetary motion, and the relation between astronomy and astrology in the ancient world. Focuses on readings from primary texts. Cross-listed with CPAC 134.

HIST 111. Public History and Community Voices (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the study of public history and the use of oral history, narratives, written sources, photographs, material culture, and other documentary evidence important to presenting historical information and interpretation to a large audience. Analysis of archives, museums, government agencies, familial sources, and other historical repositories that hold community voices. Students present public history by producing an exhibit, published work, or community project.


HIST 151. Interpreting World History (4) Lecture, 3 hours; term paper, 3 hours, or peer mentoring, 3-5 hours, or school mentoring, 3-5 hours. Prerequisite(s): HIST 010 or HIST 011H (may be taken concurrently), HIST 015 or HIST 015H (may be taken concurrently), HIST 020 or HIST 020H (may be taken concurrently). Covers approaches to interpreting human history on a global scale. Topics include units of analysis, periodization, teleology, source constraints and the impact of modern perspectives. Students may apply course concepts through peer mentoring, presentation in Riverside schools, or a research project.

HIST 180. Early Traditional China (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; at least one lower-division history course recommended. The history of China from Neolithic times to the end of the Tang Dynasty (early tenth century, C.E.) with emphasis on social, economic, and political history.

HIST 181. Late Traditional China (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; HIST 180 strongly recommended. A survey of Chinese history from the tenth century to the early nineteenth century, covering the Song, Yuan, Ming, and part of the Qing dynasties. Emphasis on social, economic, and political history.

HIST 182. Modern China (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; HIST 180 and HIST 181 are recommended. Examines the history of China from the Opium War to the early Communist period (1842-1960). The emphasis is on reaction to the Western impact and modernization.

HIST 184. The Vietnam Wars (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An in-depth introduction to Vietnamese history in the 20th century that covers the three Indochina Wars (1945-1986) primarily from different Vietnamese perspectives. Begins with experiences during French colonial rule and then covers anti-colonial movements, periods of French and American military involvement to 1975, post-war society, and post-doi mot society.

HIST 185. Southeast Asia, Prehistory to 1800 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers major historical periods and cultures in Southeast Asia from prehistory, through classical kingdoms, to early modern trading states. Considers the role of ancient stories, religious systems, technologies, and art forms in forming traditional Southeast Asian identities, as well as influences on these identities from outside the region.

HIST 186. Modern Southeast Asia, 1800 to Present (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Studies the formation of modern Southeast Asian nations and cultures since 1800. Compares colonial and post-colonial experiences in the region, studying the formation of nationalist movements and the relationship of nationalist history with traditional and local histories. Considers role of the individual, modern institutions and colonial trade in the region.

HIST 187. Vietnamese Literary History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A historical analysis of Vietnamese literature from its oral tradition to contemporary fiction, with close readings of major authors. Follows the formation of the nation-state and struggle with the Chinese, French, Japanese, and Americans. No knowledge of Vietnamese is required. Readings are in translation or bilingual edition; classes are conducted in English. Cross-listed with AST 162 and VNM 162.

HIST 188 (E-Z). Topics in Chinese History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing; HIST 180 or HIST 181 or HIST 182; or consent of instructor. An in-depth look at important topics in Chinese history. E. Chinese Food Culture. Cross-listed with AST 188 (E-Z).

HIST 189. Encountering Vietnam (5) Lecture, 6 hours; tutorial, 6 hours; project, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on literary and historical accounts of Vietnam through a study of travel writing from different genres and eras. Students read primary texts in translation, participate in language tutorials, produce a travel-writing project with a local Vietnamese institution. Proficiency in Vietnamese is not required. Taught in
HIST 190. Special Studies (1-5) To be taken with the consent of the chair of the department to meet special curricular problems. Course is repeatable to a maximum of 16 units.

HIST 191 (E-Z). Seminar in History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or upper-division course in the period or subject matter of the topic, or consent of instructor. Requires a substantial research paper or project, the result of carefully guided independent work (students may continue and expand papers or projects into a quarter of directed research by enrolling in HIST 199). E. Medieval History; F. Renaissance and Reformation; G. Seventeenth- and Eighteenth-Century Europe; H. Nineteenth-Century Europe; I. Nineteenth- and Twentieth-Century England; J. Twentieth-Century Europe; L. Modern Russia; M. European Thought and Culture; N. Mexican Migration to the United States; P. Colonial American History; Q. Nineteenth-Century American History; R. The American West; S. Twentieth-Century American History; T. American Thought and Culture; U. Colonial and Nineteenth-Century Latin America; V. Recent Latin America; W. Chinese History; X. Mass Media; Y. African History; Z. Ancient History.

HIST 198-L. Individual Internship in History (1-12) Laboratory, 4-36 hours. Prerequisite(s): consent of instructor and upper-division standing. Individual internships will learn about the policies and operations, present and past, of cooperating agencies, such as museums, archives, professional associations, clinics, hospitals, churches, businesses. Students will become familiar with the on-going operations of these organizations and will research and write their histories under faculty supervision. Course is repeatable to a maximum of 16 units.

HIST 199. Senior Research (1-4) Outside research, 3-12 hours. Prerequisite(s): a segment of HIST 191 (E-Z); not open to students in the University Honors Program. The student works individually with the instructor to continue and expand a research paper or project begun in a HIST 191 (E-Z) segment. Course is repeatable to a maximum of 8 units.

HIST 199H. Senior Honors Research (1-5) Outside research, 3-15 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. Offers the opportunity for directed research at an honors level. Satisfactory (S) or No Credit (NC) grading is not available.

Graduate Courses

Consent of the instructor is required for enrollment in all graduate courses.

HIST 200. General Colloquium in European History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces advanced study of major themes and areas in British, European, and Russian history. Concentrates on recent scholarship illustrating current methods and questions in European history. Covers all three major geographical areas, although emphasis may vary. Course is repeatable to a maximum of 8 units.

HIST 201A. Materials for American History: Colonial North America (4) Lecture and discussion, 3 hours. Colonial North American history as seen through primary and secondary literature.

HIST 201B. Materials for American History: United States, 1789-1877 (4) Lecture and discussion, 3 hours. American history from 1789 to 1877 as seen through primary and secondary literature.

HIST 201C. Materials for American History: United States, 1877 to the Present (4) Lecture and discussion, 3 hours. American history from 1877 to the present as seen through primary and secondary literature.

HIST 202A. Materials for European History: Early Modern Europe (1400-1648) (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers early modern European history (1400-1648) as seen through primary and secondary literature.

HIST 202B. Materials for European History: Ancien Régime (1648-1789) (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers Ancien Régime (1648-1789) as seen through primary and secondary literature.

HIST 202C. Materials for European History: Early Twentieth Century (1890-1945) (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers early twentieth-century European history (1890-1945) as seen through primary and secondary literature.

HIST 202D. Materials for European History: Late Twentieth Century (1945-1989) (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers late twentieth-century European history (1945-1989) as seen through primary and secondary literature.

HIST 203A. Materials for Native American History: Early America, Fifteenth through Eighteenth Centuries (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to the central historical problems, historiographical debates, and theoretical approaches to the study of Native American history in the fifteenth through the eighteenth centuries.

HIST 203B. Materials for Native American History: Nineteenth Century (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to the central historical problems, historiographical debates, and theoretical approaches to the study of Native American history in the nineteenth century.

HIST 203C. Materials for Native American History: Twentieth Century (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to the central historical problems, historiographical debates, and theoretical approaches to the study of Native American history in the twentieth century.

HIST 204. Materials for Modern French and Latin European History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Basic readings in secondary literature on the history of modern France since the Revolution of 1789 with selected themes on Italy and Spain.

HIST 205A. Materials for English History: 1485-1820 (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. An examination of some of the major primary materials for English history and an assessment of important secondary accounts.

HIST 205B. Materials for English History: 1760 to the Present (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): consent of instructor. An examination of some of the major primary materials for English history and an assessment of important secondary accounts.

HIST 206A. Materials for Latin American History: Colonial Period to 1820 (4) Lecture, 3 hours. Colonial Latin American history as seen through primary and secondary literature.

HIST 206B. Materials for Latin American History: 1820 to the Present (4) Lecture, 3 hours. Latin American history from 1820 to the present as seen through primary and secondary literature.

HIST 207A. Materials for the Early Modern World (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the major concepts, categories, methodological approaches, and historiographical issues in recent history from the early modern world (circa 1400-1750). Focuses on interregional and interdisciplinary analysis.

HIST 207B. Materials for the Modern World (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the major concepts, categories, methodological approaches, and historiography in recent scholarship on the modern world (circa 1800 to the present). Focuses on interregional and interdisciplinary analysis.

HIST 209A. Materials for Modern Russia: 1801 to 1917 (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An examination of the historiography on Russian history. Topics include social developments, cultural and religious history, peasants, industrialization, revolutionary movements, Bolshevism, ideology, and the Russian Civil War.

HIST 209B. Materials for Modern Russia: Soviet History (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. An examination of the historiography on Russian history. Topics include social developments, cultural and religious history, Stalinism, World War II, and the post-Stalin period.

HIST 210. Introduction to Economic History (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Analysis of selected problems on economic history with an emphasis on methodological approaches to those issues.

HIST 211. Materials for the Roman Empire (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the major concepts, categories, methodological approaches, and historiographic issues in the early Roman Empire. Covers the July Monarchy and continues into the high empire. Introduces students to the major historiographic texts, as well as the primary ancient sources relevant to key topics in Roman history.

HIST 215 (E-Z). Topics in American History (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Analysis of select- ed specific topics in American history. E. Slave Folklore and the Historical Process; I. Culture and Politics in Twentieth-Century United States; G. Transnational Migrations; I. Populism, the Progressive Movement, and the New Deal; J. The World of Little Women; K. History of Workers and Workers’ Organizations in the United States.
HIST 216 (E-Z). Themes in the History of the Americas (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A topical, thematic, and transnational approach to the history of the Americas. Addresses intranational and international histories of the countries and peoples of the Americas. E. Mexican Cross-Border Labor, Organizing, and Internationalism, 1900-1975.

HIST 217 (E-Z). Topics in Asian History (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing and consent of instructor. An introduction to a set of major research monographs in Asian history. E. Agrarian China from the Ming Dynasty to the Present.

HIST 218. Africa in the Era of the Transatlantic Slave Trade (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the political economies and the social and cultural histories of Atlantic Africa between 1500 and 1800 within the wider framework of the Atlantic world. Emphasis is on methodological and theoretical issues and questions. Readings are based on primary historical sources as well as on recent research in the field.

HIST 220. Approaches to Women’s History (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An exploration of the major methodological and historiographical issues in women’s history. It will focus primarily, but not exclusively, on women in the United States.

HIST 221. Approaches to the Hellenistic World, East and West (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces the Hellenistic age as it took shape in the Eastern and Western Mediterranean. Examines how new currents of thought merged with preexisting institutions. Topics include political, social, religious, and intellectual developments.

HIST 222. Approaches to Late Antiquity (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An introduction to the central historiographical debates in the field of Late Antiquity. Course is repeatable as content changes to a maximum of 8 units.

HIST 223. Approaches to Early Medieval History (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to advanced scholarship in selected areas of early medieval historiography. Students focus on independent historiographical research. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

HIST 224. Approaches to Later Medieval History (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to advanced scholarship in selected areas of later medieval historiography. Students focus on independent historiographical research. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

HIST 225A. Seminar in Ancient and Medieval History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 225A. Examines a historical theme or issue in ancient and medieval history. Includes readings in primary sources and analysis of research methods. Second of a two-quarter sequence in which students complete a major research paper. After completing both HIST 225A and HIST 225B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 225B. Seminar in Ancient and Medieval History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 225A. Examines a historical theme or issue in ancient and medieval history. Includes readings in primary sources and analysis of research methods. Second of a two-quarter sequence in which students complete a major research paper. After completing both HIST 225A and HIST 225B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 226 (E-Z). Special Topics in Latin American History (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): HIST 206A or HIST 206B or consent of instructor. Analysis of selected specific topics in Latin American History. E. Latin American Social and Economic History; F. Race and Ethnicity in Latin America; G. Women in Latin America; I. Politics and the Formation of Nation States; J. History of the Latin American Family; K. Immigration, Emigration, and Migration; M. Mass Media in Latin America; N. U.S.-Latin American Relations; O. Nationalism, Liberalism, and Socialism in Latin America: the Southern Cone, 1880-1980; Q. Slavery and Slave Society in Nineteenth-Century Latin America.

HIST 229. The American Other: Apparitions and Appropriations (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Cultural studies of the uncanny in American history in relation to race, gender, and colonialism.

HIST 230. The American Frontier: Ideas and Interpretations (4) Lecture, 3 hours; consultation and extra reading, 3 hours. Prerequisite(s): HISA 137. The broad themes and historical interpretations regarding the frontier as a factor in the American character and in American institutions.

HIST 237. Theory and the Study of Native American History (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An examination of salient theoretical issues raised by Native American history. Critiques theoretical approaches and assumptions currently shaping Native American history and assess the potential contributions to Native American history of theoretical approaches developed in other fields of concentration.

HIST 238A. Oral History Methods and Theory (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A study of oral history methods, theory, and practice. Students discuss readings and develop oral history projects and questions. Course is repeatable to a maximum of 8 units.

HIST 238B. Oral History Methods and Theory (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): HIST 238A. A study of oral history methods, theory, and practice. Students conduct interviews, transcribe, and produce a paper which utilizes the oral history interviews. Includes discussion of final interviews, transcripts, analysis, and paper of each student. Course is repeatable to a maximum of 8 units.

HIST 240 (E-Z). Documentary Source Study (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to the scholarly handling of texts, whether ancient or modern, including inscriptions, manuscripts, and archival documents. Instruction in the methodologies, tools, sources, and the editing and use of texts in history. Analysis of archival structure and organization and of questions of document authorship, provenance, paleography, language and syntax, internal structure, and variant texts. E. Russian. Each segment is repeatable to a maximum of 12 units.

HIST 242. Approaches to Southeast Asian History (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to central historical problems, historiographical debates, materials, and theoretical approaches in Southeast Asian history. Readings each week focus on a different theme. Course is repeatable to a maximum of 8 units. Cross-listed with SEAS 204.

HIST 243A. Seminar in Southeast Asian History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Discusses Southeast Asian topics from regional, comparative, and local perspectives. May be undertaken as a one- or two-quarter course (HIST 243A/SEAS 243A, HIST 243B/SEAS 243B). Graded In Progress (IP) until the last quarter is assigned, at which time a final grade is assigned. After completing both HIST 243A/SEAS 243A and HIST 243B/SEAS 243B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Cross-listed with SEAS 243A.

HIST 243B. Seminar in Southeast Asian History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 243A/SEAS 243A. Discusses Southeast Asian topics from regional, comparative, and local perspectives. Students produce a substantial research paper that continues their work from HIST 243A/SEAS 243A. May be undertaken as a one- or two-quarter course (HIST 243A/SEAS 243A, HIST 243B/SEAS 243B). After completing both HIST 243A/SEAS 243A and HIST 243B/SEAS 243B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Cross-listed with SEAS 243B.

HIST 250. New Directions in Historical Research (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Seminar in European history, including continental European, British, and Russian history, intended primarily for M.A. students. Includes readings in archival and research methods, and in a shared research theme. Students complete a major research paper based on extensive use of primary source material. Graded In Progress (IP) until HIST 251A and HIST 251B are completed, at which time a final grade is assigned. After completing both HIST 251A and HIST 251B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 251A. General Seminar in European History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Seminar in European history, including continental European, British, and Russian history, intended primarily for M.A. students. Includes readings in archival and research methods, and in a shared research theme. Students complete a major research paper based on extensive use of primary source material. Graded In Progress (IP) until HIST 251A and HIST 251B are completed, at which time a final grade is assigned. After completing both HIST 251A and HIST 251B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 251B. General Seminar in European History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 251A. Seminar in European history, including continental European, British, and Russian history, intended primarily for M.A. students. Includes readings in archival and research methods, and in a shared research theme. Students complete a major research paper based on extensive use of primary source material. Graded In Progress (IP) until HIST 251A and HIST 251B are completed, at which time a final grade is assigned. After completing both HIST 251A and HIST 251B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.
source material. After completing both HIST 251A and HIST 251B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 252. Materials Supplement (4) Seminar, 3 hours. Prerequisite(s): any course in 201-206 series. Designed as a supplement to program of readings covered in materials courses; additional works are to be drawn from reading lists for M.A. comprehensive examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

HIST 253A. Seminar in Renaissance and Reformation History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers primary and secondary literature related to Renaissance and Reformation history. First of a two-quarter sequence in which students begin work on a research paper. Graded In Progress (IP) until HIST 253A and HIST 253B are completed, at which time a final grade is assigned. After completing both HIST 253A and HIST 253B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 253B. Seminar in Renaissance and Reformation History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 253A. Second of a two-quarter sequence in which students complete a research paper on Renaissance and Reformation history. After completing both HIST 253A and HIST 253B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 254. Theory and Methods in History (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor; consent of advisor if repeating the course. Studies the evolution of the discipline of history by exploring theories, philosophies, and methods that are used in historical explanation. Concentrates on how some particular body of history has influenced the writing of history. Course is repeatable to a maximum of 12 units as topics change.

HIST 255A. Seminar in Modern Russia (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): UC Riverside graduate standing; consent of one of the UC Riverside instructors. A research seminar on modern Russian history (1801 to present). Covers appropriate primary sources and secondary literature. Topics include, but are not limited to, social history, labor, ideology, politics, and revolutions from the Imperial and/or Soviet periods. An intercampus course taught jointly by faculty from UC Riverside, Irvine, San Diego, and Los Angeles. Graded In Progress (IP) until HIST 255A and HIST 255B are completed, at which time a final grade is assigned. After completing both HIST 255A and HIST 255B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 255B. Seminar in Modern Russia (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): UC Riverside graduate standing; consent of one of the UC Riverside instructors; HIST 255A. A research seminar on modern Russian history (1801 to present). Covers completion of research paper begun in HIST 255A. Topics include, but are not limited to, social history, labor, ideology, politics, and revolutions from the Imperial and/or Soviet periods. An intercampus course taught jointly by faculty from UC Riverside, Irvine, San Diego, and Los Angeles. After completing both HIST 255A and HIST 255B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 256A. Seminar in English History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing; HISE 151, HISE 152, or equivalents. A seminar on seventeenth- and eighteenth-century English history with primary emphasis on the historical literature within the field. Covers appropriate primary sources and secondary literature. Graded In Progress (IP) until HIST 256A and HIST 256B are completed, at which time a final grade is assigned. After completing both HIST 256A and HIST 256B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 256B. Seminar in English History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing; HISE 151, HISE 152, or equivalents; HIST 256A. A seminar on seventeenth- and eighteenth-century English history with primary emphasis on the historical literature within the field. Students complete a research paper. After completing both HIST 256A and HIST 256B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 258A. Seminar in Modern European History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 258B, completed, at which time a final grade is assigned. Course is repeatable to a maximum of 8 units.

HIST 258B. Seminar in Modern European History (4) Seminar, 3 hours. Graded In Progress (IP) until HIST 258B is completed, at which time a final grade is assigned. Course is repeatable to a maximum of 8 units.

HIST 260. Historic Preservation (4) Seminar, 3 hours; conference, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Public policy and instruments of historic preservation in the urban setting.

HIST 260L. Preservation Conservation Practicum (2) Research, 6 hours. Prerequisite(s): HIST 260, and/or HIST 261. Supervised training in the National Register nomination process and in development of the conservation management plan, with independent research projects in either conservation or preservation.

HIST 261. Conservation Science and Historical Objects (4) Seminar, 3 hours; laboratory, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Prerequisites: and methods of conservation science related to historical artifacts, introduction to conservation practice in selected categories of objects; seminar and laboratory.

HIST 262. Museum Research and Interpretation (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Prerequisites: and methods of historical research in material culture; museum interpretation of artifacts; general orientation to the role of the historical curator.

HIST 262L. Museum Interpretation Practicum (2) Outside research, 2 hours. Prerequisite(s): concurrent enrollment in HIST 262. Supervised research and interpretation in a museum; intended to accompany HIST 262.

HIST 263. Archival Management (4) Seminar, 3 hours; research, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Theory and practice of archival management; history of archives; professional ethics.

HIST 263L. Archival Management Practicum (3) Research, 3 hours. Prerequisite(s): HIST 263. Supervised research and administrative experience in an archive; intended to follow HIST 263.

HIST 264. Materials for Public History (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to primary materials for public history and its central historical problems and historiography. Also discusses debates within the field.

HIST 265A. Seminar in Public History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on themes affecting the management of archives, museums, cultural resources, and historic preservation. Students study sources and documents and present findings through an original research paper or museum, archival, or preservation project. First of a two-quarter sequence. Graded In Progress (IP) until HIST 265A and HIST 265B are completed, at which time a final grade is assigned. After completing both HIST 265A and HIST 265B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 265B. Seminar in Public History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on themes affecting the management of archives, museums, cultural resources, and historic preservation. Students study sources and documents and present findings through an original research paper or museum, archival, or preservation project. Second of a two-quarter sequence. After completing both HIST 265A and HIST 265B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 272A. Seminar in American Colonial and Early National History (4) Seminar, 3 hours. Graded In Progress (IP) until all terms are completed, when a final grade will be assigned. Course is repeatable to a maximum of 8 units.

HIST 272B. Seminar in American Colonial and Early National History (4) Seminar, 3 hours. Course is repeatable to a maximum of 8 units.

HIST 273A. Seminar in the American West (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A research seminar focusing on themes in the study of the American West from the colonial era to the present, including migration, expansion, and modern urban development. Includes historical interpretations, readings, discussions, and research. Students begin a paper based on archival research, oral history, and material culture. Graded In Progress (IP) until HIST 273A and HIST 273B are completed, at which time a final grade is assigned. After completing both HIST 273A and HIST 273B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 273B. Seminar in the American West (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 273A. A research seminar focusing on themes in the study of the American West from the colonial era to the present, including migration, expansion, and modern urban development. Includes historical interpretations, readings, discussions, and research. Students complete a paper based on archival research, oral history, and material culture. After completing both HIST 273A and HIST 273B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 274A. Seminar in Nineteenth-Century United States History (4) Seminar, 3 hours. Graded In Progress (IP) until HIST 274A and HIST 274B are completed, at which time a final grade is assigned. Course is repeatable to a maximum of 8 units.
HIST 274B. Seminar in Nineteenth-Century United States History (4) Seminar, 3 hours. Course is repeatable to a maximum of 8 units.

HIST 275A. Seminar in Twentieth-Century United States History (4) Seminar, 3 hours. Graded In Progress (IP) until HIST 275A and HIST 275B are completed, at which time a final grade is assigned. Course is repeatable to a maximum of 8 units.

HIST 275B. Seminar in Twentieth-Century United States History (4) Seminar, 3 hours. Course is repeatable to a maximum of 8 units.

HIST 276A. Seminar in Native American History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An examination of Native American historical research, exploring philosophy, methodology, historiography, and sources relative to American Indians. Students study a variety of sources and documents, compile an annotated bibliography, conceptualize and design a research project, and begin work on an original historical paper. Graded In Progress (IP) until HIST 276A and HIST 276B are completed, at which time a final grade is assigned. After completing both HIST 276A and HIST 276B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 276B. Seminar in Native American History (4) Seminar, 3 hours; outside research, 3 hours. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

HIST 277. Approaches to Early Modern World History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 276A. A continuation of HIST 276A. Students conduct research on the topics selected in HIST 276A. Additional readings may be assigned at the discretion of the instructor. At the term's end, students present their findings through an original historical research paper. Instructors may also assign oral presentations of research findings. After completing both HIST 276A and HIST 276B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units.

HIST 287A. Seminar in Nature, Place, and Space: Environmental and Spatial Approaches to History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 287A. Surveys historical literature and methodologies involved in spatial and environmental analyses of the past, examines technical and methodological issues involved in using spatial documents (maps), and discusses applications of historical research to environmental remediation. Students discuss and critique each other's research. After completing both HIST 287A and HIST 287B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Course is repeatable to a maximum of 8 units.

HIST 287B. Seminar in Nature, Place, and Space: Environmental and Spatial Approaches to History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; HIST 287A. Surveys historical literature and methodologies involved in spatial and environmental analyses of the past, examines technical and methodological issues involved in using spatial documents (maps), and discusses applications of historical research to environmental remediation. Students discuss and critique each other's research. After completing both HIST 287A and HIST 287B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Course is repeatable to a maximum of 8 units.

HIST 290. Directed Studies (1-6) Prerequisite(s): consent of the chair of the department. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

HIST 291. Individual Study in History (1-12) A program of study designed to advise and assist graduate candidates who are preparing for examinations. Does not count toward the unit requirement for the master's degree. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

HIST 292. Concurrent Analytical Studies (1-4) Outside research, 3-12 hours. Prerequisite(s): consent of instructor. Taken concurrently with some 100-series course, the program of study is worked out with the instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

HIST 297. Directed Research (1-6) Prerequisite(s): consent of instructor. Individualized graduate student research under the supervision of specific faculty members, in topics other than the student's dissertation. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

HIST 299. Research for Thesis or Dissertation (1-12) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

HIST 301. The Teaching of History at the College Level (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Usually required of all doctoral candidates and teaching assistants in the department; open to terminal M.A. students with consent of instructor. Credit not applicable to graduate unit requirements. Graded Satisfactory (S) or No Credit (NC).

HIST 302. Teaching Practicum (1-4) Clinic, 1-4 hours; seminar, 1 hour. Prerequisite(s): limited to departmental teaching assistants; graduate standing. Supervised teaching in upper- and lower-division history courses. Required of all History teaching assistants. Provides teaching position of Ph.D. teaching requirement. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

HIST 390-I. Internship in Public History (8-12) Outside research, 8-12 hours; internship, 16-24 hours. Prerequisite(s): consent of program coordinator. An internship at a museum, archive, gallery, or other cooperating institution under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

HIST 402. Professional Practice for the Public Historian (2) Lecture, 1 hour; discussion, 1 hour. Prerequisite(s): graduate standing. Case study approach to the practice, professional codes, and ethics of public historians, including problems in conflict of interest, fee services, political advocacy, expert legal testimony, civil service, conflict with other professions (e.g., architecture), bidding procedures, and proprietary rights.

HIS A 110A. Colonial America (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An exploration of early American society from settlement through the mid-eighteenth century. Topics include the convergence of Native American, European, and African cultures; the origins of slavery, religious diversity; and the growth and development of the colonies.

HIS A 110B. Revolutionary America (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analysis of the political, social, and cultural movements that led to the American revolution and the formation of the Republic. Topics include crowd activity, imperial conflict, and the creation of the constitution.

HIS A 110C. The Early Republic. The United States, 1789-1848 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes social, economic, political, and intellectual forces that transformed the United States from a fledgling preindustrial nation into a sprawling, exuberant, capitalist society. Topics include industrialism, capitalism, Christianity, democratic politics, slavery and racial structures, abolitionism, and American radicalism and nationalism.

HIS A 113. Slavery and the Old South (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An investigation of slavery in the antebellum South. Topics include: the emergence of the self-conscious South, the romanticized plantation, American historians and slavery, etc.

HIS A 114. The American Civil War (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Major leaders and events of the post-Civil War America. Topics will include: Slavery as a cause of the war, the impact of emancipation and of the war on both North and South.

HIS A 115. Reconstruction (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Major leaders and events of post-Civil War America, with emphasis upon Reconstruction, racial and political conflict, industrial growth, and other historical developments that helped shape the modern South and the expanding nation.

HIS A 116. The United States, 1877-1914 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analysis of political, social, economic, and cultural developments in the United States between the end of Reconstruction and the beginning of World War I.

HIS A 117A. United States, 1914 to 1945 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include the emergence of the United States as a global power, the second industrial revolution, the devel-
HISA 117B. United States, 1945 to the Present (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include the Cold War; the political and cultural consequences of the War II affluence; the social movements of the 1960s, Vietnam, and the conservative resurgence of the 1970s and 1980s.

HISA 118. American Thought in the Twentieth Century (4) Lecture, 3 hours; online discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The rise of contemporary liberal culture in the United States and the conservative challenge to it, from the crisis of 1893 to the 1970s. Emphasizing the contributions of Herbert Croly, John Dewey, Robert Oppenheimer, and Reinhold Niebuhr.

HISA 119. Modern U.S. Consumer Culture (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the history and culture of mass consumerism in the United States. Topics include the shift from mass production to mass consumption; the growth of advertising and product marketing; the rise of the department store and shopping mall; the relationship of race, ethnicity, and gender to the market; globalization; and anti-consumerism.

HISA 120A. The Supreme Court and the Constitution (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the intellectual and political sources of the Constitution in English, colonial, and revolutionary war history; the Philadelphia convention and the debate over ratification; the formative impact of the Marshall court; and the crisis over slavery and the nature of the Union. Discusses the role of the court in protecting U.S. capitalism and then examines the court’s role in legitimizing the New Deal by 1953. The main materials of the course are the actual opinions of the court.

HISA 120B. The Supreme Court and the Constitution (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines constitutional history after the New Deal settlement of issues concerning the powers of the national government. Explores the court’s focus after 1953 on the struggle over racial and gender equality and on the expansion and protection of individual liberties contained in the Bill of Rights. The main materials of the course are the major court opinions from the Warren to the Rehnquist courts, 1953-2001.

HISA 122A. Religious Cultures in Early America (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; HST 017A is recommended. An introduction to religious beliefs and practices during the seventeenth and eighteenth centuries in the colonies that became the United States. Cross-listed with RLST 137A.

HISA 122B. Religious Cultures in Modern America (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; HST 017B is recommended. An introduction to a variety of religious traditions, movements, and cultures from 1800 to the present in the United States. Cross-listed with RLST 137B.

HISA 123. American Economic History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 002 (or ECON 002H), ECON 003, or ECON 004. Covers the economic history of the United States from colonial times to the present. Cross-listed with ECON 123.

HISA 124. Labor and Working Class History of the United States (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the history of work, workers and their families, communities, organizations, unions, and workers’ organizations in the United States from the mid-nineteenth century to the present. Attention is paid to gender, race, immigration, and diversity of the work force, and role of government, within an economic and international context.

HISA 130. Gender, Sex, and Sexuality in Early America (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to issues of gender, sex, and sexuality in the culture of early America. Based on both primary and secondary literature. Cross-listed with WMST 130.

HISA 132. U.S. Women, Gender, and Sexuality: 1620-1850 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers topics in early American women’s lives—work, politics, and sexuality—while charting the developments of gendered systems in the United States. Topics may include masculinity, the rise of the middle class, and the private-public dichotomy. Cross-listed with WMST 132.

HISA 133. Women, Gender, and Sexuality in U.S. History: 1850-Present (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces students to major themes in the history of U.S. women and gender issues. Drawing upon recent work in the field, it explores the relationships between gendered meanings of politics and the politics of gender in the late nineteenth and twentieth centuries in the United States. Cross-listed with WMST 133.

HISA 134. African American Women (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers the writings and collective organizational strategies of African American women intellectuals and activists developed in response to the ways racial, sexual, and economic oppression work interdependently and are institutionalized. Beginning with early women’s slave narratives, follows black women’s agendas for social change to the present. Cross-listed with ETST 113.

HISA 135. The Civil Rights Movement, 1950-1970 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The Civil Rights Movement of the 1950s and 1960s. The main focus will be on the “grass roots.” African American aspects of “The Movement,” as it was popularly known, from school desegregation to voting rights and beyond. Cross-listed with ETST 112.

HISA 137. Frontier History of the United States (4) Lecture, 3 hours; journal, 1 hour; term paper, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the frontier in U.S. history, with special attention to the Western frontier and borderlands.

HISA 138. California (4) Lecture, 3 hours; journal, 1 hour; term paper, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. The history of California from the earliest discoveries to the present.

HISA 139. American Musical Subcultures: A Genealogy of Rock (4) Lecture, 3 hours; extra reading, 0-2 hours; listening, 2-3 hours. Prerequisite(s): upper-division standing or consent of instructor. A historical and cultural overview of the genre of American popular music known as “rock.” Covers themes ranging from musical form and structure, aesthetics, and audio technology to community and individualism, gender and racial identity, political resistance, and the music industry. Cross-listed with MUS 140.

HISA 140. California Indian History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Provides students with a broad understanding of the rich and varied heritage and history of California Indians from the invasion of the Spanish to the twentieth century. Examines geographically and culturally diverse groups as a means of illustrating the various Euro-American Indian policies that affected native Californians. Course is comparative and thematic. Cross-listed with ETST 180.

HISA 141. Northwestern Indian History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Presents a historical examination of selected Native American groups in the Southwest. Examines the relationship of Southwestern Indians to the Spanish, Mexican, and United States governments. Focuses on Quechans, Tohono O’Odham, Yavapai, Chiricahuas, Navajos, Zunis, Hopis, Comanches, and selected Puebloans along the Rio Grande. Cross-listed with ETST 181.

HISA 142. Northwestern Indian History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines selected aspects of Northwestern Indian History, from approximately the 1750s to the twentieth century. Deals with several native groups along the Northwest coast from Alaska to Oregon. Compares policies of the Russian, Spanish, English, and United States governments. Particular emphasis on the 1860s when the U.S. negotiated a number of treaties with Native Americans in the Washington and Oregon territories. Cross-listed with ETST 182.

HISA 143. Native American Oral Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 007; upper-division standing or consent of instructor. Comparative examination of Native American oral literature of tribes in the United States, Canada, and Mexico. Enhances the student’s understanding of Native American language, literature, drama, geography, geology, biology, history, and culture. Cross-listed with ETST 183.

HISA 144 (E-Z). Topics in Native American History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Selected topics addressing the issues of the Native American. Includes reading, research, and discussion on the Native American experience. F. Early America: Emerging Interceptions. Cross-listed with ETST 115 (E-Z).

HISA 145. Southeastern Indian History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A historical examination of selected Native American groups in the Southeast from precontact to the present. Examines the relationship of Southeastern Indians to Europeans and Africans, various colonial powers, and the U.S. government. Considers cultural change, creativity, and continuity in the context of trade, contact, and colonialism.

HISA 146. History of Native American Women (4) Lecture, 3 hours, extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines selected important aspects of the lives of Native North American women, including their political, economic, and religious participation in their societies. Further traces historic changes in Native women’s lives as a result of the colonization of the New World and examines the complex imagery of
HISE 147. Medicine Ways of Native Americans (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the medical history of Native Americans. Focuses on traditional Native American medicine and how Western diseases, medical practices, health care, and policies influenced American Indian health. Topics include medicine people, rituals, ceremonies, smallpox, measles, influenza, anomy, accidents, diabetes, suicides, mental illness, and murders. Cross-listed with WMST 136.

HISA 160. Colonial Latin America (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A history of Latin America from pre-Columbian times to independence with an emphasis upon selected themes concerning the social, economic, and cultural aspects of colonialism. Cross-listed with LNST 170.

HISA 161. Nineteenth-Century Latin America (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include the breakdown of political order and the problem of the nation-state, liberalism and conservatism, slavery and abolition, foreign intervention and capital investment, the reemergence of political order in the Age of Liberalism (1860-1900), and social and cultural change. Cross-listed with LNST 171.

HISA 162. Twentieth-Century Latin America (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include the Mexican Revolution, the Great Depression, industrialization, revolution, and the emergence of conservative regimes in the age of neoliberalism. Cross-listed with LNST 172.

HISA 163A. Colonial Mexico (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The history of Mexico to independence.

HISA 163B. Modern Mexico (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The development of the Mexican Republic and its impact on the Mexican people.

HISA 164A. The United States and Latin America to 1930 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of United States-Latin American relations from 1776 to the Good Neighbor Policy. Topics include the Monroe Doctrine; United States expansionism and the Latin American response; the United States-Mexican War; and the age of imperialism.

HISA 164B. The United States and Latin America since 1930 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of United States-Latin American relations from the Good Neighbor Policy to the present. Topics include United States intervention after 1945; the Cold War and counterrevolution; crises in Guatemala, Cuba, Brazil, Chile, Nicaragua, and El Salvador; and defining the new enemy after the Cold War.

HISA 165. Modern Brazil: State and Society (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes power and resistance in Brazilian history with emphasis on the social and political movements challenging state power. Topics include slave rebellions, banditry, millenarian uprisings, the industrial working class, the urban poor, social Catholicism, feminism, and “Black Power.”

HISA 166. Modern Argentina: Democracy and Dictatorship (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the major issues in modern Argentine history. Topics include industrialization and trade union politics, Peronism, the rise of the revolutionary left, militarism, state terrorism, political culture and the cultural dimensions of violence, and state and society during the democratic transition.

**History of Europe**

**Upper-Division Courses**

HISE 107. The Legacy of Mesopotamian Civilizations (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): HIST 025 or HIST 026 or consent of instructor. Surveys the history of ancient Mesopotamia from the development of civilization to the fall of the Assyrian Empire. Cross-listed with WMST 146.

HISE 108. History of Babylonia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): HIST 025 or HIST 026 or consent of instructor. Uses archaeological and written sources to study the political and cultural history of Babylonia from its emergence as a state in the second millennium B.C. through its incorporation within the Hellenistic period.

HISE 110. History of Assyria (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): HIST 025 or HIST 026 or consent of instructor. Studies the history and culture of ancient Assyria, from the Old Assyrian Kingdom to the Neo-Assyrian Empire, and the impact of the Assyrian Empire on subsequent cultures.

HISE 111. Ancient Greece from the Bronze Age to the Persian Wars (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics include the Mycenaean civilization; the rise of the Mycenaean civilization in Greece; and the political and cultural changes that took place during the Hellenistic Age until the conquest by Rome.

HISE 112. Ancient Greece: The Hellenistic Age from Alexander to Cleopatra (336-31 B.C.) (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the weaknesses in the Roman Empire that led to its demise, as well as the circumstances in which the new religions and empires came into existence, through a study of the period from the third to the seventh centuries A.D.

HISE 116. The Roman Empire (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the political, economic, institutional, social, and cultural history of the Roman Empire from its foundation until the end of the Roman Republic (27 B.C.). Focuses on prominent figures and moments of crisis as it examines the forces that brought Rome to the forefront of the Mediterranean world.

HISE 117. Decline and Fall of the Roman Empire (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the weaknesses in the Roman Empire that led to its demise, as well as the circumstances in which the new religions and empires came into existence, through a study of the period from the third to the seventh centuries A.D.

HISE 118. Ancient Greece: The Hellenistic Age from Alexander to Cleopatra, 336-31 B.C. (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics in medieval history, from the end of classical antiquity to the 11th Century, including Christianity, Islam, the Byzantine Empire, and the barbarians.

HISE 121. The Middle Ages (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics in medieval history, from the 9th century to the 15th century, including the development of medieval institutions, the 12th century Renaissance, and the rise of European universities.

HISE 122. Lord, Peasant, and the Manor in Medieval Europe (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The course will give undergraduates a basic historiographic introduction to the medieval estate as a unit of land use, settlement, and lordship. It will be based on secondary literature, a selection of classical works on the medieval estate, and recent revisions of the major themes and models raised by the classical works.
HISE 123. Law and Society in Medieval Europe (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Surveys the legal system of Europe from the late crisis of the Roman Empire to the late fourteenth century. Explores the development of legal heritage of Europe (Roman law, early canon law, customary laws of various peoples), transformations of that heritage in the central Middle Ages (revival of Roman and canon law, custom and legislation, use and abandonment of the ordeal), and the relationship between the resulting legal systems and royal authority. Primary sources are the central component of the course materials.

HISE 130. History of Christianity (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. History of Christianity from its origins to the twentieth century, with historical and thematic emphases determined by faculty expertise. Cross-listed with RLST 135.

HISE 131. The Renaissance (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The history of Western Europe from 1400-1527 with special attention to Italy.

HISE 132. The Reformation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The history of Europe from 1517 to 1618, with special attention to the key events of the continental reformation.

HISE 133. Women Artists in Renaissance Europe, 1400-1600 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017B or upper-division standing or consent of instructor. Surveys the lives and work of women artists in Renaissance Europe from perspectives offered by the latest scholarly literature. Key topics considered are circumstances under which it was possible for women to become artists, how these women evolved from artists practicing in the cloistered convent to artists participating in the competitive public market place, what they painted, and who their patrons were. Cross-listed with AHS 165 and WMST 170.

HISE 134. Art and Society: Patrons and Museums (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores how patrons and museums have influenced the production and reception of art. Topics include patronage, collecting, and audience for art in Renaissance Italy; modern American megaportraits, such as the Gettys and Rockefeller; and multimedia museum programs used to educate a wider public in the visual arts. Cross-listed with AHS 134.

HISE 135. Absolutism and Enlightenment (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The development of monarchical absolutism in the 17th and 18th centuries and the intellectual Enlightenment.

HISE 136. The Age of Revolution (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The French Revolution and its impact upon Europe from the 1780s through the reign of Napoleon Bonaparte.

HISE 140. Nineteenth-Century Europe (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The history of Europe from 1815 to 1848. Topics include the Industrial Revolution, the revolutions of 1848, Bismarck and the unification of Germany, the rise of mass politics, imperialism, and the origins of World War I.

HISE 141. Europe, 1914-1945 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The history of Europe from 1914 to the end of the Second World War. Topics include World War I, the rise of fascism and communism in the twentieth century, democratic corruption, the appeasement of World War II, and the Holocaust.

HISE 142. Europe Since 1945 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The comparative social and political history of Europe from 1945 to the present. Topics include the cold war; decolonization; the emergence of the neoliberal welfare state; the Common Market; De Gaulle, Communism and detente; technology and new forms of social protest.

HISE 145. World War I (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of the origins of the conflict and its development into the world's first war and the first total war. Special attention given to the role of technology in the war and to the social consequences of the war.

HISE 146. The Second World War (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The origins of the conflict and the fighting in Europe, Asia and Africa; Nazi oppression in conquered Europe and the destruction of the Jews; the social, economic and technological impact of the conflict; and the origins of the Cold War.

HISE 148A. Women and Gender in Early Modern Europe, 1348-1800 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introductory survey of women and gender relations in early modern Europe. Topics include women in the Italian Renaissance, the Protestant and Catholic reformation, the witchcraft persecutions, the Enlightenment, and the French Revolution.

HISE 148B. Women and Gender in Europe, 1800-present (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introductory survey of women and gender in Europe. Topics include changes in gender relations and the roles of women in the family, workplace, and politics; sexuality and science; and the debate over the “woman question.”

HISE 150. Ancient and Medieval England (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An broad but occasionally intensive survey of England from its pre-history to the beginning of the Tudor period (c. 1500). Social and legal developments will be stressed.

HISE 151. England: 1485-1760 (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of England from the sixteenth century until her emergence as a major power at the accession of George III. An assessment of social, economic, and legal changes as well as important political events.

HISE 152. Modern Britain (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of the rise of Great Britain to world domination in the late eighteenth and nineteenth centuries and its subsequent fall from grace in the twentieth century. Special emphasis on major changes in the economy.

HISE 153. History of the Common Law (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of the development of the English Common Law beginning with the reign of Henry II and extending into the early eighteenth century. Special attention to the history of the jury.

HISE 155. Tudor England (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. The history of England from 1517 to 1615. Topics include the origins of the Reformation, the “price revolution,” and the development of the English political and economic system.

HISE 157. Eighteenth-Century Britain, 1714-1815 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes Great Britain’s emergence as one of the dominant world powers in the eighteenth century. Special attention is paid to the realm’s social and economic transformation and to its often problematic imperial visions.

HISE 162. Germany from Bismarck to Hitler (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Germany from Bismarck’s accession as chancellor in 1862 to Hitler’s defeat in 1945, with special attention to the economic underpinnings of the period and the process of social and economic modernization.

HISE 163. Modern German History through Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores twentieth-century German history through film. Includes World Wars I and II, inflation and polarization of classes, Nazi Germany, representations of the Holocaust, and a divided and reunited Germany. Cross-listed with CPLT 115, GER 163, and MCS 115.

HISE 165. Modern France (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of major themes in French history since the Revolution. Topics include the revolutionary tradition, social change in the countryside and city, the Dreyfus Affair, the experience and legacy of two world wars, and May 1968.

HISE 168 (E-Z). Topics in European History (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Selected topics addressing the issues of European history. F. Religious Conflict and Coexistence in Europe.

HISE 169. History of Democracy to 1800 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A comparative analysis of democratic political systems before 1800. Examines institutional forms, political culture and rituals, and theoretical discussions. Draws cases from classical Greece and Rome and from Renaissance and early modern Europe.

HISE 171. Early Russia (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Russia from pre-history to the establishment of the Romanov dynasty. Deals with the Slavic, Norse, and Asian origins of the Kievan state, the impact of the Mongol conquest, the rise of Moscow, and the Time of Troubles in the seventeenth century. Special attention to European vs. Asian influences.

HISE 172. Imperial Russia (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Russia under the Romanov dynasty, 1650-1917. Using the twin themes of absolute monarchy and the rise of revolutionary movements, the course deals with such topics as Peter the Great, autocracy, the nobility, serfdom, the radical intelligentsia, and the origins of the Russian Revolution.
HISE 173. Religion and Nationality in Imperial Russia (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces students to the great religious, national, and ethnic diversity inside the Russian Empire (1552-1917). Topics include colonial expansion and frontiers; attitudes and policies toward non-Russians; discovery and defense of ethnoreligious identities; nation-building and nationalism; nationality conflicts, violence, and revolution.

HISE 174. Russia Since 1917 (4) Lecture, 3 hours; online discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Russia from 1917 to the present, with emphasis on the Russian Revolution, the Communist Party, Stalinism, the Great Purges, World War II, and the Khrushchev, Brezhnev, and Gorbachev years. Revolutionary change in a traditional society will be a central theme.

HISE 175 (E-Z). Topics in Russian History (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): HISE 172 or HISE 174 or consent of instructor. Selected topics addressing the issues of Russian history. E. The Stalin Period.

HISE 176. Serbia, Bosnia, and Kosovo: The Contemporary Crisis and Its Historical Roots (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores historical precedents for the current Yugoslav crisis. Examines the tragic events of the 1990s and South Slavic history from the Ottoman conquest to World War II. Focus is on the national histories and mythologies of Serbs, Bosnians, and Albanians.

Honors Program

See University Honors Program

Humanities, Arts, and Social Sciences

Subject abbreviation: HASS
College of Humanities, Arts, and Social Sciences

Theda Shapiro, Ph.D., Chair Committee Office, 2417 Humanities and Social Sciences (951) 827-2743; has.s.ucr.edu

Committee in Charge
John Laursen, Ph.D. (Political Science) Erich Reck, Ph.D. (Philosophy) Erika Suderburg, Ph.D. (Art) Carole-Anne Tyler, Ph.D. (English) Stephen E. Cullenberg, Ph.D., Dean, College of Humanities, Arts and Social Sciences, ex officio

Major
The Humanities, Arts, and Social Sciences major is an interdisciplinary major designed for students who have specific interests that cannot be accommodated within any one of the departments in the College of Humanities, Arts, and Social Sciences and who wish to construct a coherent program of their own. The Humanities, Arts, and Social Sciences major is not intended for students whose interests are undecided; students proposing a Humanities, Arts, and Social Sciences major must propose a specifically focused interdisciplinary topic or a two-field area. Such students must have a faculty advisor who is a member of the UCR Academic Senate.

The Humanities, Arts, and Social Sciences major is fulfilled by a course of studies determined in consultation with an advisor and with the full approval of the chair and three members of the committee overseeing the major. The student must construct either an interdisciplinary option or a two-field option for the major as described below.

Admission Students who wish to select a Humanities, Arts, and Social Sciences major must fill out a form and submit a carefully worded statement of purpose showing meaningful course interrelations. The Humanities, Arts, and Social Sciences Interdisciplinary Committee considers each proposal in the context of the student’s topic and statement of purpose.

Students whose proposals are being approved should petition for a change in major only after they have been informed of the committee’s approval of their interdisciplinary program. Every subsequent change in the student’s initial program must be approved by the advisor; a record of the program and of program changes is kept in the student’s file.

Humanities, Arts, and Social Sciences courses are supervised by the committee and are open to major as well as nonmajor students.

Interdisciplinary Option The interdisciplinary option is built around a central concept in humanities and social sciences. The concept might be a specific culture, country or ethnic group such as Italian civilization and culture; an age or period such as the Renaissance or the industrial revolution; a great social issue or human problem such as war, revolution, communication, or any other topic which receives significant attention from several disciplines.

Two-Field Option In special circumstances the committee sponsors a two-field option for the major designed to allow students to combine studies in two disciplines. Such majors are approved only if they cannot be accommodated within a dual major or within the Liberal Studies Program.

University Requirements See Undergraduate Studies section.

College Requirements See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements The major requirements for the B.A. degree in Humanities, Arts, and Social Sciences are as follows: Students may choose either an interdisciplinary or a two-field option.

Interdisciplinary Option

1. Upper-division requirements (38-unit minimum)
   a) A minimum of 32 units directly related to the chosen central concept
   b) At least 6 units (but not more than 8 units) HASS 195 and/or HASS 196

2. The committee may require upper-division courses beyond those indicated above if the topic of study requires specific language, quantitative, or methodological proficiency.

Note The senior thesis or research paper is the culmination of the major and represents an interdisciplinary approach to the central concept of the major. HASS 195 (Senior Thesis) and HASS 196 (Senior Research Paper) are supervised by a faculty advisor and designed to bring into focus a substantial portion of the major.

The following are sample interdisciplinary programs:

Revolution ANTH 127, ECON 115A or ECON 115B, HIST 104, HISE 174, POSC 112, PHIL 163, PHIL 153, HASS 195 (8 units).

Renaissance AHS 161, CPLT 150U, ENGL 153, ENGL 154, HISE 131, MUS 101A, SPN 140 (E-Z), HASS 195 (8 units).

Two-field Option

1. Upper-division requirements (56 units) Twenty-eight (28) units in each of two fields, supervised by a faculty advisor

2. The committee may require upper-division courses beyond those indicated above if the topic of study requires specific language, quantitative, or methodological proficiency.

Lower-Division Courses

HASS 001. Step-by-Step to College Success for Freshmen (2) Lecture, 1 hour; discussion, 1 hour. Prerequisite(s): none. Involves weekly readings, writing assignments, and class discussions dealing with factors relating to academic success. Topics include study skills and psychological adjustment to college life. Students investigate a wide range of academic disciplines and campus student support services. Graded Satisfactory (S) or No Credit (NC). Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

HASS 004. College of Humanities, Arts, and Social Sciences (CHASS) Connect Program Workshop (1) Workshop, 1 hour. Prerequisite(s): concurrent enrollment in the corresponding CHASS Connect program course. Introduces academic life by examining methods of successful achievement and exploring campus resources. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes to a maximum of 3 units. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

HASS 010. Arts and Ideas Experience (2) Workshop, 2 hours per quarter; individual study, 3 hours; written work, 2.5 hours. Prerequisite(s): none. Explores lectures, performances, and visual arts on the UC Riverside campus. Activities include attending at least one university- or faculty-sponsored performance, lec-
tecture, exhibition, or concert each week and writing a one-page review. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 24 units. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

HASS 020A. Flashpoint: The Individual in Conflict (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Explores the psychological and visceral experience of conflict in venues of immediate relevance to our individual lives. This course is the first of three in a yearlong, multidisciplinary sequence about the place of conflict in the psychological, political, and aesthetic realms. Students are encouraged, but not required, to take HASS 020B and HASS 020C. Fulfills the Psychology or Social Science additional requirement for the College of Humanities, Arts, and Social Sciences.

HASS 020C. At Odds with All Things: The Roles of Conflict in Philosophy, Art, and Literature (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Explores the organizational contexts in which conflict may occur, focusing especially on the group and national levels, and introducing analytical approaches to conflict. This course is the second in a yearlong, multidisciplinary sequence about the place of conflict in the psychological, political, and aesthetic realms. Students are encouraged, but not required, to take HASS 020A and HASS 020C. Fulfills the Political Science or Social Science additional requirement for the College of Humanities, Arts, and Social Sciences.

HASS 021A. Asian/Americans Making Culture: Religion (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. Explores the movement of Asian religions to America and the creation of new modes of religious expression. This course is the first of three in a yearlong, multidisciplinary sequence about the making of culture in Asian/American communities. Students are encouraged, but not required, to take HASS 021B and HASS 021C. Fulfills the Humanities (Additional) or Social Sciences (Additional) requirement for the College of Humanities, Arts, and Social Sciences.

HASS 021B. Asian/Americans Making Culture: Music (4) Lecture, 3 hours; outside research and term paper, 3 hours. Explores Asian-American musics as a window on the cultural politics of Asian America. This course is the second of three in a yearlong, multidisciplinary sequence about the making of culture in Asian/American communities. Students are encouraged, but not required, to take HASS 021A and HASS 021C. Fulfills the Humanities (Additional) requirement for the College of Humanities, Arts, and Social Sciences.

HASS 021C. Asian/Americans Making Culture: Literature (4) Lecture, 3 hours; extra reading, 3 hours. Explores how Asian Americans create a distinctive print culture through poetry, short stories, novels, and magazines. This course is the third of three in a yearlong, multidisciplinary sequence about the making of culture in Asian/American communities. Students are encouraged, but not required, to take HASS 021A and HASS 021C. Fulfills the Humanities (Additional) requirement for the College of Humanities, Arts, and Social Sciences.

HASS 022A. U.S.-Mexican Borderlands (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. Presents an anthropological overview of the formation of the borders between Mexico and the United States, and the border regions and communities associated with them. This course is the first of three in a yearlong multidisciplinary sequence about society and culture in the U.S.-Mexican borderlands. Students are encouraged, but not required, to take HASS 022B and HASS 022C. Fulfills the Humanities (Additional) or Social Sciences (Additional) requirement for the College of Humanities, Arts, and Social Sciences.

HASS 022B. U.S.-Mexican Borderlands: Theatre and Performance (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. Explores the idea of the border and the making of U.S.-Mexican border culture through theatre, comedy, performance art, and film. This course is the second of three in a yearlong, multidisciplinary sequence about society and culture in the U.S.-Mexican borderlands. Students are encouraged, but not required, to take HASS 022A and HASS 022C. Fulfills the Humanities (Additional) or Fine Arts requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 022C. U.S.-Mexican Borderlands: Word, Sound, and Image (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. Explores the idea of the border and the making of U.S.-Mexican border culture through literature, popular music, and visual culture, with a close study of three border cities: Juarez, Tijuana, and Riverside. This course is the third of three in a yearlong, multidisciplinary sequence about society and culture in the U.S.-Mexican borderlands. Students are encouraged, but not required, to take HASS 022A and HASS 022B. Fulfills the Humanities (Additional) or Literature/Philosophy/Religious requirement for the College of Humanities, Arts, and Social Sciences.

HASS 023A. Concepts of the Physical Sciences through Science Fiction (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An exploration of the concepts and development of the physical sciences through science fiction. This course is the first of three in a yearlong, multidisciplinary sequence that bridges the "two cultures" of science and the humanities. Students are encouraged, but not required, to take HASS 023B and HASS 023C. Credit is awarded for only one of HASS 023A or HNPG 037F. Fulfills the Humanities (Additional) or Literature requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 023B. The Ancient Sciences through Science Fiction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. A comparative exploration of the ancient sciences through the medium of science fiction. This course is the second of three in a yearlong, multidisciplinary sequence that bridges the "two cultures" of science and the humanities. Students are encouraged, but not required, to take HASS 023A and HASS 023C. Fulfills the Humanities (Additional) or Literature requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 023C. Concepts of the Biological Sciences through Science Fiction (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An exploration of the concepts and development of the biological and ecological sciences through the medium of science fiction. This course is the third of three in a yearlong, multidisciplinary sequence that bridges the "two cultures" of science and the humanities. Students are encouraged, but not required, to take HASS 023A and HASS 023B. Credit is awarded for only one of HASS 023C or HNPG 037F. Fulfills the Humanities (Additional) or Literature requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 024A. A Course about Me: Autobiography in Literature and Performance (4) Lecture, 3 hours; workshop, 1 hour. Prerequisite(s): none. A hands-on, intensive combination of discussion and workshop whereby students develop autobiographical projects while studying seminar literary, performance, and theoretical texts. This is the first segment of a two-quarter, multidisciplinary sequence. Students are encouraged, but not required, to take HASS 024B. Fulfills the Fine Arts or the Humanities additional requirement for the College of Humanities, Arts, and Social Sciences.

HASS 024B. A Course about Me: Autobiography in Literature and Performance (4) Lecture, 3 hours; workshop, 1 hour. Prerequisite(s): HASS 024A. A hands-on, intensive combination of discussion and workshop whereby students develop autobiographical projects while studying seminar literary, performance, and theoretical texts. This is the second segment of a two-quarter, multidisciplinary sequence. Fulfills the Literature or the Humanities additional requirement for the College of Humanities, Arts, and Social Sciences.

HASS 068A. The 1960s and the Vietnam Era (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): Sophomore standing or consent of instructor. Examines the political, social, economic, and cultural impact of the Vietnam War, with an introduction to economic, historical, and cultural methods of analysis. This course is the first of three in a yearlong, team-taught, interdisciplinary sequence. Fulfills the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 068B. The 1960s and the Vietnam Era (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): HASS 068A or consent of instructor. Examines the political, social, economic, and cultural impact of the Vietnam War, with an introduction to economic, historical, and cultural methods of analysis. This course is the second of three in a yearlong, team-taught, interdisciplinary sequence. Fulfills the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 068C. The 1960s and the Vietnam Era (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): HASS 068B or consent of instructor. Examines the political, social, economic, and cultural impact of the Vietnam War, with an introduction to economic, historical, and cultural methods of analysis. This course is the third of three in a yearlong, team-taught, interdisciplinary sequence. Fulfills the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

HASS 090. Special Studies (1-3) Individual study, 3-9 hours. Prerequisite(s): consent of the chair of the Humanities, Arts, and Social Sciences Interdisciplinary Program. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable to a maximum of 8 units.

HASS 092. First-Year Seminar in the Humanities, Arts, and Social Sciences (1) Seminar, 10-15 hours per quarter. Prerequisite(s): freshman standing. Enrollment priority is given to freshmen, but sopho-
Humanities, Arts, and Social Sciences for breadth requirement information.

Upper-Division Courses

HASS 100. Studies in Leadership and Organizational Effectiveness (5) Discussion, 3 hours; consultation, 3 hours per quarter; practicum, 3 hours; written work, 21 hours per quarter. Prerequisite(s): consent of the instructor. Introduces the social science literature on leadership and organizational behavior. May be repeated to a maximum of 16 units. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

HASS 190. Special Studies (1-5) conference. Prerequisite(s): consent of the Humanities, Arts, and Social Sciences Interdisciplinary Committee. Directed interdisciplinary study.

HASS 191. Seminar in Sacramento (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Center at Sacramento Program. Examines aspects of the Sacramento area, including cultural, political, and governmental institutions and the sciences, arts, and media. Requires a substantial research project or project, the result of guided independent work drawing on the unique aspects of Sacramento. Required of participants in the UCR Center at Sacramento Program. Cross-listed with ENGR 191S and NASC 191S. See the Student Affairs Office in the College of Humanities, Arts, and Social Sciences for breadth requirement information.

HASS 191W. Seminar in Washington, D.C. (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Center at Sacramento Program. Examines aspects of the Washington, D.C., area, including cultural, political, and governmental institutions as well as the sciences, arts, and media. Requires a substantial research project or project, the result of guided independent work drawing on the unique aspects of Washington, D.C. Required of participants in the UCR Center at Washington, D.C., Center Program. Cross-listed with ENGR 191S and NASC 191S. See the Student Affairs Office in the College of Humanities, Arts, and Social Sciences for breadth requirement information.

HASS 195. Senior Thesis (1-8) Prerequisite(s): enrollment by request of student with approval of the advisor and the Humanities, Arts, and Social Sciences Interdisciplinary Committee. For honors students who may need one or more quarters to complete the research and writing of a senior thesis. Course is repeatable to a maximum of 12 units.

HASS 196. Senior Research Paper (1-4) Prerequisite(s): consent of advisor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

Interdisciplinary Studies

College of Humanities, Arts, and Social Sciences

Anne Sutherland, Ph.D., Director
Office of Interdisciplinary Programs
3117 CHASS Interdisciplinary Building
South; (951) 827-2743; www.Lsnid.ucr.edu

Committee in Charge
Lynda Bell, Ph.D. (History)
Chris Chase-Dunn, Ph.D. (Sociology)
Brad Hyman, Ph.D. (Biology)
Toby Miller, Ph.D. (Media and Cultural Studies)
Charles Whitney, Ph.D. (Creative Writing)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts and Social Sciences, ex officio

Major
The Interdisciplinary Studies major provides students with the opportunity to earn a degree within a broad liberal arts education. During the first two years, students are introduced to traditional areas of learning that will allow them to understand the intellectual relationships between various disciplines.

During the junior and senior years, students may choose to specialize in Communication Studies or select two concentrations representing different fields of study. Students gain competence in the methodology of their areas of interest that enable them to extend and deepen the investigations begun during the first two years. Requirements are sufficiently flexible to enable students to prepare for graduate or professional school as well as pursue their interests in other areas.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The requirements for the B.A. degree in Interdisciplinary Studies are as follows:

1. Upper-division requirements (at least 44 units). By the junior year (90 units) students must select option 1 or 2.

Option 1: Select two areas of concentration from the list below. No overlap between the first and second concentration is allowed.

First Area of Concentration: Minimum of 28 upper-division units.
Second Area of Concentration: Minimum of 16 upper-division units.

American Studies, Anthropology, Art History, Asian Studies, Business Administration,
Chemistry, Computer Science, Creative Writing, Dance, Earth Science (Geology, Geophysics), Economics, English, Environmental Sciences, Ethnic Studies, European Studies, Media and Cultural Studies, Health Professions (formerly Biological Sciences) Hispanic Studies, History, Human Development, Latin American Studies, Mathematics, Music, Philosophy, Physics, Political Science, Psychology, Religious Studies, Sociology, Theatre, Urban Studies, Visual and Performing Arts, Women’s Studies

Option 2: Communication Studies. In consultation with an advisor, students must submit an approved course plan of eleven upper-division courses reflecting a balanced mix of courses.

Lower-division prerequisites: ANTH 001, LING 020, CRWT 056, ENGL 033/MCS 033, MUS 006/ANTH 006, ART 006/MCS 006, WMST 020

a) ANTH 105/BUS 158, ANTH 109/WMST 109, ANTH 113, ANTH 118, ANTH 120, ANTH 123, ANTH 127, ANTH 131, ANTH 132, ANTH 140 (E-Z), ANTH 149/WMST 149, ANTH 159, ANTH 162, ANTH 163, ANTH 165, ANTH 177/MUS 126/WMST 126
b) ART 131/MCS 131, ART 135/MCS 135, ART 139, ART 140, ART 145, ART 150/MCS 150, ART 155, ART 167, ART 168, ART 169 E-Z, ART 170/MCS 175, ART 175
c) AHS 182, AHS 186/MCS 186, AHS 187/MCS 187
d) CRWT 130, CRWT 132, CRWT 134, CRWT 151, CRWT 165, CRWT 176 (E-Z)
e) ECON 111, ECON 116, ECON 117/PHIL 119, ECON 119, ECON 123/HISA 123, ECON 124, ECON 125, ECON 153/BUS 153, ECON 181, ECON 182, ECON 185/LNST 185, ECON 187/LNST 187
f) All upper-division English courses, especially ENGL 103, ENGL 143 (E-Z)/MCS 143 (E-Z), ENGL 144 (E-Z)/MCS 144 (E-Z), ENGL 145 (E-Z)/MCS 145 (E-Z), ENGL 146 (E-Z)/MCS 146 (E-Z)
g) All upper-division Media and Cultural Studies courses
h) MUS 126/ANTH 177/WMST 126, MUS 140/HISA 139
i) PHIL 108/WMST 108, PHIL 111, PHIL 112, PHIL 116
j) POSC 146
k) PSYC 134, PSYC 135, PSYC 142, PSYC 148, PSYC 163, PSYC 165
l) SOC 120, SOC 121, SOC 122, SOC 123, SOC 133, SOC 134, SOC 139/MCS 139,
Information on minors.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

International Relations Minor

College of Humanities, Arts, and Social Sciences

Bronwyn A. Leebaw, Ph.D., Chair
Office, 2230 Watkins Hall
(951) 837-5509 or 5312
internationalrelations.ucr.edu

Committee in Charge

Stephen E. Cullenberg, Ph.D.
Irwin Wall, Ph.D. (History/Religious Studies)
Steven Helfand, Ph.D. (Economics)

Dean, College of Humanities, Arts, and Social Sciences, ex officio

Offered by the Department of Political Science, the International Relations minor offers a basic examination of the major approaches, disciplines, and perspectives of international relations. The study of international relations is necessarily interdisciplinary, focusing on economic, geographic, historical, and political issues and questions.

The International Relations minor is helpful in preparing students for the many careers in the international arena.

Requirements for the minor (28 units)

1. Eight (8) units from HISA 117B, HISE 142, HISE 146, HISA 164B, HISE 174, HIST 182
2. Eight (8) units from ECON 171, ECON 175, ECON 178/BUS 178, ECON 181, ECON 182, ECON 185/LNST 185
3. POSC 124
4. Eight (8) units from POSC 123, POSC 125, POSC 126, POSC 127, POSC 128, POSC 129, POSC 130, POSC 155, POSC 160

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Journalism Minor

College of Humanities, Arts, and Social Sciences

D. Charles Whitney, Ph.D., Chair
Department Office, 4146 INTS
(951) 827-3615; creativewriting.ucr.edu

Committee in Charge

Mike Davis, M.A. (Creative Writing)
Claire Hoffman, M.S.J. (Creative Writing)
Martin Johnson, Ph.D. (Political Science)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Offered by the Department of Creative Writing, the minor offers basic examination of the theory, practice and ethics of contemporary journalism, with an emphasis on reporting and editing. Coupled with work on student publications and internships, the minor serves as an entryway to professional writing in news media or to graduate study in journalism.

Lower-division requirements (9 Units)

1. ART 003
2. CRWT 057C

Upper-division requirements (20 units)

1. Eight (8) units from:
   a) CRWT 165
   b) CRWT 175
2. Eight (8) units from:
   a) CRWT 174
   b) One (1) course either from an approved list of media-related upper-division courses, or, with the approval of the academic advisor for journalism minors, an upper-division course relevant to an area of journalism specialization.

3. Either CRWT 195: Senior Thesis [4], or CRWT 1981: Internship [4]. Students electing a thesis will complete a series of news features or an investigative article or series requiring significant endeavor in reporting and writing and demonstrating an understanding of sound journalistic principles. CRWT 195 is open to seniors only. Students completing CRWT 1981 must complete 4 units of internship with a journalism organization.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Labor Studies Minor

Subject abbreviation: LABR
College of Humanities, Arts, and Social Sciences

Ellen Reese, Ph.D., Chair
Office, 1217 Watkins Hall
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Committee in Charge

Christopher Chase-Dunn, Ph.D. (Sociology)
Mike Davis, Ph.D. (Creative Writing)
David H. Fairris, Ph.D. (Economics)
John N. Medearis, Ph.D. (Political Science)
Dylan Rodriguez, Ph.D. (Ethnic Studies)
Todd Sorensen, Ph.D. (Economics)
Deva A. Weber, Ph.D. (History)

Labor studies is an interdisciplinary minor that focuses on the conditions, activities, and struggles of workers and other members of the working class from an international, contemporary, comparative and historical perspective. Although trade unions are the primary focus, students will also examine other forms of working class organizing, including community organizing, and organizing by women and people of color. Courses focus on work in formal workplaces, including service, industrial, clerical, professional, and managerial work, and may also address other forms of work, such as unpaid housework, prison labor, or work in the informal economy. The minor addresses issues affecting workers, including governmental policies, technological change, globalization, neoliberalism, and alternative models for organizing for social justice. In addition to taking academic courses, students gain hands-on experience through a one-quarter internship with a union or related organization. This minor helps to prepare students for careers in labor and community organizing, labor law, or labor regulatory agencies.

1. Five courses (at least 20 units) from the approved list of courses
2. An introductory labor studies course: LABR 001
3. A labor internship (one course [at least 4 units] or the equivalent) approved by the Labor Studies chair and completed through one of the following courses: ANTH 198I, BUS 198-I, ECON 198-I, ETST 198G, HISA 198-I, POSC 198G, SOC 198-I, WMST 198-I
4. One course (at least 4 units) that deals with race or gender inequality: ECON 155/WMST 155, ETST 102, ETST 131, ETST 177, SOC 140, WMST 101, WMST 109/ANTH 109, WMST 140/ANTH 147, WMST 149/ANTH 149
5. Two courses from the following: ANTH 122, ANTH 138, ANTH 139, BUS 144, BUS 155, BUS 157, BUS 160/ECON 160, ECON 146/URST 146, ECON 152/BUS 152, ECON 153/BUS 153, ECON 155/WMST 155, ETST 102, ETST 131,
Latin American Studies

Lower-Division Course

LABR 001. Introduction to Labor Studies (4) Lecture, 3 hours; extra reading, 3 hours. Through comparative and historical perspective, examines the social forces shaping labor conditions and workers' struggles for justice. Covers the changing nature of work under capitalism, race and gender discrimination in the labor market, the impact of economic globalization, and unions' successes and limitations.

Latin American Studies

Subject abbreviation: LNST
College of Humanities, Arts, and Social Sciences

Marcelle Chauvet, Ph.D., Chair
Office, 3111 CHASS Interdisciplinary
South, (951) 827-2743;
latinamericanstudies.ucr.edu

Committee in Charge
Jorge Aguero, Ph.D. (Economics)
Eugene Anderson, Ph.D. (Anthropology)
Susan Antebi, Ph.D. (Hispanic Studies)
Alicia Arrizón, Ph.D. (Ethnic Studies)
Wendy Ashmore, Ph.D. (Anthropology)
Serio Riviera-Ayala, Ph.D. (Hispanic Studies)
Will Barndt, Ph.D. (Political Studies)
Victoria Bomberry, Ph.D. (Ethnic Studies)
James Brennan, Ph.D. (History)
Edgar Butler, Ph.D. (Sociology, Emeritus)
Amelia Cabezas, Ph.D. (Women's Studies)
Paulo Chapas, Ph.D. (Music)
Christopher Chase-Dunn, Ph.D. (Sociology)
Ronald Chilcote, Ph.D. (Economics, Emeritus)
Walter Clark, Ph.D. (Music)
Carlos Cortes, Ph.D. (History, Emeritus)
Ralph Crowder, Ph.D. (Ethnic Studies)
David Fairs, Ph.D. (Economics)
Scott Fedick, Ph.D. (Anthropology)
Alfredo Figueroa
Alessandro Formazzari, M.A. (Hispanic Studies)
Paul Green, Ph.D. (Education)
Tenibac (T.S.) Harvey Ph.D. (Anthropology)
Marta Hernandez-Salvan, Ph.D. (Hispanic Studies)
David Herzberger, Ph.D. (Hispanic Studies)
Jennifer Hughes, Ph.D. (Religious Studies)
Michael Kearney, Ph.D. (Anthropology)
Juliette Levy, Ph.D. (History)
Tiffany Lopez, Ph.D. (English)
William Megenney, Ph.D. (Hispanic Studies)
Toby Miller, Ph.D. (English, Sociology, and Women's Studies)
Stella Nair, Ph.D. (Art History)
Armando Navarro, Ph.D. (Ethnic Studies)
Rhonda Neugebauer
June O'Connor (Religious Studies)
John Ochoa (Hispanic Studies)
Luis Paredes
Robert Patch, Ph.D. (History)
Thomas Patterson, Ph.D. (Anthropology)
Marina Pianca, Ph.D. (Hispanic Studies)
David Pion-Berlin, Ph.D. (Political Science)
Jonathan Ritter, Ph.D. (Music)
Leonora Saavedra, Ph.D. (Music)
Roberto Sanchez-Rodriguez (UC Mexus)
Anna Beatrice Scott, Ph.D. (Dance)
Karl Taube, Ph.D. (Anthropology)
Deva Weber, Ph.D. (History)
Raymond Williams, Ph.D. (Hispanic Studies)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major
Latin American Studies is an interdisciplinary, area studies major that allows students to combine insights from many related disciplines. The interdisciplinary focus permits students to study the anthropology, economics, geography, history, sociology, languages and cultures of the region to gain a broad understanding of a complex world area. The Latin American Studies major provides great flexibility to explore a wide range of subjects of particular interest—from religious cults in the Caribbean to indigenous video in the Andes or the dynamics of agrarian reform in rural Mexico. The flexibility of the major allows the possibility of completing a double major with other departments such as History, Anthropology, or Political Science.

UCR has a strong faculty in Latin American Studies, with more than 35 members drawn from departments across the campus. More than 125 courses taught at UCR have a significant focus on the region. The strength and breadth of the offerings at UCR permit each student to specialize in the particular country or discipline of greatest interest. Students have many opportunities to get involved in research projects with Latin American Studies professors. Students are encouraged to spend time living and studying in Latin America through, for example, the University of California Education Abroad Program (EAP).

Career Opportunities
The Latin American Studies major presents numerous opportunities after graduation. The interdisciplinary nature of the program prepares the student for further study in any number of academic fields at the graduate level, including anthropology, geography, history, sociology, Spanish and Portuguese, law, and journalism. The B.A. degree itself is valuable preparation for many careers, including the U.S. foreign service, nongovernmental development and aid organizations, international organizations, large overseas corporations, banking, foreign missions, journalism and the media, and teaching.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The major requirements for the B.A. degree in Latin American Studies fall into three major groups. First, students must take Introduction to Latin American Studies (LNST 001) and satisfy a language requirement in either Spanish or Portuguese. Second, students choose three disciplinary areas in which to focus their upper-division work. They must take a total of 24 required units in these three areas. Finally, students take an additional 12 units of elective courses in Latin American Studies. Latin American Studies students are encouraged to take additional coursework at the lower and upper division levels.

The specific requirements for the major are as follows:

1. Lower-division requirements (5 units)
   a) Introduction to Latin American Studies (LNST 001)
   b) Proficiency in Spanish to the SPN 005 level or in Portuguese to a comparable level

Note Additional course work in Spanish and/or Portuguese recommended for students interested in careers in Latin American fields

2. Upper-division requirements (36 units)
   a) At least two courses in three of the following groups (24 units total):
      (2) Economics: ECON 185/LNST 185, ECON 187/LNST 187
      (3) History: HISA 160/LNST 170, HISA 161/LNST 171, HISA 162/LNST 172, HISA 163A, HISA 163B, HISA 164A, HISA 164B, HISA 165, HISA 166
      (4) Literature: LNST 120/SPN 120C, LNST 153/ETST 153, SPN 102B, SPN 120A, SPN 121E, SPN 170 (E-Z)
      (5) Music, Film and Art: AHS 112, AHS 113, AHS 115/LNST 115, MCS 171/SPN 171, LNST 105/
MCS 185/SPN 185, LNST 109/ MCS 179/SPN 179/WMST 179, MUS 113, MUS 125

(6) Political Science: LNST 142/ POSC 162, LNST 148/POSC 158
b) Twelve (12) units selected from other Latin American Studies courses or from a list of upper-division Latin American Studies related courses available in the program office.

Minor
Latin American Studies offers a minor consisting of 20 upper-division units.

To complete the requirements for the minor, students must select five courses from three of the following groups:

2. Economics: ECON 185/LNST 185, ECON 187/LNST 187
4. Literature: LNST 120/SPN 120C, LNST 153/ETST 153, SPN 120A, SPN 121E, SPN 102B, SPN 170 (E-Z)
6. Political Science: LNST 142/POSC 162, LNST 148/POSC 158

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Upper-Division Courses

LNST 105. Imagining the Nation: Film and Media in Latin America (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Study of the role of media and film in creating a national imaginary in Latin America. Focus is on one region or nation—such as the Andes, the Caribbean, Mexico, Argentina, or Chile—relating local history to the global context. Course is repeatable as topics change to a maximum of 8 units. Cross-listed with MCS 185 and SPN 185.

LNST 109. Gender, Media, and Latin America (5) Lecture, 3 hours; screening, 3 hours; outside research, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Explores the way Latin Americans have thought of and represented gender across a variety of media, including essays, film, novel or short story, and performance. Compares the possibilities and limitations of these media for representing gender in the Latin American context. Cross-listed with MCS 179, SPN 179, and WMST 179.

LNST 115. Modern and Contemporary Art of Latin America (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): AHS 028 or upper-division standing or consent of instructor. A study of Latin American art from circa 1900 to the present. Considers national and regional histories and artistic trajectories, beginning with the advent of an artistic avant-garde, and investigates the relationships between European and Latin American developments. Cross-listed with AHS 115.

LNST 120. Major Topics in Hispanic Literature: Latin America (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SPN 110. Reading and analysis of major texts of authors from Latin America. Cross-listed with SPN 120C.

LNST 125 (E-Z). Topics in Latin American Film and Media (5) Lecture, 3 hours; screening, 3 hours; extra reading, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of a theme or issue in Latin American film and media. E.

LNST 138. Colonialism and Religions in Mexico (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers the survival, revival, and invention of religious traditions in ancient and contemporary Mesoamerica. Examines indigenous and immigrant religions through themes such as myths and rituals of pre-Columbian peoples; sexuality and eroticism in religion; Indian theology and theogony; Counter Reformation Catholicism; and growing religious syncretisms. Cross-listed with RLST 138.

LNST 142. Latin America: The Quest for Development and Democracy (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A comparative examination of central issues in and components of Latin American political life, including economic development, regimes and alliances, guerrilla wars, the armed forces, human rights, and democratic consolidation. Countries studied include Argentina, Brazil, Chile, El Salvador, and Cuba. Cross-listed with POSC 162.

LNST 148. Politics of Mexico (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A survey of contemporary Mexican politics. Emphasis is on recent economic and social changes and their impact on Mexico's political system. Topics include relations with the United States, the rise of drug trafficking in Mexico, and the recent emergence of opposition politics. Cross-listed with POSC 158.

LNST 153. Contemporary Latin American and Chicano Novels (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of contemporary Latin American novels in translation and Chicano novels, based on a consideration of their salient, formal, and thematic concerns. Cross-listed with ETST 153.

LNST 161. Indigenous People and the State in Latin America (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. Reviews the historical processes and regional circumstances that have governed relations between indigenous peoples and Latin American states. Studies concepts of nationalism, ethnicity, and the state in the context of indigenous efforts to resist assimilation and to gain limited autonomy. Compares with the problems and prospects of multilingual societies worldwide. Cross-listed with ANTH 161.

LNST 164. Gender and Development in Latin America (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Discusses the role and contribution of Latin American and Caribbean women within their societies. The effects of national economic development policies upon their status and their participation in and integration into the policy-making process are emphasized. Cross-listed with ANTH 164 and WMST 164.
Law and Society

Subject abbreviation: LWSO
College of Humanities, Arts, and Social Sciences

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Carl F. Cranor, Ph.D., Pre-Law Advisor
carl.cranor@ucr.edu

Committee Office, 1604 Humanities and Social Sciences
(951) 827-5208; lawandsociety.ucr.edu

Committee in Charge
John Cioffi, Ph.D. (Political Science)
Carl Cranor, Ph.D. (Philosophy)
David Eastmond, Ph.D. (Neuroscience)
Robert Parker, Ph.D. (Sociology)
Georgia Warnke, Ph.D. (Philosophy)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major
The Law and Society major offers undergraduates an interdisciplinary liberal arts approach to the study of legal and law-like relationships and institutions. The program combines the perspectives of various disciplines in the Humanities and Social Sciences. The multidisciplinary approach introduces students to a wider range of views about law than is generally possible within a single department, provides a coherent and rigorous program of courses organized around the theme of law and law-like relationships, and allows students to develop critical thinking about law and social institutions.

For students not planning to pursue graduate studies, this program offers a means of understanding some complex relationships between social institutions. For those who plan to pursue graduate studies, the breadth of course work should provide a sound basis for graduate studies in areas related to law: history, philosophy, political science, and sociology, among others. And for students who choose to pursue the study of law in a professional school of law, the curriculum can offer a sound background.

Students may select Law and Society as a major with the departments of Anthropology, Economics, History, Philosophy, Political Science, Psychology, and Sociology.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The major requirements for the B.A. degree in Law and Society are as follows:

1. Specified requirements of the cooperating department (See the departments of Anthropology, Economics, History, Philosophy, Political Science, Psychology, or Sociology.)

2. Law and Society requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWSO 100
   c) One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
   d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
   e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 186, POSC 186, SOC 147, SOC 149, SOC 180
   f) LWSO 193, Senior Seminar

Note
For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (specified departmental requirements and Law and Society requirements).

Minor
The minor in Law and Society has the following requirements.

1. Upper Division (six courses [at least 24 units])
   a) LWSO 100
   b) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
   c) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, PHIL 164, LWSO 175 (E-Z), POSC 111, POSC 166, POSC 186, POSC 186, SOC 147, SOC 149, SOC 180

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Upper-Division Courses

LWSO 100. Introduction to the Study of Law and Society (4) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the interdisciplinary study of the role of law and legal institutions in society. Examines the role of criminal, tort, contract, constitutional, or other areas of the law in society from different disciplinary perspectives.

LWSO 175 (E-Z). Topics in Law and Society (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): LWSO 100; upper-division standing. Current topics in law and society.

LWSO 180A. Symposium in the Law (1) Seminar, 10 hours per quarter. Prerequisite(s): upper-division standing; consent of instructor in the preceding quarter. A discussion of legal matters of common interest, in conjunction with experts from outside the university. Graded In Progress (IP) until LWSO 180A, LWSO 180B, and LWSO 180C are completed, at which time
a final, Satisfactory (S) or No Credit (NC) grade is assigned. After completing LWSO 180A, LWSO 180B, and LWSO 180C, students may repeat the sequence once for credit; total credit for each course may not exceed 2 units.

LWSO 180B. Symposium in the Law (1) Seminar, 10 hours per quarter. Prerequisite(s): LWSO 180A. A discussion of legal matters of common interest, in conjunction with experts from outside the university. Graded In Progress (IP) until LWSO 180A, LWSO 180B, and LWSO 180C are completed, at which time a final, Satisfactory (S) or No Credit (NC) grade is assigned. After completing LWSO 180A, LWSO 180B, and LWSO 180C, students may repeat the sequence once for credit; total credit for each course may not exceed 2 units.

LWSO 180C. Symposium in the Law (1) Seminar, 10 hours per quarter. Prerequisite(s): LWSO 180A. A discussion of legal matters of common interest, in conjunction with experts from outside the university. Graded Satisfactory (S) or No Credit (NC). After completing LWSO 180A, LWSO 180B, and LWSO 180C, students may repeat the sequence once for credit; total credit for each course may not exceed 2 units.

LWSO 192. Science and Law (4) Lecture, 3 hours; extra reading, 1 hour; outside research, 1 hour; term paper, 1 hour. Prerequisite(s): LWSO 100. Discusses the intersection between science and law and compares legal and scientific procedures and decision making.

LWSO 193. Senior Seminar in Law and Society (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): LWSO 100; senior standing in Law and Society/Anthropology, Law and Society/Economics, Law and Society/History, Law and Society/Philosophy, Law and Society/Political Science, Law and Society/Psychology, or Law and Society/Sociology. Aims to synthesize multidisciplinary perspectives and knowledge provided by other courses in the Law and Society Program through readings, group discussion, and research on an issue or problem in law and society. Covers topics such as law and morality, law and social change, law and religion, and law and culture. Satisfactory (S) or No Credit (NC) grading is not available.

LWSO 198-I. Individual Internship in Law and Society (4-8) Consultation, 1-2 hours; term paper, 3-6 hours; internship, 8-16 hours. Prerequisite(s): LWSO 100; consent of instructor and department chair; upper-division standing. An individual internship in the professional legal or policy-making community. Requires a substantive paper relating the internship to the student's area of study. Course is repeatable to a maximum of 16 units.

LGBT, Gay, Bisexual, Intersexual, and Transgender Studies Minor

Subject abbreviation: LGBS

College of Humanities, Arts, and Social Sciences

George E. Haggerty, Ph.D., Interim Chair Program Office, 3155 INTS (951) 827-3456
glbsstudies.ucr.edu

Committee in Charge
Byron Adams, D.M.A. (Music)
Alicia Arrozon, Ph.D. (Women's Studies)
Amalia Cabezas, Ph.D. (Women's Studies)
Renee Coulombe, Ph.D. (Music)
Jennifer Doyle, Ph.D. (English)
Neil Greenberg, Ph.D. (Dance)
Keith Harris, Ph.D. (English)
Tamara Ho, Ph.D. (Women's Studies)
John Master (History)
Molly McGarry, Ph.D. (History)
Erika Suderberg, Ph.D. (Art)
James Tobias, Ph.D. (English)
Carole-Anne Tyler, Ph.D. (English)
Jane Ward, Ph.D. (Sociology)
Taise Yamamoto, Ph.D. (English)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The program reflects current critical, theoretical, and methodological developments across several disciplines that focus on lesbian, gay, bisexual and gender issues. Lesbian, Gay, Bisexual, Intersexual, and Transgender Studies are by nature interdisciplinary, and this program is meant to encourage new cross-disciplinary research in the field for interested students in the College of Humanities, Arts, and Social Sciences. The curriculum addresses such issues as sexual identity and orientation; gay, lesbian, and bisexual representation; gay, lesbian, and bisexual perspectives on the arts; retheorizations of gender; sexuality and cultural diversity; intersections of sexualities and ethnic identities.

Requirements for the minor (24 units)

1. Lower-division requirements (4 units) chosen from WMST 001 or LGBS 001

2. Upper-division requirements (20 units): a) Four (4) units of English chosen from ENGL 122 (E-Z)/LGBS 122 (E-Z), ENGL 143 (E-Z)/MCS 143 (E-Z), ENGL 144 (E-Z)/MCS 144 (E-Z) b) Four (4) units from Ethnic Studies or History chosen from ETST 175/WMST 175, HISAA 130/ETST 130, HISAA 132/WMST 132, HISAA 133/WMST 133, HISAA 148A, HISAA 148B, HISAA 149A, HISAA 149B, HISAA 191T c) Four (4) units of any from AMST 182, AHS 186/MCS 186, CLA 120E, MUSE 131/WMST 127, LGBS 153/MUS 153, MUS 114, MUS 126/ANTH 177/WMST 126 d) Four (4) units of Psychology, Sociology, or Women's Studies chosen from LGBS 189/WMST 189, PSYC 160A, PSYC 160B, PSYC 161, SOC 140, SOC 141, SOC 153, SOC 177E, WMST 100, WMST 103/ANTH 145, WMST 108/PHIL 108, WMST 135, WMST 140/ANTH 147, WMST 152/SOC 152 e) Four (4) additional units chosen from those listed above or LGBS 190 or LGBS 193

Note: Students may satisfy an upper-division requirement by completing 4 units of LGBS 198-I (Internship).

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for information on minors.

Lower-Division Course

LGBS 001. Introduction to Lesbian, Gay, Bisexual, and Transgender Studies (4) Lecture, 3 hours; extra reading, 3 hours. Introduces students to basic issues in lesbian, gay, bisexual, and transgender studies. Topics include the history of sexuality, identity politics and community activism, the relation between sexuality and gender, the theories of sexual identity, and the globalization of lesbian, gay, bisexual, intersexual, and transgender issues.

Upper-Division Courses

LGBS 122 (E-Z). Literature and Sexualities (4) Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): upper-division standing or lower-division English course (other than composition) or consent of instructor. A study of English and American literature from the perspective of sexuality and sexual identity. Courses cover issues such as gay and lesbian texts and contexts; sexual ideologies and literature; marginalized writers and texts; and the uses of theories of sexualities in the study of literature. Cross-listed with ENGL 122 (E-Z).

LGBS 153. Homosexuality and Music (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Uses a topical rather than a chronological approach to investigate homosexuality on the part of composers, performers, critics, theorists, and historians. Requires a final paper on a topic of student's choice in consultation with the instructor.

LGBS 189. Gender, Technology, and the Body (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): LGBS 001 or WMST 001. Examines various technologies that alter our bodies and investigates how technological interventions in the body reproduce and reshape gender ideologies in contemporary Western culture. Explores theoretical approaches to feminism, body, and technology. Topics include cosmetic, sex-reassignment, and weight loss surgeries; reproductive, contraceptive, and medical technologies; anti-depressants; sex toys; and body piercing. Cross-listed with WMST 189.

LGBS 190. Special Studies (1-5) Consultation, 1 hour; individual study, 2-14 hours. Prerequisite(s): upper-division standing; consent of instructor and program
The major is to give prospective elementary school teachers information about state requirements that are best met when students are undergraduates and to advise on how to prepare to teach the required subjects in California elementary schools. The program is administered in the Office of Interdisciplinary Programs, 2417 Humanities and Social Sciences, (951) 827-2743.

**Blended Program in Undergraduate Teacher Preparation** Qualified students have the opportunity to enroll in an accelerated program resulting in an elementary credential. The end goal is to be able to begin “professional” student teaching in the final quarter of the senior year. Our goal is to give early decisions the opportunity to begin teaching their own classes earlier and as interns to continue to receive the intense support of the Graduate School of Education and the school district during the first two quarters of the first year of teaching.

Students must take EDUC 001 and EDUC 002. Successful completion also requires careful course selection and a minimum GPA of 3.0. Advising is a collaborative effort between the Bridge to Teaching Program and the Graduate School of Education. For information about undergraduate requirements, contact Susan Braddock in the Office of Interdisciplinary Programs, 2417 Humanities and Social Sciences, (951) 827-2743, or susan.braddock@ucr.edu. Information about UCR’s credential programs can be found at the Graduate School of Education Web site, education.ucr.edu/teach or at 1124 Sprout Hall.

**California Teach-Science/Mathematics Initiative (CaTEACH-SMI)** California Teach-Science Mathematics Initiative (CaTEACH-SMI) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SMI at UCR offers undergraduate students paid/unpaid opportunities to explore STEM teaching as a career option. Through CaTEACH-SMI, students receive advising and mentoring to prepare for entrance into an internship teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SMI Resource Center provides future STEM teachers with material and financial resources to promote planning and professional development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit http://smi.ucr.edu or at the Resource Center at 1104 Pierce Hall.

**University Requirements**

See Undergraduate Studies section.

**College Requirements**

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

**Major Requirements**

The major requirements for the B.A. degree in Liberal Studies are as follows:

1. Lower-division requirements (20 courses [at least 80 units]). Courses can be used to fulfill college breadth requirements.
   a) Science and Mathematics (6 courses [at least 24 units]): BIOL 002, BIOL 003, GEO 002, one course in physics, one course in chemistry, and one of MATH 004, MATH 005, MATH 008A, or MATH 015.
   b) Humanities and Fine Arts (7 courses [at least 28 units]): CPST 017A, DANCE 005, RLST 012/ETST 012, one of ART 001, ART 002, or ART 005, one of MUS 006/ANTH 006 or MUS 014/ETST 014/URST 014, one of ENGL 014 or ENGL 020B, and one of CRWT 056, THEA 010, or THEA 070.
   c) History and Social Science (8 courses [at least 32 units]): ANTH 001, HIST 010, HIST 017A, ENG 102, POSC 010, SOC 001, WMST 001

2. Upper-division requirements: 8 courses (at least 32 units).
   a) One course in American Literature from: ENGL 130, ENGL 131, ENGL 132, ENGL 133, ENGL 134, ENGL 136T, ENGL 137T, ENGL 138A, ENGL 138B, ENGL 138T
   b) One course in Ethnicity or Gender from: ETST 100, ETST 101A, ETST 102, ETST 111, ETST 121, ETST 131, WMST 100, WMST 101, WMST 108/PHIL 108, WMST 126/ANTH 177/MUS 126, WMST 132/HISA 132, WMST 149/ANTH 149, WMST 161
   c) One course in United States History or United States Government from: HISA 110A, HISA 110B, HISA 110C, HISA 113, HISA 114, HISA 115, HISA 116, HISA 117A, HISA 117B, HISA 118, HISA 120A, HISA 120B, HISA 135/ETST 112, POSC 100, POSC 101, POSC 113
   d) One Course in Communication Studies from: ANTH 113, ANTH 120, ANTH 123, ANTH 131, ANTH 165, ANTH 177/ MUS 126/WMST 126, ART 131/MCS 131, ART 135/MCS 135, ART 139, ART 140, ART 145, ART 150/MCS 150, ART 155, ART 167, ART 168, ART 169 (E-Z), AHS 182, AHS 186/MCS 186, AHS 187/MCS 187, CRWT 130, CRWT 165, CRWT 166A/MCS 166A/THEA 166A, CRWT 174, CRWT 176 (E-Z), ECON 111, ECON 116, ECON 117/PHIL 119, ECON 119, ECON 123/HISA 123, ENGL 103, ENGL 143 (E-Z)/MCS 143 (E-Z), ENGL 144 (E-Z)/ MCS 144 (E-Z), ENGL 145 (E-Z)/MCS 145 (E-Z), ENGL 146 (E-Z)/MCS 146 (E-Z), MCS 110 (E-Z), MCS 114/CPLT

**Preparation for Teaching**

The **Prepare to Teach Program** is a pre-professional program open to undergraduates in all majors who are interested in teaching in California elementary schools. Through the program, prospective teachers begin to think pedagogically about subjects they are studying, gain early field experience in the schools, and receive an introduction to the profession that will help them make informed decisions about their own careers. The goal is to give prospec-
f) Three additional courses from the areas above.
3. Education Component: 5 courses (at least 18 units): EDUC 100B, EDUC 109, EDUC 139, EDUC 172, EDUC 177A

The College of Humanities, Arts, and Social maximizes opportunities for students and faculty to explore, across a broad array of disciplines, what it means to be human.
Management

Subject abbreviation: MGT

A. Gary Anderson Graduate School of Management

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The A. Gary Anderson Graduate School of Management
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Mohsen El-Hafsi, Ph.D., Associate Dean
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Theodore Mock, Ph.D.
Michael Moore, Ph.D.
Waymond Rodgers, Ph.D.

Professor Emeritus
K. Hung Chan, Ph.D.

Associate Professors
Brendra Mishra, Ph.D.
Paul Pavliou, Ph.D.
Erik Rolland, Ph.D.

Lecturers
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Joseph Walloch, M.B.A.
Craig Weaver, M.B.A.

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Yunzeng Wang, Ph.D.

Professors Emeriti
Robert D. Auerbach, Ph.D.
Herbert E. Johnson, Ph.D.
Kiichiro C. Kogiku, Ph.D. (Economics)
David Meyers, Ph.D.
Siegfried Schaible, Ph.D.

Associate Professor
Mohsen El-Hafsi, Ph.D.
Sattar Mansi, Ph.D.

Assistant Professor
Canlin Li, Ph.D.
Long Gao, Ph.D.

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Thomas Novak, Ph.D. Albert O. Steffey Professor of Marketing
Rami Zwick, Ph.D.

Professors Emeriti
Kenneth W. Gardiner, Ph.D. (Management/Environmental Sciences)
G. Lawrence Zahn, Ph.D.

Associate Professors
Jenay Halebian, Ph.D.
Jorge Silva-Risso, Ph.D.
Shuba Srinivasan, Ph.D.

Assistant Professors
Baler Bilgin, Ph.D.
Cecile Cho, Ph.D.
Andrea Godfrey, Ph.D.
Seok-Woo Kwon, Ph.D.
Xing Pan, Ph.D.

Lecturers
Sean Jasso, Ph.D.
Farrokh Moshiri, M.B.A.
Gary Patterson, Ph.D.
Alan Theriault, M.B.A.

The School

The A. Gary Anderson Graduate School of Management (AGSM) emphasizes growing strengths in the areas of marketing, supply chain management, accounting, and finance. The school resides in a 30,000-square-foot home featuring state-of-the-art research and teaching facilities.

The M.B.A. curriculum prepares students to excel in a competitive environment marked by unprecedented challenges and technological advances. Communication and computer skills are incorporated into a global approach to both the art and science of management. Most elective courses are seminar size and encourage participative learning. Computers and software are used extensively for teaching and effective management decision making. An internship program assists students in obtaining experience in their professional fields. In addition to regularly scheduled course work during the day, courses are offered in the evening to permit career professionals to pursue the M.B.A. part time. The mixture of career professionals and recent baccalaureate graduates provides a stimulating and well-rounded classroom environment.

The AGSM Microcomputer Facility offers software packages in statistics, databases, spreadsheets, financial planning, management science, econometrics, graphics, word processing and Internet connections. The facility is used for teaching, class demonstrations, theses, and research projects. Students learn computing skills in AGSM courses with special computing requirements, and in optional seminars.

The UCR Library, with more than 2 million bound volumes, 13,000 serials, and 1.6 million microforms, including extensive literature in the management field, provides substantial support for student and faculty research.

An MBA Student Association represents student interests at faculty meetings and arranges student activities. Student evaluations of courses are an important part of the evaluation of curriculum and faculty performance.

The A. Gary Anderson Graduate School of Management is accredited by AACSB International - The Association to Advance Collegiate Schools of Business.

Graduate Program

The A. Gary Anderson Graduate School of Management offers a professional graduate program leading to the Master of Business Administration (M.B.A.) degree. The course of study provides a balanced approach to the art and science of management, with an emphasis on managing through information, and recognizes the global context of management in today’s business world.

Admission

The program is open to eligible students from all undergraduate majors. Quantitative methods (business calculus, linear algebra) is a prerequisite to the program. Qualified students who have not taken this prerequisite course may be admitted, but must meet this requirement during their first two quarters in residence. Admission to the graduate program is based on several criteria including the quality of previous academic work, scores on the Graduate Management Admission Test (GMAT), letters of recommendation, and managerial experience.

Course Work

The M.B.A. program can be completed in two years on a full-time basis or in three to four years on a part-time basis. In the 80-unit program (20 courses), all students take 36 units in a common body of knowledge that consists of courses in quantitative analysis, managerial economics, financial accounting, finance, operations and management science, information systems, organizational behavior and theory, strategic management, and marketing management. Thereafter, students complete a required internship, 28-36 units selected from electives, a management synthesis course, and a thesis or an industry-based case project (in the management synthesis class MGT 238). All students must complete a nondegree credit workshop in communications, leadership, teams, and ethics.

Electives are selected with the assistance of a faculty advisor to meet individual educational and career goals. Electives are offered in areas such as accounting, entrepreneurial management, finance, human resources management, international management, management science, management information systems, marketing, and production and operations management. The program is flexible to meet individual student interests, and students are also encouraged to take courses in related disciplines such as economics, statistics, computer science, and sociology.
The school has a working agreement with the Department of Psychology for collaborative training of doctoral students in consumer behavior/marke
UCR Palm Desert Graduate Center The M.B.A. program is also offered at the Richard J. Beckman International Center for Entrepreneurial Management at the UCR Palm Desert Graduate Center, where numerous electives are offered in entrepreneurship.

Normative Time to Degree 7 quarters.

Master of Business Administration Candidates for the M.B.A. are required to complete all the general requirements specified in the Graduate Studies section of this catalog. The program conforms to Plan I or Plan II.

Plan I (Thesis) For thesis work, a maximum of 8 units of credit is granted. The thesis is a two or more quarter research endeavor to be initiated during a student’s final year in the program. It is expected that most students will develop theses related to advanced work in their elective courses. The format and other details of the thesis must meet the requirements of the Graduate Division of UCR.

Plan II (Comprehensive Examination) Students who elect Plan II must complete an industry-based group case analysis as part of the management synthesis course. This course serves in lieu of a comprehensive final examination. Students whose case analyses are deemed “not acceptable” are given one additional quarter to revise them to an “acceptable” level.

Graduate Courses

MGT 200. Organizational Behavior and Theory (4) Lecture, 3 hours; extra reading, 1.5 hours; outside projects, 1.5 hours. Prerequisite(s): MGT 404 or consent of instructor. Enhances student understanding of complex organizational life using multiple perspectives at the micro and macro levels. Addresses theories and research pertaining to organizational structure, culture, group dynamics, interpersonal relations, and social psychological factors with the goal of developing students’ capabilities for diagnosing organizational problems and identifying appropriate solutions.

MGT 201. Quantitative Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MGT 403 or equivalent; familiarity with Microsoft’s Excel spreadsheet software. Addresses the process of generating decision-making information from data and solving management problems using common computer tools. Covers problem identification and formulation, model selection and use, and interpretation of the results of statistical analysis. Topics include estimation, hypothesis testing, analysis of variance, simple and multiple regression, time series, and forecasting. May not be taken for degree credit by students in statistics undergraduate or graduate programs.

MGT 202. Financial Management (4) Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 201, MGT 211, or equivalents. Examines primary corporate finance theories and how to use them to solve problems. Topics include time value of money, net present value analysis, security valuation, portfolio theory and asset pricing models, capital budgeting decision, dividend policy, capital structure decision, mergers and acquisitions, and multinational financial management.

MGT 203. Managerial Economics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): MGT 403 or equivalent. Studies the micro-, macro-, and global economic environments of managerial decisions. Topics include demand and supply, production and cost functions, competition, labor supply, national income accounting, aggregate output, interest rates, fiscal and monetary policy, inflation, economic growth and business cycles, exchange rates, and international relationships in trade and finance.

MGT 204. Cost and Management Accounting (4) Lecture, 3 hours; outside projects, 3 hours. Prerequisite(s): MGT 211 or equivalent. A study of accounting information for managerial planning and control. Topics include managerial applications for product costing, budgeting, and performance evaluation; accounting techniques for modern manufacturing systems; activity-based accounting and cost management; international cost accounting systems; and the behavioral implications of accounting information.

MGT 205. Information Systems (4) Lecture, 3 hours; laboratory, 1 hour; outside projects and extra reading, 2 hours. Prerequisite(s): MGT 403 or equivalent. Seeks to increase the students’ ability to identify and respond to ethical issues in organizations, including such areas as affirmative action, bribery, deception, working conditions, product safety, environmental impact, and international relations.

MGT 206. Budgeting (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 201 or consent of instructor. Covers management issues arising from a work force that is increasingly diverse in terms of gender, age, ethnicity, culture, and health status. Topics include participation patterns and career development, stereotyping, communication styles, work-family conflicts, reasonable accommodation and other legislative requirements.

MGT 207. Management Labor Relations (4) Lecture, 3 hours. Prerequisite(s): MGT 210 or equivalent and consent of instructor. The social forces leading to collective employee action in public and private institutions are examined in light of labor legislation, labor law, labor economics, collective bargaining, and the aspirations of social groups.

MGT 208. Business, Government, and Society (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): MGT 403 or equivalent. Studies the micro-, macro-, and global economic environments of managerial decisions. Seeks to increase the students’ ability to identify and respond to ethical issues in organizations, including such areas as affirmative action, bribery, deception, working conditions, product safety, environmental impact, and international relations.

MGT 209. Marketing Management (4) Lecture, 3 hours; outside projects and extra reading, 3 hours per week. Prerequisite(s): MGT 201, spreadsheet skills. Focuses on managing the activities involved in the creation of products and services, such as design, production, and distribution. Provides managers with the skills and tools to analyze, optimize, and improve production processes for competitive advantage. Explores issues through lectures, cases, and videos pertaining to various industries.

MGT 210. Human Resources Management (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing. Provides a managerial perspective on the relationship between business and its external stakeholders. Primary focus is on the impact of public policy on business and the management of public issues in a global environment. Case studies and teamwork are emphasized.

MGT 211. Financial Accounting (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers financial accounting concepts and the analytical tools needed to understand and interpret financial statements. Examines the uses of financial accounting information.

MGT 215. International Comparative Management (4) Lecture, 3 hours; outside projects and readings, 3 hours. Prerequisite(s): graduate standing. Comparative analysis of significant management practices. The impacts of cultural, political, social, and economic factors on decision making within the international arena are examined.

MGT 216. Managing a Diverse Work Force (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): MGT 200 or consent of instructor. Covers management issues arising from a work force that is increasingly diverse in terms of gender, age, ethnicity, culture, and health status. Topics include participation patterns and career development, stereotyping, communication styles, work-family conflicts, reasonable accommodation and other legislative requirements.

MGT 217. Management Operation (4) Lecture, 3 hours. Prerequisite(s): MGT 210 or equivalent and consent of instructor. Develops student understanding of the theory and processes underlying a broad spectrum of negotiation problems. Students attain competence in negotiations by applying analytic and interpersonal skills learned from readings and lectures to negotiation exercises and debriefings.

MGT 218. Decision Making Under Uncertainty (4) Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 207 or consent of instructor. Introduces basic tools for using data to make informed managerial decisions under uncertainty. Addresses modeling, performance evaluation, and optimization of systems with uncertain parameters. Topics include Markov chains, Markov decision processes, and probabilistic linear and dynamic programming. Applications are drawn from operations, finance, marketing, and other management fields.

MGT 219. Organization Development and Change (4) Lecture, 3 hours. Prerequisite(s): MGT 200 or consent of instructor. Stressors the initiation and management of organizational change through the use of applied behavioral science knowledge. Emphasizes the diagnosis of organizational problems followed by the development of an improved plan and the strategies and tactics for implementing that plan.

MGT 224. Managing for Quality Improvement (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 201 or consent of instructor. Discusses the operational aspects of quality improvement in manufacturing and service organizations.
Focuses on the broader issues of total quality management, statistical process control, and the difficulties in implementing quality efforts in organizations.

MGT 226. Fraud and Forensics Auditing (4)
Lecture, 3 hours; extra reading, 1.5 hours; outside projects, 1.5 hours. Prerequisite(s): MGT 204 or equivalent. Addresses forensic and fraud examination in how it pertains to both civil and criminal matters. Develops a basic understanding of the characteristics of fraud, fraud prevention and detection, investigative techniques, asset recovery, and use of information technology.

MGT 227. Financial Institutions and Markets (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 201. Discusses characteristics of financial assets, financial markets, and financial institutions. Covers the simple relationships between these financial entities and basic macroeconomic variables such as wealth, income, and interest rates. Studies the demand and supply of money, loanable funds, the determinations of real rates of interest, and the term structure of interest rates.

MGT 228. Consumer Behavior (4)
Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MGT 209 or consent of instructor. Analyzes why people buy and examines purchase decision processes and outcomes. Studies current models of consumer behavior. Topics include brand equity, customer delight, global marketing, behavior modification, and strategic market analysis.

MGT 229. Management Control Systems (4)
Lecture, 3 hours; outside projects and readings, 3 hours. Prerequisite(s): MGT 204 or equivalent. Discusses the role of accounting information in the design and implementation of management control systems. Responsibility accounting and performance evaluation will be emphasized. Complex issues related to management control systems will be discussed through cases.

MGT 230. Databases for Management (4)
Lecture, 3 hours; outside projects and readings, 3 hours. Prerequisite(s): MGT 205. Examines the features and capabilities of database management systems, including database classification, data structures, file organizations, evaluation, and management of database systems.

MGT 231. Corporate Finance and Investment (4)
Lecture, 3 hours; outside problem sets and extra reading, 3 hours. Prerequisite(s): MGT 202. An intensive analysis of the effects of various corporate financial policy decisions on the value of the firm, including a discussion of the effects of taxes, bankruptcy costs, and agency costs on these decisions. Examines the interrelation of financing policy with executive compensation, leasing, hedging, and payout policies. Provides an understanding of the theoretical issues involved in the choice of these policies.

MGT 233. Marketing Research (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 201, MGT 209; or consent of instructor. Examines how marketing-related data is gathered from individuals and organizations. Explores the importance of integrating problem formulation, research design, questionnaire construction, and sampling so as to yield the most valuable information. Also studies the proper use of statistical methods and the use of computers for data analysis.

MGT 234. Marketing Channels and Sales Force (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): graduate standing. Studies the formulation, implementation, and evaluation of business unit and corporate strategies and the organizational policies and managerial practices that support them. Applies theory to actual general management problems using cases, group exercises, and other simulations of strategic challenges.

MGT 236. Decision Making Under Certainty (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 207 or consent of instructor. Introduces basic tools for using data to make informed managerial decisions under certainty. Covers modeling and solution methods in network optimization, integer and nonlinear programming, and multiple criteria decision analysis. Examines applications and case studies in operations, logistics, finance, and marketing.

MGT 237. Multinational Financial Management (4)
Lecture, 3 hours; outside projects and readings, 3 hours. Prerequisite(s): MGT 202. The fundamentals of financial management on an international scale are examined. Topics covered include the international financial systems (past, current, and proposed), balance of payments, foreign exchange markets (spot, forward, futures, options), the euromarkets, measurement of foreign exchange risk, hedging foreign exchange risk, the multinational capital asset pricing model, and trade financing.

MGT 238. Management Synthesis (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 200, MGT 201, MGT 202, MGT 203, MGT 205, MGT 207, MGT 209, MGT 211, MGT 235. A team-taught, integrative case course that focuses on managing the complex tasks of the total organization. Examines the interdependence of the functional areas of management. Student teams analyze cases involving several functional areas and recommend actions for improvement.

MGT 239. Simulation for Business (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 201, MGT 205. Introduces computer simulation as a tool for analyzing complex decision problems. Analyzes and discusses the theory and practice of modeling through simulation. Topics include modeling uncertainty and collecting input data, basic simulation principles, Monte Carlo simulation techniques, model verification and validation, and analysis of simulation output. Examines applications in manufacturing, finance, health services, and public policy.

MGT 240A. Taxation (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 201 or equivalent. Introduces computer simulation as a tool for analyzing complex decision problems. Analyzes and discusses the theory and practice of modeling through simulation. Topics include modeling uncertainty and collecting input data, basic simulation principles, Monte Carlo simulation techniques, model verification and validation, and analysis of simulation output. Examines applications in manufacturing, finance, health services, and public policy.

MGT 240B. Advanced Taxation (4)
Lecture, 3 hours; outside case analysis, 3 hours. Prerequisite(s): MGT 240A or equivalent. Articulates advanced topics in federal taxation and tax planning. Explores many facets of the complex body of tax law including tax research, alternative minimum tax, investment losses, employee compensation, corporate distributions, and federal transfer taxes.

MGT 241. Accounting Systems and Control (4)
Lecture, 3 hours; outside projects and readings, 3 hours. Prerequisite(s): MGT 204 or equivalent. Study of the design and implementation of accounting systems including those for sales, receivables, purchases, payables, cash receipts and disbursements, payroll, production control, etc. Topics on auditing, internal accounting control, and related issues will be emphasized.

MGT 242. Accounting Policy Making (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 211 or consent of instructor. Examines the accounting policy-making process from a management perspective. Topics include the formulation of accounting policy, the institutional framework of accounting, the development of accounting standards, and accounting policy alternatives for issues such as revenue recognition, valuation of assets and liabilities, intangibles, and foreign exchange accounting. Cases are heavily used for illustrating accounting problems.

MGT 243. Product Development (4)
Lecture, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 209 or consent of instructor. Develops a framework for the development of product concepts through new product introduction. Emphasis is given to tactical and strategic decisions in product positioning and policy. Relies on extensive computer-based analysis.

MGT 244. Cases in Financial Management (4)
Lecture, 3 hours; written case analyses and reports, 3 hours. Prerequisite(s): MGT 202, MGT 231. Provides intensive exercise in valuation methods and the economic analysis of problems of corporate financial policy. Specific case topics include advanced capital budgeting, cost of capital estimation, corporate valuations, merger and takeover transactions, recapitalizations, capital structure policy, security issuance and repurchase, risk management, and dividend policy. Case reports, both written and oral, are required.

MGT 245. Financial Statement Analysis (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 211 or consent of instructor. Explains the role of financial statement analysis in an efficient capital market. Data from financial statements of major corporations is analyzed to develop skills necessary to interpret financial accounting information. Designed for future professionals who will be intensive users of financial accounting reports (e.g., security analysts, credit analysts).

MGT 246. Entrepreneurial Management (4)
Lecture, 3 hours; outside projects, 3 hours. Prerequisite(s): MGT 202, MGT 209; or consent of instructor. Study of the entrepreneurial process, its challenges, and the driving forces behind it—the managerial skills, mental attitudes, and basic knowledge necessary for creating and growing a new venture. Topics include opportunity assessment; building the management team; marshalling capital and other critical resources; and harvest strategies.

MGT 247. Advertising Management (4)
Lecture, 3 hours. Prerequisite(s): MGT 228 or consent of instructor. Examines the role and use of advertising within the marketing function. The models and research methods appropriate to the field will be explored with special attention given to objective setting, copy decisions, media decisions and budgeting. Social/economic issues are also examined.

MGT 248. Global Marketing (4)
Lecture, 3 hours; outside research, 2 hours; extra reading, 1 hour. Prerequisite(s): MGT 209 or consent of instructor. Examines the proper use of strategic management required to meet the demands of global markets in a dynamic setting.

MGT 249. Pricing Strategy (4)
Lecture, 3 hours; consultation or discussion, 1 hour. Prerequisite(s): MGT 209 or consent of instructor. The concepts of competitive pricing, price leadership, price discrimination, price warfare, and the strategic implication of skimming versus penetration strategies with respect to the experience curve will be developed.

MGT 250. Marketing Channels and Sales Force (4)
Lecture, 3 hours; outside project, 3 hours.
MGT 251. Market Assessment (4) Lecture, 3 hours; outside project, 3 hours. Prerequisite(s): MGT 209. Examines advanced topics in marketing, with emphasis on quantitative tools to aid marketing decision making. Topics include demand and market-share forecasting, conjoint analysis, market segmentation and cluster analysis, brand positioning and competitive market structures, and assessing market response to price, advertising, promotion, distribution, and sales force.

MGT 252A. Securities Markets (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 202. Discusses portfolio theory, including the Markowitz model. Addresses pricing in the capital markets with an emphasis on the Capital Asset Pricing Model and the Arbitrage Pricing Theory. Covers empirical issues in testing these models. Other topics addressed include risk-adjusted portfolio performance, term structure of interest rates, bond pricing, and bond portfolio management.

MGT 252B. Speculative Markets (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 201, MGT 202; MGT 252A or consent of instructor. Covers various topics in derivatives markets. Introduces pricing techniques for forwards, futures, options, swaps, and other derivatives. Addresses risk management and investment strategies with derivatives.

MGT 252. Internet Marketing (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 209 or consent of instructor. Examines the role of the Internet in an organization's overall marketing framework. Discusses marketing applications of personalization, traffic generation, online search, community, online experience, and other current Internet-enabled marketing techniques. Emphasizes Internet retailing.

MGT 254. Internet Retailing Project (4) Lecture, 3 hours; extra reading, 1.5 hours; outside projects, 1.5 hours. Prerequisite(s): MGT 209; consent of instructor. A practical examination of the Internet retailing customer chain from a managerial perspective. Involves special-topic lectures, directed readings, active discussion, and student presentations. Culminates in a class-written book comprised of chapters focusing on team-developed solutions to industry problems. Course is repeatable to a maximum of 8 units.

MGT 257. Marketing Strategy (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): MGT 209 or consent of instructor. A framework is developed for strategic marketing planning. Topics emphasized include market audits and futures research, product-market identification, product portfolio balancing, target market strategy, and integrated marketing program planning. Relies heavily on an extensive computer-based market simulation.

MGT 258. Logistics and Supply Chain Management (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): MGT 207 or consent of instructor. Examines the integration of value-creating elements in supply, procurement, manufacturing, distribution, and logistics processes, using information technologies as a main enabler. Topics include distribution networks, demand management, sourcing, transportation, pricing, supply chain coordination, information technology, and e-business.

MGT 259. Operations Planning and Control (4) Seminar, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 207. A study of the design of systems used for controlling assets, planning, and scheduling in manufacturing and service operations. Includes analysis of operating systems and discussion of planning and scheduling methods, heuristics, and interfaces with MRP and JIT inventory systems. Emphasizes the importance of integration, flexibility, and automation of the operation system.

MGT 260. Contemporary Issues in Management (4) Seminar, 30 hours per quarter; individual study, 30 hours per quarter. Prerequisite(s): graduate standing or consent of instructor. Addresses current issues and innovations in entrepreneurial management to develop a broad understanding of the interrelationship among all functions of management, including marketing, finance, accounting, information technology, production, and distribution. Discusses topics such as family business management, entrepreneurial marketing, managing growth, strategies for innovation, and market entry and exit decision making.

MGT 262. Advanced Topics in Management (4) Seminar, 30 hours per quarter; outside research, 30 hours per quarter. Prerequisite(s): graduate standing or consent of instructor. Intensive study of selected topics in management. Includes readings, discussion, and presentation of research. Requires completion of an analytical research paper based on recent advances in management strategy. Topics include leadership, change, value creation, and innovations in strategies related to the functional areas of management. Course is repeatable as topics change to a maximum of 8 units.

MGT 263. Advanced Topics in Entrepreneurship (4) Seminar, 30 hours per quarter; outside research, 30 hours per quarter. Prerequisite(s): graduate standing or consent of instructor. Intensive study of selected topics in management. Includes readings, discussion, and presentation of research. Requires completion of an analytical research paper based on recent advances in management strategy. Topics include leadership, change, value creation, and innovations in strategies related to the functional areas of management. Course is repeatable as topics change to a maximum of 8 units.

MGT 264. Information Systems Resources Management (4) Seminar, 3 hours; outside research, 2 hours; extra reading, 1 hour. Prerequisite(s): MGT 205 or consent of instructor. Provides an understanding of the issues, strategies, and tactics involved in managing information systems in large organizations. Topics include cost allocation, capacity planning, congestion problems, and distributed information systems. Relies heavily on case studies.

MGT 265. Decision Support and Expert Systems (4) Seminar, 3 hours; outside projects and extra reading, 3 hours. Prerequisite(s): MGT 205, MGT 207; or consent of instructor. Covers advanced topics in management support systems, including problem theory, decision support, and expert systems. Examines key issues involved in using information systems for decision making. Explores how information systems are used to solve management problems.

MGT 266. Project Management (4) Seminar, 3 hours; extra reading and project, 3 hours. Prerequisite(s): MGT 207 or equivalent. Addresses issues of project planning and control. Topics include differences between projects and production systems, project selection, project teams; breakdown structures of organization and work; scheduling and budgeting; resources management; project control and evaluation; and current project management software.

MGT 267. Applied Business Forecasting (4) Seminar, 3 hours; outside project, 3 hours. Prerequisite(s): MGT 201 or equivalent. Provides experience in developing forecasting models and applying them to problems in marketing, production, inventory management, business economics, and other fields. Discusses issues in data acquisition, data analysis, modeling of relations between variables, trend analysis, and seasonal forecasting. Uses case studies and applications from a variety of management areas.

MGT 268. Funding the Entrepreneurial Venture (4) Seminar, 3 hours; case studies, 2 hours; reading (extra), 1 hour. Prerequisite(s): MGT 246 or consent of instructor. Provides a working knowledge of the many financing vehicles and techniques employed in financing new and emerging ventures. Topics include identifying opportunities; deal structure; sources of debt and equity financing; valuation techniques; later-stage financing strategies; and the harvest.

MGT 269. The New Venture and the Business Plan (4) Seminar, 3 hours; outside research, 2 hours; case study preparation, 1 hour. Prerequisite(s): MGT 246 or consent of instructor. Focuses on the entrepreneurial process from conception to birth of a new venture. Explores the process of developing an opportunity assessment, structuring and rewarding the founding management team, and marshaling necessary critical resources through the development of a full-scale business plan.

MGT 270. Corporate Social Responsibility (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing. Addresses managerial and ethical issues in the social, political, and legal environments of business. Focuses on strategies that firms employ to enhance performance, given their multiple stakeholders (e.g., consumers, suppliers, government, local communities, activists, nongovernmental organizations). Uses domestic and international cases to illustrate the strategic use of corporate social responsibility.

MGT 271. Doctoral Seminar in Portfolio Theory and Investments (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): consent of department. Current research in portfolio theory (including the use of options and futures markets), capital budgeting, and applied econometric methods of testing the theories studied.

MGT 272. Global Strategy and Management (4) Seminar, 3 hours; outside projects, 3 hours. Prerequisite(s): MGT 200, MGT 202, MGT 209; or consent of instructor. Provides an overview of the strategic issues that multinational firms and managers encounter in a global marketplace. Topics include the globalization of the world economy, mode of entry into markets, analysis of political risk, global strategic alliances, and competing in emerging economies.

MGT 273. International Accounting (4) Seminar, 3 hours; extra reading and term paper, 3 hours. Prerequisite(s): MGT 211 or equivalent. Examines the context and issues of comparative international accounting and financial reporting practices. Provides
a working understanding of foreign accounting practices for international business, investments, and capital market interests.

MGT 274. Advanced Topics in Finance (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 202. Explores the latest developments in theoretical or empirical finance. Topics covered may include asset pricing, performance evaluation, derivative securities, market micro structure, corporate finance, and corporate control and governance.

MGT 275. International Banking (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): MGT 202, MGT 227. Discusses the motives behind the multi-nationalization of commercial banking activities, the international banking markets, international banking services—swaps, underwriting, foreign exchange, portfolio management, immunization techniques, etc., and the set of risks unique to international operations.

MGT 276. Corporate Financial Policy and Control (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 231 or equivalent. Examines the theory and empirical evidence for models of corporate financial policy. Includes analysis of new issues of securities, asset sales, recapitalizations, stock repurchases, and the market for corporate control (tender offers, mergers, proxy fights, and corporate voting rights). Emphasizes critical evaluation of the evidence for different models of corporate financial policy.

MGT 277. Advanced Financial Accounting (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): BUS 165C or equivalent (may be taken concurrently). Covers advanced financial accounting and reporting practices. Emphasizes topics such as consolidated financial statements, branch accounting, foreign transactions, segment reporting, partnership accounting, and accounting for nonprofit organizations.

MGT 278. Auditing and Assurance Services: Theory and Practice (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): BUS 165B or equivalent. An in-depth examination of audit processes and procedures. Develops audit judgment skills through the identification and resolution of issues associated with the auditing practice.

MGT 279. Investment Management (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MGT 252A or equivalent. Covers advanced topics in equity management. Discusses portfolio theory, market micro structure, security analysis, valuation, investment management strategies, and essential backroom operations such as accounting and reporting. Provides hands-on experience in investment management.

MGT 280. Business Issues in Electronic Commerce (4) Seminar, 3 hours; outside project, 3 hours. Prerequisite(s): MGT 205 or consent of instructor. Provides an understanding of the various business strategies, management issues, and pertinent technologies related to electronic commerce. Discovers several of the problems surrounding electronic commerce including security issues, privacy, encryption, safeguarding of intellectual property rights, acceptable use policies, and legal issues.

MGT 281. Systems Analysis and Design (4) Seminar, 3 hours; outside project, 3 hours. Prerequisite(s): MGT 205, MGT 230; or consent of instructor. Provides an understanding of the systems development life cycle with emphasis on the analysis and design phases. Familiarizes students with the tools and processes used by system developers to analyze, design, and construct computer-based systems. Provides experience in analyzing and designing a computer-based system.

MGT 282. Business Data Communications (4) Seminar, 3 hours; outside project, 3 hours. Prerequisite(s): MGT 205. Provides insight into the role of telecommunications in business, with an emphasis on information management. Specific topics include data communications (hardware components, interfaces, and link protocols), architecture and technology (protocols, local area networks, and emerging digital services), and network management (control and security).

MGT 284. Issues in Asian and American Business Interactions (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Studies American and Asian business interactions, including international trade, outsourcing, joint-venture agreements, foreign direct investments, and multinational organizations. Develops an understanding of the opportunities for business and trade between American and Asian organizations and the skills required to manage resources and successfully implement multinational business strategies.

MGT 285 (E-Z). Special Topics in Management (4) seminar, 3 hours per week or 30 hours per quarter; assignment of the remaining hours varies from segment to segment. Prerequisite(s): graduate standing or consent of instructor. Additional prerequisites are required for some segments of this course; see the School. Covers topics not contained in a regular course. Topics are announced at the time of offering.

MGT 290. Directed Studies (1-6) Prerequisite(s): consent of instructor. Directed studies and research in selected problems or theories of management for advanced graduate students to pursue special areas of interest. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MGT 297. Directed Research (1-6) Prerequisite(s): consent of instructor. Directed research in selected problems of management for graduate students with special research interests. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MGT 298-I. Fieldwork in Management (1-4) Field, 3-12 hours; consultation, 1 hour. Prerequisite(s): consent of instructor. Supervised field experience culminating in a final report or other academic component. May be repeated for up to 8 units of credit toward the degree.

MGT 299. Research for Thesis or Dissertation (1-12) Prerequisite(s): consent of instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

MGT 302. Apprentice Teaching (1-4) Seminar, 1-4 hours. Prerequisite(s): limited to departmental teaching assistants; graduate standing. Supervised individual instruction in teaching including monitoring of teaching assistant’s activities and regular consultation with assistant concerning teaching responsibilities. Graded Satisfactory (S) or No Credit (NC). May be repeated; not for degree credit.

MGT 403. Review of Quantitative Methods for Management (4) Lecture, 3 hours; laboratory, 1 hour; individual study, 2 hours. Prerequisite(s): graduate standing. Reviews quantitative concepts and techniques related to the various functional areas of management. Topics include properties of functions, systems of equations and matrices (linear algebra), differentiation and integration (calculus), and basic probability concepts. Not for degree credit. Satisfactory (S) or No Credit (NC) grading is not available.

MGT 404. Communications, Leadership, Teams, and Ethics (2) Lecture, 7 hours per quarter; workshop, 28 hours per quarter. Prerequisite(s): graduate standing. Uses case discussions, presentations, and theoretically informed readings to develop communication, presentation, and leadership skills; examine the principles of effective teamwork; and introduce representative ethical issues confronting managers. Not for degree credit.

Marxist Studies Minor

College of Humanities, Arts, and Social Sciences

Joseph Childers, Ph.D., Chair
HMSS 2109
(951) 827-1829
www.marxiststudies.ucr.edu

Committee in Charge
Edna Bonadich, Ph.D. (Sociology/Ethnic Studies, Emeritus)
Christopher Chase-Dunn, Ph.D. (Sociology)
Joseph Childers, Ph.D. (English)
Jennifer Doyle, Ph.D. (English)
Carole Fabrincant, Ph.D. (English)
Christine Gailey, Ph.D. (Women’s Studies)
Michael Kearney, Ph.D. (Anthropology)
Victor Lipton, Ph.D. (Economics)
Brian Lloyd, Ph.D. (History)
Bernd Magnus, Ph.D. (Philosophy, Emeritus)
B. Toby Miller, Ph.D. (Media and Cultural Studies)
Thomas Patterson, Ph.D. (Anthropology)
Ken Rogers, Ph.D. (Art History)
Georgia Warnke, Ph.D. (Philosophy)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Marxist Studies minor integrates courses from various disciplines in order to examine the theory and main applications of Marxism in the social sciences and humanities disciplines.

Requirements for the minor (24 units)

1. Theory, method, and history of thought requirement
   a) ECON 115
   b) PHIL 153
2. Four courses from the following dealing with applications of Marxist studies in various fields:
   a) ANTH 131
   b) CPLT 180X
   c) ECON 175
   d) POSC 160
   e) WRLT 170/EST 170

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.
Materials Science and Engineering

Subject abbreviation: MSE
The Marlan and Rosemary Bourns College of Engineering

Alexander A. Balandin, Ph.D., Chair
Advising Office, A159 Bourns Hall; (951) 827-3647 (ENGR)
www.engr.ucr.edu/mse

Program Committee
Alexander A. Balandin, Ph.D., (Electrical Engineering)
Sakhrat Khizroev, Ph.D., (Electrical Engineering)
Mart Molle, Ph.D. (Computer Science and Engineering)
Nosang Myung, Ph.D. (Chemical and Environmental Engineering)
Cengiz Ozkan, Ph.D. (Mechanical Engineering)
Valentine Vuliev, Ph.D. (Bioengineering)

Major

The B.S. degree in Materials Science and Engineering is offered jointly by the five participating departments of The Marlan and Rosemary Bourns College of Engineering. The program aims to produce students who are effective team players in materials engineering or related engineering, science or managerial positions, who use and improve on their skills in the job; who can enter into graduate or professional degree programs; and who are responsible engineers, professionals or scientists demonstrating ethical and professional responsibility and continuing to learn through a variety of educational experiences.

The program aims to produce graduates who:

- can apply knowledge of the scientific and engineering principles underlying major elements of materials engineering -- the structure, properties, processing, and performance of materials
- can design and conduct experiments relevant to materials science and engineering as well as analyze and interpret experimental data
- can identify, formulate, and solve materials selection and design problems
- can work in multidisciplinary teams
- can appreciate professional and ethical responsibility and the importance of continued learning after graduation
- can communicate effectively
- have a basic understanding of the impact of engineering on society, including the economy and environment
- have an elementary understanding of contemporary issues in materials science and engineering

University Requirements

See Undergraduate Studies section.

College Requirements

See The Marlan and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Electrical Engineering major uses the following major requirements to satisfy the college’s Natural Sciences and Mathematics breadth requirement.

1. One course in the biological sciences chosen from an approved list
2. CHEM 001A, CHEM 001A
3. MATH 008B or MATH 009A
4. PHYS 040A, PHYS 040B

Major Requirements

1. Lower-division requirements (68 units)
   a) CHEM 001A, CHEM 011A, CHEM 001B, CHEM 011B, CHEM 001C, CHEM 011C
   b) CS 030
   c) EE 001A, EE 011A
   d) MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   d) ME 010
   f) MSE 001
   g) PHYS 040A, PHYS 040B, PHYS 040C

2. Upper-division requirements (52 units)
   a) CHEM 112A
   b) CEE 135
   c) CHE 100
   d) EE 138
   e) ENGR 180
   f) ME 110, ME 114, ME 156
   g) MSE 160, MSE 161, MSE 175A, MSE 175B
   h) STAT 155
   i) Technical Electives (20 units): chosen from BIEN 140A/CEE 140A, BIEN 140B/CEE 140B, CEE 147, EE 133, EE 136, EE 137, EE 139, ME 113, ME 116, ME 138, ME 153, ME 180

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Lower-Division Courses

MSE 001. Fundamentals of Materials Science and Engineering (2) Lecture, 1 hour; discussion, 1 hour; laboratory, 1 hour. An introduction of properties and applications of different types of materials essential for various areas of engineering. Explores the relationship between structure and properties as well as processing of the materials. Illustrates a wide range of properties required for different types of applications. Graded Satisfactory (S) or No Credit (NC).

Upper-Division Courses

MSE 160. Nanostructure Characterization Laboratory (4) Lecture, 3 hours, laboratory, 3 hours. Prerequisite(s): ME 114. Covers structure of materials at the nanoscale, including semiconductors, ceramics, metals, and carbon nanotubes. Explores relationships among morphology, properties, and processing. Addresses primary methods of characterization, including scanning electron microscopy, scanning probe microscopy, X-ray diffraction, and transmission electron microscopy. Also covers elementary discussions of X-ray, vibrational, and electron waves in solids and introductory diffraction theory.

MSE 161. Analytical Materials Characterization (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): MSE 160. Analysis of the surfaces of materials via ion, electron, and photon spectroscopies. Includes Rutherford back scattering; secondary ion mass spectroscopy; electron energy loss spectroscopy; Auger electron spectroscopy; X-ray photoelectron spectroscopy; photoluminescence; extended X-ray absorption fine structure; Fourier transform infrared spectroscopy; and Raman spectroscopy. Also covers sputtering, high-vacuum generation, and focused ion beam milling.

MSE 175A. Senior Design (4) Lecture, 2 hours; discussion, 1 hour; practicum, 3 hours. Prerequisite(s): CHE 116 or ME 116A; EE 139, senior standing in Materials Science and Engineering. Covers preparation of formal engineering reports and statistical analysis on a series of problems illustrating methodology from various branches of applied materials science and engineering. Addresses the entire design process: design problem definition; generation of a design specification; documentation; design review process; prototype fabrication; testing and calibration; cost estimation; and federal guidelines. Requires a term project and oral presentation. Graded In-Progress (IP) until MSE 175A and MSE 175B are completed, at which time a final, letter grades is assigned.

MSE 175B. Senior Design (4) Lecture, 1 hour; discussion, 1 hour; practicum, 6 hours. Prerequisite(s): MSE 175A; senior standing in Materials Science and Engineering. Covers preparation of formal engineering reports and statistical analysis on a series of problems illustrating methodology from various branches of applied materials science and engineering. Addresses the entire design process: design problem definition; generation of a design specification; documentation; design review process; prototype fabrication; testing and calibration; cost estimation; and federal guidelines. Requires a term project and oral presentation. Satisfactory (S) or No Credit (NC) grading is not available.
Materials Science and Engineering / Mathematics / 311

Mathematics

Subject abbreviation: MATH
College of Natural and Agricultural Sciences

Vyjayanthi Chari, Ph.D., Chair
Department Office, 202 Surge Building
(951) 827-3113; www.math.ucr.edu

Professors
John C. Baez, Ph.D.
Mei-Chu Chang, Ph.D.
Vyjayanthi Chari, Ph.D.
Gerhard Gierz, Ph.D.
Michel L. Lapidus, Ph.D.
Yat Sun Poon, Ph.D.
Ziv Ran, Ph.D.
Malempati M. Rao, Ph.D.
David E. Rush, Ph.D.
Reinhard Schultz, Ph.D.
Bun Wong, Ph.D.
Feng Xu, Ph.D.D.
Qi S. Zhang, Ph.D.

Professors Emeriti
Theodore J. Barth, Ph.D.
Richard E. Block, Ph.D.
Bruce L. Chalmers, Ph.D.
John E. de Pillis, Ph.D.
Neil E. Gresky, Ph.D.
Charles J. A. Halberg, Jr., Ph.D.
Lawrence H. Harper, Ph.D.
Frederic T. Metcalf, Ph.D.
J. Keith Oddson, Ph.D.
Louis J. Ratliff, Jr., Ph.D.
Victor L. Shapiro, Ph.D.
James D. Stafney, Ph.D.
Albert R. Stralka, Ph.D.

Associate Professors
Le Baron O. Ferguson, Ph.D.
Zhang-Dan Guan, Ph.D.
Frederick H. Wilhelm, Jr., Ph.D.
Stefano Vidussi, Ph.D.

Assistant Professors
Marta Asaeda, Ph.D.
Julia Bergner, Ph.D.
Vasily Dolgushev, Ph.D.
Wee Liang Gan, Ph.D.
Jacob Greenstein, Ph.D.
James Kelliler, Ph.D.

Cooperating Faculty
Bai-Lian "Larry" Li, Ph.D. (Botany and Plant Sciences)

Major

The Department of Mathematics offers a B.A. and B.S. degree in programs that share a common, solid mathematical foundation but differ in their specializations in the pure and applied areas of mathematics. These programs can provide the basis for careers in mathematics itself or within the many scientific and business fields, which, in today's technological society, depend on a basic knowledge of mathematical methods.

The B.A. in Mathematics, following the liberal arts tradition, combines a broad coverage of the humanities and social sciences with a moderate amount of advanced mathematics in the major. It is selected most often either by students who intend to obtain a teaching credential with a specialty in mathematics or by students who wish to pursue graduate work in business or the social sciences.

The B.S. in Mathematics is more technical and contains a greater concentration of work in the major field. The Pure Mathematics program is directed toward students who may wish to pursue graduate work in mathematics. The Applied Mathematics programs, with options in Biology, Chemistry, Economics, Environmental Sciences, Physics, and Statistics, are designed to provide a rigorous training in mathematics together with a substantial background in the discipline of the option. The Computational Mathematics program is designed to prepare the student for professional work with computers and computer systems and for graduate work in computer science.

The B.S. in Mathematics for Secondary Teachers is intended for students planning to pursue a career in secondary education. Its courses cover the high school curriculum from an advanced perspective. Students are required to complete mathematics education and education courses in order to facilitate the student for professional work with computers and computer systems and for graduate work in computer science.

The B.S. in Mathematics

Academic Advising

Each Mathematics major is assigned a faculty advisor who assists the student in formulating educational goals and monitors the student's subsequent progress in an academic program. Each quarter a study list must be approved by this advisor. Advising for all math majors is conducted by the CNAS Academic Advising Center in 1223 Pierce Hall.

Teaching Credential

Teachers in the public schools in California must have a credential approved by the State Commission on Teacher Credentialing. The credential requires an undergraduate major, baccalaureate degree, and completion of a graduate credential program such as that offered by the Graduate School of Education at UCR (see Education in this catalog). The Bachelor of Science in Mathematics for Secondary Teachers assists students in their preparation to face the challenges of a credentialing program.

Major Requirements for the Bachelor of Arts and Bachelor of Science in Mathematics

To fulfill the Natural Sciences requirement, the Department of Mathematics requires the following:

1. One of the year sequences
   a) BIOL 002, BIOL 003, BIOL 005C
   b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
   c) PHYS 002A, PHYS 002B, PHYS 002C or PHYS 004A, PHYS 004B, PHYS 004C

2. Either one course in the physical sciences listed above if (a) above is completed or one course in the biological sciences if (b) or (c) above is completed

The major requirements for the B.A. and B.S. degrees in Mathematics are as follows:

For the Bachelor of Arts

1. Lower-division requirements: MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046

2. Four (4) units of either CS 010 or one upper-division course in Statistics

3. A minimum of 36 units of upper-division mathematics, excluding courses in the MATH 190–199 series

For the Bachelor of Science

Lower-division requirements for all programs are MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046, CS 010 (CS 012 is recommended).
1. **Pure Mathematics program (56 units)**
   a) Thirty-six (36) units of upper-division mathematics to include at least 24 units from MATH 131, MATH 132, MATH 145A, MATH 145B, MATH 151A, MATH 151B, MATH 151C, MATH 171, MATH 172
   b) At least three courses from (a) above must be from MATH 145A, MATH 145B, MATH 151A, MATH 151B, MATH 151C
   c) Courses in the MATH 190–199 series are excluded
   d) Twenty (20) additional units of upper-division mathematics, upper-division computer science, or other related courses approved by the undergraduate advisor (For students who wish to pursue graduate work, courses in complex variables, differential equations, and probability may be particularly useful.)

2. **Applied Mathematics programs**
   MATH 113 or MATH 131, MATH 132, MATH 146A, MATH 146B, MATH 146C and the courses in one of the following options:
   a) Biology option
      (1) BIOL 005A, BIOL 051A, BIOL 051B, BIOL 051C
      (2) MATH 149A
      (3) Three courses from MATH 120, MATH 121, MATH 135A, MATH 135B, MATH 149B, MATH 149C
      (4) BIOL 102, BIOL 105, BIOL 108, BIOL 117
      (5) Four (4) additional units of upper-division biology
   b) Chemistry option
      (1) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
      (2) Either PHYS 040A, PHYS 040B, PHYS 040C (preferred); or PHYS 002A, PHYS 002B, PHYS 002C
      (3) Four courses from MATH 120, MATH 135A, MATH 135B, MATH 149A, MATH 149C, MATH 165A, MATH 165B
      (4) CHEM 110A, CHEM 110B, CHEM 111, CHEM 113
      (5) Four (4) additional units of upper-division chemistry
   c) Economics option
      (1) MATH 120, MATH 121, MATH 149A, MATH 149B, MATH 149C
      (2) Five upper-division economics courses (at least 20 units) to consist of ECON 102A and four courses to be chosen from ECON 102B, ECON 103A, ECON 103B, ECON 107, ECON 108, ECON 110, ECON 111, ECON 134/BUS 106, ECON 135, ECON 143A/ENSC 143A, ECON 143B/ENSC 143B, ECON 143C/ENSC 143C, ECON 156, ECON 206
   d) Environmental Sciences option
      (1) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
      (2) ECON 005/ENSC 006
      (3) GEO 001 is recommended
      (4) MATH 149A
      (5) Three courses from MATH 120, MATH 121, MATH 135A, MATH 135B, MATH 149B, MATH 149C, CS 177, STAT 155
      (6) ENSC 100/ENSC 101, ENSC 102
      (7) Eight (8) additional units of upper-division environmental sciences
   e) Physics option
      (1) MATH 135A, MATH 165A, MATH 165B
      (2) Either MATH 120 or MATH 171
      (3) PHYS 130A, PHYS 130B
      (4) Either PHYS 135A, PHYS 135B, PHYS 136 or PHYS 156A, PHYS 156B
   f) Statistics option
      (1) MATH 120, MATH 149A, MATH 149B, MATH 149C
      (2) Either STAT 130 or STAT 146
      (3) STAT 161, STAT 170A, STAT 170B, STAT 171

3. **Computational Mathematics program**
   a) MATH 011/CS 011, MATH 113 or MATH 131, MATH 132, MATH 135A, MATH 135B, MATH 138A, MATH 145A, MATH 145B, MATH 149A, MATH 149B, MATH 151A, MATH 151B, MATH 151C, MATH 171, MATH 172
   b) Four courses from: MATH 132, MATH 136, MATH 137, MATH 138A, MATH 145A, MATH 145B, MATH 149A, MATH 149B, MATH 149C, MATH 151A, MATH 151B, MATH 151C, MATH 171, MATH 172
   c) At least three courses from (a) above
   d) Twenty-four (24) units of technical electives to be chosen from the list of approved technical elective courses.

4. **Natural Sciences (16-20 units)**
   a. BIOL 002 or BIOL 003 or BIOL 005A and BIOL 051A
   b. CHEM 001A and CHEM 011A or CHEM 001HA and CHEM 11LA
   c. PHYS 002A or PHYS 040A
   d. CHEM 001B and CHEM 011B or CHEM 001HB and CHEM 11LB or PHYS 002B or PHYS 040B or an additional laboratory Biological science course

5. **Social Sciences (16 units)**
   a. One course in ECON or PSYC
   b. One course in ANTH
   c. One course in PSYC
   d. One course in SOC

6. Mathematics Education and Education requirements (18 or 19 units):
   EDUC 104/MATH 104, EDUC 003 or EDUC 004 or EDUC 100B or equivalent, EDUC 109, EDUC 110, EDUC 139

7. **Recommended Courses**
   LING 020 or LING 021, EDUC 116, EDUC 174, EDUC 177A

**Mathematics Honors Program**
Candidates for the Honors Program in Mathematics must complete:
1. Earn an overall GPA of at least 3.50 in Mathematics.
2. Earn a grade of “B” or better in each of MATH 151A, MATH 151B and MATH 151C.
3. Earn a grade of “B” or better in each of MATH 145B and MATH 171 OR in each of MATH 146A, MATH 146B and MATH 146C OR in each of MATH 149A, MATH 149B and MATH 149C.
4. Satisfactorily complete one of the following:
   i) A research project earning a grade of “A” in MATH 197.
   ii) Two courses chosen from one of the following sequences: MATH 201A, 201B, 201C, MATH 205A, MATH 205B, MATH 205C; MATH 209A, MATH 209B, MATH 209C; MATH 210A, MATH 210B with a grade of “B” or better in each course.

It is the responsibility of the honors candidates to notify the department of their eligibility.

**Minor**
The following are the requirements for a minor in Mathematics.

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**Major Requirements for the Bachelor of Science in Mathematics for Secondary School Teachers**

1. **Lower-division Mathematics requirements (24 units)**
   MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046

2. **Upper-division Mathematics requirements (36 units)**
   a. MATH 131, MATH 133, MATH 140, MATH 144, MATH 153
1. Lower-division courses (20 units):
   - MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B

2. Upper-division requirements: 24 units of upper-division mathematics courses. Of the specified upper-division units, a minimum of 16 must be unique to the minor and may not be used to satisfy major requirements and no more than 4 units in courses numbered 190–199.

Students with a minor in Mathematics should consult with a faculty advisor in Mathematics to construct a specific program consistent with their goals.

See Minors under the College of Natural and Agricultural Sciences in the Colleges and Programs section of this catalog for additional information on minors.

**Education Abroad Program**

The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard

**Graduate Programs**

The Department of Mathematics offers the M.A., M.S., and Ph.D. degrees in Mathematics.

**Admission**

Domestic applicants must supply GRE General Test scores (verbal, quantitative, and analytical).

**M.A. or M.S. in Mathematics**

General university requirements are listed in the Graduate Studies section of this catalog. Specific requirements are as follows:

1. Completion of two of the following sequences:
   - MATH 201A, MATH 201B, MATH 201C
   - MATH 205A, MATH 205B, MATH 205C
   - MATH 209A, MATH 209B, MATH 209C
   - MATH 210A, MATH 210B, MATH 210C
   - with a grade of "C" or better in each course and a GPA of 3.00 in each chosen sequence

2. As a substitute for one or more course sequences in (1), passing a Ph.D. qualifying examination fulfills the course requirement of the corresponding sequence

3. Taking 36 units of courses approved by the Mathematics Graduate Committee, of which at least 18 must be in the 200 series courses in Mathematics (MATH 260 cannot be used without the Mathematics Graduate Committee’s approval.)

4. Completion of the courses MATH 131, MATH 132, MATH 151A, and MATH 151B, or their equivalents

**M.S. in Mathematics (Applied)**

General university requirements are listed in the Graduate Studies section of this catalog. Specific requirements are as follows:

1. Passing written qualifying examinations at the master’s level (or higher) in two of the following fields: Advanced Ordinary Differential Equations, Partial Differential Equations, Advanced Statistical Inference, Calculus of Variations, Combinatorial Theory, Real Analysis, and Advanced Numerical Analysis

2. Thirty-six (36) units of approved courses, of which 18 must be in the 200 series (MATH 260 cannot be used without the Mathematics Graduate Committee’s approval.)

3. Completion of the courses MATH 131, MATH 132, MATH 151A, MATH 151B, MATH 146A, MATH 149A, or their equivalents. Also, MATH 165A is recommended, but not required

**Doctoral Degree**

The Department of Mathematics offers the Ph.D. degree in Mathematics. Specific requirements are as follows:

1. Passing the introductory courses in algebra (MATH 201A, MATH 201B, MATH 201C), complex analysis (MATH 210A, MATH 210B), real analysis (MATH 209A, MATH 209B, MATH 209C), and topology/differentiable manifolds (MATH 205A, MATH 205B, MATH 205C)

2. Passing at least three of the four qualifying examinations in algebra, complex analysis, real analysis and topology/differentiable manifolds with a grade of "A." The fourth of the above qualifying examinations must be passed with a grade of "B" or better; a student is allowed to take the qualifying examination at most twice in each area

3. Completing four quarter-courses in mathematics numbered between 211 and 259

**Normative Time to Degree**

15 quarters

**Lower-Division Courses**

Mathematics advisory examinations are scheduled before each quarter. The UCR Mathematics Advisory Exam is a prerequisite for students who wish to enroll in math courses but have not received course equivalences in MATH 004, MATH 008A, MATH 008B, MATH 009A, MATH 015, MATH 022, or MATH 023.

MATH 004. Introduction to College Mathematics for Business and the Social Sciences (3) Lecture, 5 hours. Prerequisite(s): a sufficiently high score on the Mathematics Advisory Examination, as determined by the Mathematics Department.

MATH 005. Precalculus (5) Lecture, 5 hours. Prerequisite(s): a sufficiently high score on the Mathematics Advisory Examination, as determined by the Mathematics Department. Covers functions and their graphs, including linear and polynomial functions, zeros, and inverse functions as well as exponential, logarithmic, and trigonometric functions and their inverses. Also includes counting, including elementary probability. Applications to business and social sciences. Credit is awarded for only one of MATH 004, MATH 005, or MATH 008A.

MATH 005P. MATH 005 Support Practicum (1) Practicum, 2-4 hours; individual study, 2-4 hours. Prerequisite(s): Students must be enrolled in UCR’s Summer Bridge MATH 005 program. Covers understanding course content and developing thinking and problem-solving skills. Introduces university life through exposure to test-taking techniques, effective note-taking strategies, time management, and university procedures and practices. Offered in summer only. Graded Satisfactory (S) or No Credit (NC).

MATH 008A. Introduction to College Mathematics for the Sciences (5) Lecture, 5 hours. Prerequisite(s): a sufficiently high score on the Mathematics Advisory Examination, as determined by the Mathematics Department. Covers functions and their graphs, including linear and polynomial functions, zeros, and inverse functions as well as exponential, logarithmic and trigonometric functions and their inverses. Includes counting, including elementary probability. Applications to the natural sciences and engineering. Credit is awarded for only one of MATH 004, MATH 005, or MATH 008A.

MATH 008B. Introduction to College Mathematics for the Sciences (5) Lecture, 5 hours. Prerequisite(s): MATH 008A with a grade of "C-" or better or a sufficiently high score on the Mathematics Advisory Examination, as determined by the Mathematics Department. Not intended for students who have been awarded a grade of "C-" or better in MATH 005. Involves further study of trigonometry and analytic geometry. Introduction to the differential calculus of functions of a single variable. Credit is awarded for only one of MATH 008B, MATH 009A, or MATH 09HA.

MATH 009A. First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 005 with a grade of "C-" or better or equivalent. Introduction to the differential calculus of functions of one variable. Credit is awarded for only one of MATH 009B, MATH 009A, or MATH 09HA.

MATH 009B. First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 008B with a grade of "C-" or better or MATH 009A with a grade of "C-" or better or MATH 09HA with a grade of "C-" or better. Introduction to the integral calculus of functions of one variable. Credit is awarded for only one of MATH 009B or MATH 09HB.

MATH 009C. First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of "C-" or better or MATH 09HB with a grade of "C-" or better. Further topics from integral calculus, improper integrals, infinite series, Taylor’s series, and
Taylor’s theorem. Credit is awarded for only one of MATH 009C or MATH 09HC.

MATH 09HA. First-Year Honors Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): a sufficiently high score on the placement examination, as determined by the Mathematics Department. Honors course corresponding in content and emphasis to MATH 099A for students with strong mathematical backgrounds. Introduces the differential calculus of functions of one variable. Emphasis is on theory and rigor. Credit is awarded for only one of MATH 008B, MATH 099A, or MATH 09HA.

MATH 09HB. First-Year Honors Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): a score of 3 or higher on the AB Advanced Placement Test in Mathematics or MATH 09HA with a grade of “B” or better. Prerequisite course corresponding to MATH 099B for students with strong mathematical backgrounds. Introduces the integral calculus of functions of one variable. Emphasis is on theory and rigor. Credit is awarded for only one of MATH 099B or MATH 09HB.

MATH 09HC. First-Year Honors Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 09HB with a grade of “B” or better. Honors course corresponding to MATH 099C for students with strong mathematical backgrounds. Covers further topics from integral calculus, improper integrals, infinite series, Taylor’s series, and Taylor’s theorem. Emphasis is on theory and rigor. Credit is awarded for only one of MATH 009C or MATH 09HC.

MATH 010A. Calculus of Several Variables (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 099B with a grade of “C-” or better or MATH 099B with a “C-” or better or equivalent. Topics include Euclidean geometry, matrices and linear functions, determinants, partial derivatives, directional derivatives, Jacobians, gradients, chain rule, and Taylor’s theorem for several variables.

MATH 010B. Calculus of Several Variables (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A with a grade of “C-” or better or equivalent. Covers vectors; differential calculus, including implicit differentiation and extreme values; multiple integration; line integrals; vector field theory; and theorems of Gauss, Green, and Stokes.

MATH 011. Introduction to Discrete Structures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009A or MATH 099A; CS 010 or MATH 099B or MATH 099B. Introduction to basic concepts of discrete mathematics with emphasis on applications to computer science. Topics include propositional and predicate calculus, elementary set theory, functions, relations, proof techniques, elements of number theory, enumeration, and discrete probability. Cross-listed with CS 011.

MATH 015. Contemporary Mathematics for the Humanities, Arts, and Social Sciences (4) Lecture, 3 hours; discussion, 1 hour. Designed to fulfill the breadth requirement for students in the humanities, arts, and social sciences. Illustrates the interaction of mathematics with other subject areas through the study of selected topics of contemporary mathematics. Topics are chosen from discrete mathematics, counting and probability, and the interaction between algebra and geometry.

MATH 022. Calculus for Business (5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): a sufficiently high score on the placement examination, as determined by the Mathematics Department, or MATH 004 with a grade of “C-” or better or MATH 005 with a grade of “C-” or better or MATH 008A with a grade of “C-” or better or MATH 023 with a grade of “C-” or better. Explores relations and functions (linear, polynomial, logarithmic, and exponential), differential calculus of functions of one and two variables, and integration (indefinite and definite) with applications to business and economic problems. Credit is not awarded for MATH 022 if a grade of “C-” or better has already been awarded for MATH 008B, MATH 099A, or MATH 099A.

MATH 023. Applied Matrix Algebra (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): a sufficiently high score on the placement examination, as determined by the Mathematics Department, or MATH 004 with a grade of “C-” or better or MATH 005 with a grade of “C-” or better or MATH 099A with a grade of “C-” or better or MATH 099A with a grade of “C-” or better or MATH 099A with a grade of “C-” or better or MATH 022 with a grade of “C-” or better. A study of matrix operations, linear dependence and independency, ranks and inverses, systems of linear equations, determinants, eigenvalues, and eigenvectors with business and economic applications designed for students who are not Mathematics majors.

MATH 046. Introduction to Ordinary Differential Equations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 099B with a grade of “C-” or better or equivalent. Introduction to first-order equations, linear second-order equations, and Laplace transforms, with applications to the physical and biological sciences.

Upper-Division Courses

Courses numbered MATH 100–109 do not meet upper-division mathematics requirements.

MATH 104. Mathematics Education (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): sophomore, junior, or senior standing. Examines contemporary instructional strategies relating to mathematics education. Includes thinking skills and problem solving strategies applicable to number theory, logic patterns and functions, statistics, probability, and geometry and algebra. Cross-listed with EDUC 104.

MATH 111. Discrete Structures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010; CS 011/MATH 011; MATH 009C or MATH 099C. Study of discrete mathematical structures with emphasis on applications to computer science. Topics include asymptotic notation, generating functions, recurrence equations, elements of graph theory, trees, algebraic structures, and number theory. Cross-listed with CS 011.

MATH 112. Finite Mathematics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009A or MATH 099A; CS 010 or MATH 099B or MATH 099B. Introduction to the basic concepts of finite and structural mathematics with emphasis on applications to computer science. Topics include axiomatic systems, combinatorics, propositional and predicate calculus, graph theory, trees, state diagrams, networks, induction, elementary enumeration, and recurrence relations.

MATH 113. Applied Linear Algebra (5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): concurrent enrollment in or completion of MATH 010A. Study of matrices and systems of linear equations, determinants, Gaussian elimination and pivoting, vector spaces, linear independence and linear transformation, orthogonality, eigenvalues, and eigenvectors. Also examines selected topics and applications. Integrates numerical linear algebra and extensive computer use with these topics. Credit is awarded for only one of MATH 113 or MATH 131.

MATH 120. Optimization (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A; MATH 113 or MATH 131 (may be taken concurrently). Introduction to classical optimization, including unconstrained and constrained problems in several variables, Jacobian and Lagrangian methods, and the Kuhn-Tucker conditions. Covers the basic concepts of linear programming, including the simplex method and duality, with applications to other subjects.

MATH 121. Game Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A. Games in extensive, normal, and characteristic form as models of conflict and/or cooperation. Two-person zero-sum games, minimax theorem, relation to linear programming, non-zero-sum games, Nash equilibrium theorem, bargaining, the core, Shapley value. Economic market games.

MATH 126. Combinatorics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 111/MATH 111. A study of elements of combinatorics theory. Topics include chromatic polynomials, enumerating partitions of sets and integers, asymptotic enumeration, Polya theory, and Ramsey theory.

MATH 131. Linear Algebra I (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): concurrent enrollment in or completion of MATH 010A. An introduction to vector spaces, matrices, and linear transformations. Credit is awarded for only one of MATH 113 or MATH 131.

MATH 132. Linear Algebra II (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 113 or MATH 131 or consent of instructor. Elementary theory of affine and projective planes, the line at infinity, finite geometries, Euclidean and non-Euclidean geometries, groups of transformations, and other algebraic structures related to geometry.

MATH 135A. Numerical Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010 or equivalent; MATH 113 or MATH 131 (may be taken concurrently). A study of numerical methods for determining solutions of nonlinear equations and systems of linear equations. Topics also include interpolation, techniques of error analysis, and computer applications.

MATH 135B. Numerical Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010; MATH 113 or MATH 131. MATH 135A. Continuation of MATH 135A. Explores numerical methods, numerical integration, and the numerical solution of ordinary differential equations.

MATH 136. Introduction to the Theory of Numbers (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 113 or MATH 131. Prime and composite integers, number-theoretic functions, Diophantine equations, congruences, quadratic reciprocity, additive arithmetic.

MATH 137. Plane Curves (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 011/MATH 011; MATH 113 or MATH 131; MATH 171 and MATH 172. Are recommended. A study of the complex projective plane, homogeneous polynomials, plane curves, intersection multiplicities, and Bezout’s theorem.

MATH 138A. Introduction to Differential Geometry (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s):
MATH 113 or MATH 131. Elementary theory of curves and surfaces. First and second fundamental forms.

MATH 138B. Introduction to Differential Geometry (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010B; MATH 138A. Gaussian curvature; geodesics; Gauss-Bonnet Theorem.

MATH 140. Polynomials and Number Systems (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): CS 011/MATH 011; MATH 113 or MATH 131. Topics include number systems, elementary number theory, rings, fields, polynomials, congruences, and applications of finite fields.

MATH 141. Fractal Geometry with Applications (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010B, MATH 046, completion of or concurrent enrollment in MATH 144; or consent of instructor. Covers classical fractals, fractal dimensions, self-similar fractals, fractal curves and sets, random fractals, stochastic dynamics and fractals, iteration theory: Julia set and the Mandelbrot set. Also covers the beauty of fractals, mathematical description of irregular shapes (clouds, trees, coastlines, mountains, galaxies, lungs, snowflakes), and applications to physics, engineering, biology, and computer graphics.

MATH 144. Introduction to Set Theory (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010A. Algebra of subsets of a set. Algebra of relations and functions. Cardinal and ordinal numbers and their arithmetic operations. The well-ordering theorem, transfinite induction, and Zorn's lemma.

MATH 145A. Introduction to Topology (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 144. Elementary topology in metric spaces.

MATH 145B. Introduction to Topology (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 145A. Geometric topology, algebra associated with finite complexes and applications.

MATH 146A. Ordinary and Partial Differential Equations (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 009C or MATH 02HC; MATH 010A; MATH 113 (may be taken concurrently) or MATH 113 (may be taken concurrently) or equivalent; MATH 046 is recommended. Focuses on the theory of linear differential equations and transform methods.

MATH 146B. Ordinary and Partial Differential Equations (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 141, MATH 146A. Further study of the theory of linear differential equations and problems in valuing ordinary differential equations.

MATH 146C. Ordinary and Partial Differential Equations (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 141B, MATH 146A. Explores boundary value problems for partial differential equations, orthogonal expansions, and separation of variables.

MATH 147. Introduction to Fourier Analysis and Its Applications (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 009C or MATH 02HC; MATH 010B; MATH 046 or MATH 146A; MATH 113 or MATH 131 (MATH 113 or MATH 131 may be taken concurrently). Covers Fourier series expansions of periodic functions, properties, and convergence; the Dirichlet kernel; Fourier integrals and the Fourier transform in one and several variables; the Plancherel theorem; and Fourier inversion. Includes applications of Fourier analysis (e.g., to spectral theory, numerical analysis, ordinary and partial differential equations, and wavelet transform).

MATH 149A. Probability and Mathematical Statistics (4) Lecture, 3 hours; laboratory, 1 hour. Prerequisite(s): MATH 010A, MATH 010B, completion of or concurrent enrollment in MATH 046. An introduction to the mathematical theory of probability and discrete and continuous distributions. Credit is awarded for only one of the MATH 149A, MATH 149B, and MATH 149C or STAT 150A, STAT 160B, and STAT 160C sequences.

MATH 149B. Probability and Mathematical Statistics (4) Lecture, 3 hours; laboratory, 1 hour. Prerequisite(s): MATH 010A, MATH 010B, MATH 046, MATH 149A. Continuation of MATH 149A. Topics include sampling and limit distributions. Credit is awarded for only one of the MATH 149A, MATH 149B, and MATH 149C or STAT 150A, STAT 160B, and STAT 160C sequences.

MATH 149C. Probability and Mathematical Statistics (4) Lecture, 3 hours; laboratory, 1 hour. Prerequisite(s): MATH 010A, MATH 010B, MATH 046, MATH 149A, MATH 149B. Continuation of MATH 149B. Topics include tests of hypotheses, estimation, maximum likelihood techniques, regression, and correlation. Credit is awarded for only one of the MATH 149A, MATH 149B, and MATH 149C or STAT 150A, STAT 160B, and STAT 160C sequences.

MATH 151A. Advanced Calculus (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010A, MATH 010B, MATH 046, MATH 145A, MATH 151A; or consent of instructor. Continuation of MATH 151A. Topics include sequences and series of functions and functions of several variables.

MATH 151B. Advanced Calculus (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010A, MATH 010B, MATH 046, MATH 145A, MATH 151A; or consent of instructor. Continuation of MATH 151B. Further study of several variables, integration of differential forms, and Lebesgue integration.

MATH 153. History of Mathematics (4) Lecture, 3 hours; discussion; 1 hour, or term paper, 3 hours. Prerequisite(s): MATH 009C or consent of instructor. A survey from a historical point of view of various developments in mathematics with particular emphasis on the nineteenth and early twentieth centuries.

MATH 165A. Introduction to Complex Variables (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010A. An introduction to the theory of analytic functions of a complex variable. Includes mappings by elementary functions, complex integrals, as well as Cauchy's theorem, power series, and Laurent series.

MATH 165B. Introduction to Complex Variables (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 010B, MATH 165A. Topics include the theory of residues, conformal mapping, and applications to physical problems.

MATH 171. Introduction to Modern Algebra (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 131, MATH 144A. An introduction to the fundamental concepts of modern algebra: groups, subgroups, quotient groups, homomorphisms, symmetry groups, fundamental properties of rings, integral domains, ideals, and quotient rings.

MATH 172. Modern Algebra (4) Lecture, 3 hours; discussion; 1 hour. Prerequisite(s): MATH 171. Fundamental concepts of modern algebra: groups, fields, polynomials, geometric constructions, algebraic coding, boolean algebras.

MATH 190. Special Studies (1-5) To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable.

MATH 194. Independent Reading (1-2) Independent reading in materials not covered in course work. Normally taken in the senior year. Total credit for MATH 194 may not exceed 4 units.

MATH 197. Research for Undergraduates (1-4) Outside research, 3-12 hours. Prerequisite(s): upper-division standing; consent of instructor. Involves a research project on a problem in, or related to, mathematics conducted under the supervision of a Mathematics faculty member. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 8 units.

MATH 198-I. Internship in Mathematics (1-4) variable hours. Prerequisite(s): upper-division standing, with at least 12 units of upper-division credits toward the major. An academic internship to provide the student with career experience as a mathematician in a government, industrial, or research unit under the joint supervision of an off-campus sponsor and a faculty member in Mathematics. Each individual program must have the prior approval of both supervisors and the department chair. A final written report is required. Graded Satisfactory (S) or No Credit (NC). May be repeated for a total of 8 units.

Graduate Courses

MATH 201A. Algebra (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 171, MATH 172, or equivalents. Topics include basic theory of groups and rings, the Sylow theorems, solvable groups, and the Jordan-Holder theorem.

MATH 201B. Algebra (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 201A. Topics include rings, the functors hom and tensor, modules over a principle ideal domain, and applications to matrices.

MATH 201C. Algebra (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 201B. Topics include algebraic and transcendental extensions of fields and the Galois theory, and the tensor and exterior algebras.

MATH 205A. Topology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 151B or equivalent. An introduction to pointset topology.

MATH 205B. Topology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 205A or equivalent. Covers homotopy theory and homology theory.

MATH 205C. Topology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 205A or equivalent. Covers differential topology.

MATH 209A. Real Analysis (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 145B or equivalent. An introduction to pointset topology.

MATH 209B. Real Analysis (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 205A, MATH 205B, or equivalents. Covers differential topology.
MATH 209C. Real Analysis (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 209B. Topics include complex measures, general measure spaces, integration on product spaces, and Lebesgue spaces.

MATH 210A. Complex Analysis (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 151C, MATH 165A. Studies include complex analytic functions, Cauchy's theorem, Cauchy's integral formula and the Laurent series, and the residue theorem.

MATH 210B. Complex Analysis (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 210A. Studies include entire and meromorphic functions, normal families and the Riemann mapping theorem, and harmonic functions and the Dirichlet problem.

MATH 211A. Ordinary Differential Equations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 151C. Topics include the existence and uniqueness of solutions, linear differential equations, singularities of the first and second kind, self-adjoint eigenvalue problems on a finite interval, and singular self-adjoint boundary-value problems for second-order equations.

MATH 211B. Ordinary Differential Equations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 211A. Topics include the method of averaging and numerical integration, autonomous systems, the method of Liapunov, and stability for linear systems.

MATH 212. Partial Differential Equations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 151C and MATH 165A. Classical theory of initial and boundary value problems for hyperbolic, parabolic and elliptic partial differential equations.

MATH 216A. Combinatorial Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 111/MATH 111. Addresses the solving of combinatorial problems by studying their morphisms (transformations preserving the problem). Covers optimum path problems and their variants. Develops general techniques and work through the solutions of challenging special cases. Particular focus given to utilizing symmetry to systematically reduce a problem.

MATH 216B. Combinatorial Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 216A. Addresses the solving of combinatorial problems by studying their morphisms (transformations preserving the problem). Covers optimum flow problems. Develops general techniques and work through the solutions of challenging special cases. Particular focus given to utilizing symmetry to systematically reduce a problem.

MATH 217. Theory of Probability (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 209C. Topics include independence, strong limit theorems including the strong law and the Kolmogorov three-series theorem, weak law and the central limit theorem, the Helly-Bray theorem, and Bochner's theorem on positive definite functions.

MATH 221. Several Complex Variables (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): MATH 151A, MATH 151B, MATH 165A, MATH 165B. Harthog’s theorems, domains of holomorphy, pseudoconvexity, Levi’s problem, coherent analytic sheaves, Cartan’s theorems A and B.

MATH 222. Algebraic Number Theory (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 201A. Topics include algebraic number theory, principal ideal domains, integral independence, algebraic number fields, classical ideal theory in Dedekind domains, classes of ideals, valuations, and p-adic numbers.

MATH 224. Introduction to Homological Algebra (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 201C or consent of instructor. Theory of derived functors and its application to rings and associative algebras.

MATH 225. Commutative Algebra (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 201C. Covers basic theory of commutative rings, primary decomposition, integral dependence and valuation rings, and the intersection theorem of Krull.

MATH 227A. Lie Algebras (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 201A, MATH 201B. Studies include basic definitions, solvable and nilpotent Lie algebras, and structure and classification of semisimple Lie algebras.

MATH 227B. Lie Algebras (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 227A. Studies include enveloping algebras and representation theory, representations of semisimple Lie algebras, general theory to Kac-Moody Lie algebras, and modular Lie algebras.

MATH 228. Functional Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 209A, MATH 209B, MATH 209C. Topological linear spaces; function spaces; linear operators; spectral theory; operational calculus; and further selected topics.

MATH 232A. Geometry I (Introduction to Manifolds) (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 131 and MATH 151C. Basic notions and examples; vector fields and flows; tensors and vector bundles; differential forms, integration and deRham’s theorem.

MATH 232B. Geometry II (Introduction to Differential) (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 232A. Local and global theory of surfaces. Surfaces in R3: the Gauss map, fundamental forms, curvature. Riemannian geometry: the Levi-Civita connection, curvature, geodesics, exponential map, completeness, Gauss-Bonnet theorem for surfaces.

MATH 241. Mathematical Physics: Classical Mechanics (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 205A, MATH 205B, MATH 205C or PHYS 205; or consent of instructor. Hamilton’s principle of least action. Variational methods and Lagrange’s equations. Hamilton’s equations. Introduction to symplectic geometry and its applications to classical mechanics. Poisson brackets. Conserved quantities and Noether’s theorem. Examples of Hamiltonian and dissipative dynamical systems. Introduction to classical chaos.

MATH 242. Mathematical Physics: Quantum Mechanics (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 205A, MATH 205B, MATH 205C or PHYS 205; or consent of instructor. Schrödinger’s equation. Wave mechanics, quantum mechanics, wave operators. Stone’s theorem and other topics. Spectral theory for (unbounded) self-adjoint observables, noncommutativity and the uncertainty principle. Quantum mechanics, self-adjoint operators and physical observables, noncommutativity and the uncertainty principle. Spectral theory for (unbounded) self-adjoint operators. Stone’s theorem and other topics.

MATH 243A. Algebraic Geometry (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 209A. Topics include further study of varieties, sheaves, and cohomology and detailed study of curves and special topics.

MATH 246A. Algebraic Topology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 205A; MATH 205B or equivalent. Topics include simplicial and cell complexes, polyhedra, manifolds, homology and cohomology theory, and homotopy theory.

MATH 246B. Algebraic Topology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 246A. Covers topics such as topological indices, Lefschetz fixed point theory, Poincare duality, vector bundles and characteristic classes, and transformation groups.

MATH 260. Seminar (1-4) variable hours. Prerequisite(s): consent of department. Seminar on special topics of mathematics in preparation for individual research. Course is repeatable.

MATH 289. Colloquium in Mathematics (1) Prerequisite(s): graduate standing. Specialized discussions by staff, students and visiting scientists on current research topics in Mathematics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MATH 290. Directed Studies (1-6) Prerequisite(s): consent of instructor. Research and special studies in mathematics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MATH 299. Research for Thesis or Dissertation (1-12) Prerequisite(s): consent of department. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

MATH 302. Apprentice Teaching (2-4) Lecture, 0-1 hour; seminar, 2-4 hours; consultation, 1-2 hours. Prerequisite(s): appointment as a teaching assistant or associate in Mathematics. Supervised training for teaching in lower- and upper-division Mathematics courses. Topics include effective teaching methods, such as those involved in leading mathematics discussion sections, preparing and grading examinations, and relating to students. Required each quarter of all teaching assistants and associates in Mathematics. Units to be decided in consultation with graduate advisor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Mechanical Engineering

Subject abbreviation: ME

The Marian and Rosemary Bourns College of Engineering

Shankar Mahalingam, Ph.D., Chair
Department Office, A342 Bourns Hall
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Professors
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Assistant Professors
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Cooperating Faculty
Bahman Anvari, Ph.D. (Bioengineering)
Ludwig Bartels, Ph.D. (Chemistry)
Sakhrat Khizroev, Ph.D. (Electrical Engineering)
Joseph M. Norbeck, Ph.D. (Chemical and Environmental Engineering)

Major
The design and production of machines requires a broad-based education. The Mechanical Engineering degree program has been structured to provide the necessary background in chemistry, physics, and advanced math to achieve success in the advanced engineering subjects. In addition, students are taught the basics of Mechanical Engineering while learning about the latest developments and experimental techniques.

The Mechanical Engineering program objectives are to produce mechanical engineers who:

- have the knowledge and skills to adapt to the changing engineering environment in industry
- are able to pursue and succeed in graduate studies
- have the educational breadth and the intellectual discipline required to enter professional careers outside engineering, such as business and law
- have an ability to work in multi-disciplinary teams
- engage in a lifetime of learning

The Mechanical Engineering B.S. degree at UCR is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700. For more details see www.me.ucr.edu.

All undergraduates in the College of Engineering must see an advisor at least annually. Visit www.engr.ucr.edu/studentaffairs for details.

University Requirements
See Undergraduate Studies section.

College Requirements
See The Marian and Rosemary Bourns College of Engineering, Colleges and Programs section.

The Mechanical Engineering major uses the following major requirements to satisfy the college’s Natural Sciences and Mathematics breadth requirement.

1. BIOL 003
2. MATH 008B or MATH 009A
3. PHYS 040A, PHYS 040B, PHYS 040C

Major Requirements
1. Lower-division requirements (74 units)
   a) BIOL 003, BIOL 005A, BIOL 051A
   b) CHEM 001A, CHEM 001B, CHEM 01LA, CHEM 01LB
   c) EE 001A, EE 01LA
   d) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   e) ME 001A, ME 001B, ME 001C, ME 009, ME 010, ME 018
   f) PHYS 040A, PHYS 040B, PHYS 040C

2. Upper-division requirements (77 units)
   a) ME 100A, ME 103, ME 110, ME 113, ME 114, ME 116A, ME 118, ME 120, ME 130, ME 135, ME 170A, ME 170B, ME 175A, ME 175B, ME 175C
   b) STAT 100A
   c) Choose one Focus Area:
      (1) Mechanics of Materials and Structures
         Sixteen (16) units of technical electives chosen from ME 100B, ME 121, ME 153, ME 156, ME 180, ME 197
      (2) Energy and Environment
         Sixteen (16) units of technical electives chosen from ME 100B, ME 116B, ME 117, ME 135, ME 136, ME 197
      (3) Design and Manufacturing
         Sixteen (16) units of technical electives chosen from ME 121, ME 122, ME 131, ME 133, ME 153, ME 156, ME 174, ME 180, ME 197
      (4) General Mechanical Engineering
         Sixteen (16) units of technical electives chosen from selected from the following list, in consultation with an advisor: ME 100B, ME 116B, ME 117, ME 121, ME 122, ME 131, ME 133, ME 136, ME 137, ME 138, ME 153, ME 156, ME 174, ME 180, ME 197
   d) Sixteen (16) units of technical electives
   e) Complete ME 175A, ME 175B, ME 175C

Visit the Student Affairs Office in the College of Engineering or www.engr.ucr.edu/studentaffairs for a sample program.

Graduate Program
The Department of Mechanical Engineering offers graduate educational programs leading to M.S. and Ph.D. degrees in Mechanical Engineering. Broad areas of research include 1) mechanics and materials, 2) fluids and thermal sciences and 3) information computation and design. Specific research focus areas include the following:

- Air quality, small and large-scale pollutant dispersion in urban flows, turbulent combustion and wildland fire behavior; engine emissions and nanoparticle science, thermal and electrical properties of nanowires and nanotubes, direct energy conversion, porous media and multiphase transport, bioheat transfer, biomedical optics, and medical laser applications
- Wafer fab processing, thin film mechanics and nanotechnology, bio-inspired materials, mechanical behavior of thin films and other small-featured structures, mechanics of interfaces and surfaces, mechanical properties of carbon nanotubes and ferroelectric/piezoelectric materials, sensing and imaging, mechanics of geophysical materials, advanced material synthesis, composites, MEME, BioMEMS, biomedical devices, and processing of nanocrystalline materials
- Artificial intelligence, computer-aided design or manufacturing, process planning, sensor networks, and distributed computing and control

Visit www.me.ucr.edu/programs/gradindex.html, for detailed information on the research programs of individual faculty members.

Combined B.S. + M.S. Five-Year Program
The college offers a combined B.S. + M.S. program in Mechanical Engineering designed to lead to a Bachelor of Science degree as well as a Master of Science degree in five years. Applicants for this program must have a high school GPA above 3.6, a combined SAT Reasoning score above 1950 (or ACT plus Writing equivalent), complete the Entry Level Writing Requirement before matriculation, and have sufficient mathematics preparation to enroll in calculus in their first quarter as freshmen.

Interested students who are entering their junior year should check with their academic advisor for information on eligibility and other details.

Admission
In addition to the following requirements, all applicants must meet the general requirements of the Riverside Division of the Academic Senate and the UCR Graduate Council as set forth in this catalog under the Graduate Studies section.

Language Requirement
All international students whose first language is not English must demonstrate proficiency in spoken English by securing at least a “conditional pass” score on the TAST or SPEAK test before they can be appointed as a TA. However, to be considered for subsequent TA appointments, they must secure a “clear pass” on the TAST or SPEAK. The fee associated with this test is paid by the department for the first attempt only. The TAST or SPEAK requirement is, however, waived for international students who are appointed as GSIs or are self-supported throughout their studies at UCR.

Master’s Degree
The Department of Mechanical Engineering offers the M.S. degree in Mechanical Engineering.

Admission
Applicants should have an undergraduate degree in engineering, physical sciences, or mathematics; a satisfactory GPA for the last two years of their undergraduate studies;
and high scores on the GRE General Test. All official transcripts, official GRE reports and three letters of recommendation must be submitted for evaluation. Foreign students and permanent residents whose first language is not English must also submit an acceptable TOEFL test score prior to admittance; the minimum TOEFL exam score is 550 (paper-based), 213 (computer-based), or 80 (Internet-based).

The M.S. degree in Mechanical Engineering can be earned by either completing a thesis (Plan I), which reports a creative investigation of a defined problem, or passing a comprehensive examination (Plan II). A minimum of three quarters of residency is required. Students should enroll in 12 units each quarter unless the graduate advisor grants an exception.

Course work used to satisfy the student’s undergraduate degree requirements may not be applied toward the 36-unit M.S. requirement.

Plan I (Thesis) requires completion of a minimum of 36 units of upper-division and graduate-level approved course work and submission of an acceptable thesis. At least 24 of these units must be in graduate courses (200-series courses), a minimum of four of these being Mechanical Engineering graduate courses (ME 200 or higher, excluding ME 250, ME 290, ME 297, ME 298.i, and ME 299). The student must take 1 unit of seminar (ME 250) and at least 7 but no more than 11 units of directed or thesis research credits (ME 297 or ME 299). No more than 8 units of course work may be satisfied with directed studies (ME 290) or individual internship (ME 298.i). Students must defend the thesis.

Plan II (Comprehensive Examination) requires completion of a minimum of 36 units of upper-division and graduate-level approved course work and successfully passing a comprehensive examination. At least 24 of these units must be in graduate courses (200-series courses), a minimum of four of these being Mechanical Engineering graduate courses (ME 200 or higher, excluding ME 250, ME 290, ME 297, ME 298.i, and ME 299). The student must take 1 unit of seminar (ME 250) and no more than 7 units of directed studies (ME 290) or individual internship (ME 298.i). The comprehensive examination covers a broad range of topics chosen from upper-division and graduate courses the student has taken. This examination is prepared and administered by the graduate program committee. It is held during the spring quarter of every year.

Doctoral Degree

The Department of Mechanical Engineering offers the Ph.D. degree in Mechanical Engineering.

Admission An M.S. or equivalent degree in engineering or physical sciences or mathematics is normally required for admission to the Ph.D. program, although applicants with exceptional undergraduate or research record may be admitted directly into the Ph.D. program without an M.S. degree. Applicants for the Ph.D. degree must also meet the same requirements as for the master’s programs. Students in the M.S. program of Mechanical Engineering who desire to pursue the Ph.D. degree must formally apply for admission to the Ph.D. program.

The procedure for satisfying the requirements for the Ph.D. degree in Mechanical Engineering at UCR consists of four principal parts:

1. Successful completion of an approved program of course work
2. Passing a written and oral preliminary examination
3. Oral defense of a dissertation proposal written and submitted by the candidate
4. Defense and approval of the dissertation

Course Work Although there is no strict course or unit requirement, the department requires a minimum of 36 units of graduate-level and upper-division courses, exclusive of seminar and research (ME 250, ME 297, and ME 299). In addition, students must fulfill a six-quarter residency requirement. Students must take a seminar (ME 250) for at least three quarters. They must pursue a program of study that includes the following:

A coherent program of at least 24 units of graduate course work (including 16 units of Mechanical Engineering graduate courses) in the major area should satisfy the major requirement. A coherent program of at least 12 units of graduate or upper-division course work, or both, in the minor area should satisfy the minor requirement. The student and the faculty advisor should formulate this program within two quarters after admission to the program, and it must be approved by the student’s advisor and graduate committee. Changes to the program may occur as the student’s research progresses and should be documented after consultation with the advisor and graduate committee.

Written and Oral Preliminary Examination The examination aims to screen candidates for pursuing doctoral studies. It is administered by the graduate program committee and is composed of two sessions:

Session 1: Engineering Principles
Session 2: An area of specialty in mechanical engineering

Normally, both sessions are completed within a one-week period. Session 1 is a written examination designed to test understanding of concepts and methods used in mechanical engineering. It covers three subject areas to be selected by the student. For details, consult the departmental guidelines. Problems will be typical of those encountered in upper-division courses of undergraduate engineering curricula in U.S. schools with graduate-level understanding. Session 2 is conducted orally and assesses the student’s ability to conduct independent research. Consult departmental guidelines for details. The preliminary examination is normally offered once every year in the spring quarter.

Dissertation and Final Oral Examination After successfully completing the preliminary examination, the student, with advice from the advisor, recommends a qualifying committee and prepares a dissertation proposal. The dissertation proposal consists of a written document and an oral presentation or defense. Typically, the student submits a dissertation proposal to the qualifying committee within one year after successfully completing the preliminary examination. The qualifying committee chair normally schedules an oral defense within one month of the written proposal submission. The presentation is given only to the qualifying committee members. The student is advanced to candidacy after successfully completing this examination.

After completing the dissertation research, a written draft copy of the completed dissertation must be submitted to the dissertation committee for review, evaluation, and determination of whether the draft thesis is ready for oral defense. Once a draft has been approved for defense, an oral defense of the dissertation is scheduled and is open to the entire academic community. This defense consists of a presentation, followed by a question-and-answer period conducted by the dissertation committee and the audience. After successfully defending the dissertation, the candidate must submit final copies of the dissertation that comply with the format requirements set forth by the Graduate Division. Copies are given to the department and the dissertation advisor, in addition to those required by the Graduate Division.

Consult departmental guidelines for appointments to qualifying and dissertation committees. Refer to the department’s graduate program guidelines for further details.

Lower-Division Courses

ME 001A. Introduction to Mechanical Engineering (1)
Laboratory, 3 hours. Prerequisite(s): none. An introduction to mechanical engineering as a field of study and as a profession. Orientates students to the curriculum, faculty, and resources in the Department of Mechanical Engineering. Graded Satisfactory (S) or No Credit (NC). Credit is awarded for only one of ENGR 010 or ME 001A.

ME 001B. Introduction to Mechanical Engineering (1)
Laboratory, 3 hours. Prerequisite(s): none. An introduction to mechanical-engineering and computer-aided design. Students design, analyze, prototype, and test a mechanical device using modern methods. Graded Satisfactory (S) or No Credit (NC).
ME 001C. Introduction to Mechanical Engineering (1) Laboratory, 3 hours. Prerequisite(s): MATH 008B or MATH 009A or MATH 093A. An introduction to engineering problem solving and computations using EXCEL and MATLAB. Topics include functions, scalar and array operations, graphics, linear algebra, and symbolic mathematical operations with applications in mechanical engineering.

ME 009. Engineering Graphics and Design (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): none. Graphical concepts and projective geometry relating to spatial visualization and communication in design, including technical sketching, instrument drawing, and computer-aided drafting and design.

ME 010. Statics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009C, PHYS 040A. Covers equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; and distributed loads.

ME 018. Introduction to Engineering Computation (2) Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): ME 001C. An introduction to the use of MATLAB in engineering computation. Covers scripts and functions, programming, input/output, two- and three-dimensional graphics, and elementary numerical analysis.

Upper-Division Courses

ME 100A. Thermodynamics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A. ME 018, PHYS 040B. Introduces basic concepts and applications of thermodynamics relevant to mechanical engineering. Topics include work and energy, the first law of thermodynamics, properties of pure substances, system and control volume analysis, the Carnot cycle, heat and refrigeration cycles, the second law of thermodynamics, entropy, reversibility and irreversible processes. Credit is awarded for only one of CHE 100 or ME 100A.

ME 100B. Thermodynamics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 100A. Topics include the second law of thermodynamics, entropy function, entropy production, analysis of cycles, vapor power systems, gas power systems, refrigeration and heat pumps, systems of states, thermodynamic property relations, ideal gas mixtures and psychrometrics, multicomponent systems, combustion, and reacting mixtures.

ME 103. Dynamics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046, ME 010 with a grade of “C” or better, or ME 018. Topics include vector representation of kinematics and kinetics of particles; Newton's laws of motion; force-mass-acceleration, work-energy, and impulse-momentum methods; kinetics of systems of particles; and kinematics and kinetics of rigid bodies.

ME 110. Mechanics of Materials (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046, ME 010 with a grade of “C” or better, or ME 018. Topics include mechanics of deformable bodies subjected to axial, torsional, shearing, and bending loads; combined stresses; columns; energy design; and their applications to the design of structures.

ME 113. Fluid Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046, PHYS 040B, ME 010 with a grade of “C” or better, or ME 018. Introduces principles of fluid mechanics relevant to mechanical engineering. Topics include shear stresses and viscosity, fluid statics, pressure, forces on submerged surfaces, Bernoulli and mechanical energy equations, control volume approach, mass conservation, momentum and energy equations, the differential approach, turbulent flow in pipes, and lift and drag. Credit is awarded for only one of CHE 114 or ME 113.

ME 114. Introduction to Materials Science and Engineering (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 001B, PHYS 040C, upper-division standing. Covers materials classification, atomic structure and interatomic bonding, crystal structure of metals, imperfections in solids, diffusion, mechanical properties of engineering materials, strengthening mechanisms, basic concepts of fracture and fatigue, phase diagrams, ceramics, polymers, and composites.

ME 116A. Heat Transfer (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046, ME 010A, ME 113 (ME 113 may be taken concurrently). Introduces the analysis of steady and transient heat conduction, fin and heat generating systems, two-dimensional conduction, internal and external forced convection, natural convection, radiation heat transfer, heat exchangers, and mass transfer. Credit is awarded for only one of CHE 116 or ME 116A.

ME 116B. Heat Transfer (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 116A. Covers analytical and numerical methods in heat transfer and fluid mechanics. Topics include heat conduction and convection, gaseous radiation, boiling and condensation, general aspects of phase change, mass transfer principles, multimode heat transfer and the simulation of thermal fields, and the heat transfer process.

ME 117. Combustion and Energy Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 100A, ME 113, ME 118. Discusses premixed and diffusion flames, fuel-air thermochromy, combustion-driven engine design and operation, engine cycle analysis, fluid mechanics in engine components, pollutant formation, and gas turbines.

ME 118. Mechanical Engineering Modeling and Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046, ME 018. Introduces data analysis and modeling used in engineering through the software package MATLAB. Numerical methods include descriptive and inferential statistics, sampling and bootstrapping, fitting linear and nonlinear models to observed data, interpolation, numerical differentiation and integration, and solving systems of ordinary differential equations. Final project involves the development and evaluation of a model for an engineering system. Credit is awarded for only one of ENGR 118 or ME 118.

ME 120. Linear Systems and Controls (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 001A, EE 011A, ME 103. Introduces the modeling and analysis of dynamic systems, emphasizing the common features of mechanical, hydraulic, pneumatic, thermal, electrical, and electromechanical systems. Controls are introduced through state equations, equilibrium, linearization, stability, and time and frequency domain analysis.

ME 121. Feedback Control (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 118, ME 120. Introduces students to the analysis and design of feedback control systems using classical control methods. Topics include control system terminology, block diagrams, analysis and design of control systems in the time and frequency domains, closed-loop stability, root locus, Bode plots, and an introduction to analysis in state-space.

ME 122. Vibrations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 103. Covers free and forced vibration of discrete systems with and without damping resonance; matrix methods for multiple degree-of-freedom systems; normal modes, coupling, and normal coordinates; and use of energy methods.

ME 130. Kinematic and Dynamic Analysis of Mechanisms (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 009, ME 103. Explores the kinematic analysis of planar mechanisms including linkages, cams, and gear trains. Introduces concepts of multibody dynamics.

ME 131. Design of Mechanisms (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 130. Involves design of planar, spherical, and spatial mechanisms using both exact and approximate graphical and analytical techniques. Requires a computer-aided design project.

ME 133. Introduction to Mechatronics (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 120, ME 130. Introduces hardware, software, sensors, actuators, physical systems models, and control theory in the context of control system implementation. Covers data acquisition (Labview), sensors, actuators, electric circuits and components, semiconductor electronics, logic circuits, signal processing using analog operational amplifiers, programmable logic controllers, and microcontroller programming and interfacing. Uses MATLAB and simulink.

ME 135. Transport Phenomena (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 100A, ME 113, ME 116A. Introduces new concepts of thermo-dynamics, fluid mechanics, and heat transfer; symchometry, combustion, one-dimensional compressible flow, and turbomachinery. Integrates the most important concepts of transport of momentum, heat, and mass.

ME 136. Environmental Impacts of Energy Production and Conversion (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 100A, ME 113, ME 116A. Covers thermodynamics, heat transfer, and fluid mechanics as applied to the examination of the environmental impacts of energy production and conversion. Topics include pollution associated with fossil fuel combustion, environmental impacts of energy use, turbulent transport of pollutants, and principles used in the design of pollution control equipment.

ME 137. Environmental Fluid Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 100A, ME 113. Covers the application of fluid mechanics to flows in the atmosphere and oceans. Topics include hydrostatic balance, Coriolis effects, geostrophic balance, boundary layers, turbulence, tracer and heat transport.

ME 138. Transport Phenomena in Living Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046, PHYS 040B. An introduction to the application of the basic conservation laws of mechanics (mass, linear momentum, and energy) to the modeling of complex biological systems. Emphasizes how these concepts can explain and predict life processes.

ME 153. Finite Element Methods (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 118. Covers weak form formulation, the Galerkin method and its computational implementation, mesh generation, data visualization, as well as programming finite element codes for practical engineering applications.

ME 156. Mechanical Behavior of Materials (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): senior standing, ME 110; ME 114. Introduces the theory and experimental techniques for testing the mechanical behavior of materials and structures. Covers the fundamental mechanisms of deformation and failure of metals, ceramics, polymers, composite materials, and electronic materials as well as structural design and materials selection.
ME 170A. Experimental Techniques (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001A, EE 011A, ME 118. Covers the principles and practice of measurement and control, and the design implementation of experiments. Topics include dimensional analysis, error analysis, signal-to-noise problems, filtering, data acquisition and data reduction, and statistical analysis. Includes experiments on the use of electronic devices and sensors, and practice in technical report writing.

ME 170B. Experimental Techniques (4) Laboratory, 6 hours; discussion, 2 hours. Prerequisite(s): ME 103, ME 110, ME 113, ME 116A, ME 170A. Analysis and verification of engineering theory using laboratory measurements in advanced, project-oriented experiments involving fluid flow, heat transfer, structural dynamics, thermodynamic systems, and electromagnetic systems.

ME 174. Machine Design (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 009, ME 103, ME 110, ME 114. Introduction to the fundamentals of strength-based design. Topics include deflection and stiffness, static failure, and fatigue failure. Applies these topics to the design of standard machine components such as shafts, fasteners, and gears. Includes a design project. Sawyer

ME 175A. Professional Topics in Engineering (2) Lecture, 2 hours. Prerequisite(s): senior standing in Mechanical Engineering, ME 009, ME 170A. Topics include technical communication, team work, project management, engineering economics, professional ethics, and computer-aided design. Satisfactory (S) or No Credit (NC) grading is not available.

ME 175B. Mechanical Engineering Design (3) Lecture, 2 hours; laboratory, 3 hours. Prerequisite(s): senior standing in Mechanical Engineering: ME 135 (may be taken concurrently); ME 170B; ME 175A (may be taken concurrently). Students in teams define a design problem and conceive and detail the design solution. Lecture topics include design theory, design for safety, reliability, manufacture, and assembly. Graded In Progress (IP) until ME 175B and ME 175C are completed, at which time a final letter grade is assigned.

ME 175C. Mechanical Engineering Design (3) Lecture, 1 hour; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): senior standing in Mechanical Engineering. ME 175B. Students create, test, and evaluate a prototype based on the project design generated in ME 175B. Lecture topics include prototyping techniques, design verification, and special topics in design. Satisfactory (S) or No Credit (NC) grading is not available.

ME 180. Optics and Lasers in Engineering (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): senior standing; ME 010, ME 110, ME 170A. Focuses on the principles of optics and lasers, optical measurement techniques, and laser material interactions. Involves applications of optical methods using coherent and incoherent lights in mechanical engineering deformation and stress analysis; optical data acquisition and image analysis; and applications of lasers in material processing and characterization.

ME 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): consent of instructor, department chair, and Mechanical Engineering Undergraduate Program Committee chair. Individual study to meet special curricular needs. Requires a final written report. Course is repeatable to a maximum of 9 units.

ME 197. Research for Undergraduates (1-4) Outside research, 3-12 hours. Prerequisite(s): consent of instructor and Mechanical Engineering Undergraduate Program Committee chair. Directed research in a particular subject relevant to mechanical engineering. Requires a final written technical report. Course is repeatable to a maximum of 8 units.

**Graduate Courses**

ME 200. Methods of Engineering Analysis (4) Lecture, 4 hours. Prerequisite(s): graduate standing in engineering or consent of instructor. Topics include linear algebra theory, vector spaces, eigenvalue problems, complex analytic functions, contour integration, integral transforms, and basic methods for solving ordinary and partial differential equations in mechanical engineering applications.

ME 201. Computational Methods in Engineering (4) Lecture, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Explores numerical methods with computer applications. Topics include solution of nonlinear algebraic equations, solution of systems of linear equations, interpolation, integration, statistical description of data, model fitting, Fast Fourier Transform and applications, and numerical solution of ordinary and partial differential equations.

ME 211. Advanced Dynamics (4) Lecture, 4 hours. Prerequisite(s): ME 103 or consent of instructor. Introduces spatial kinematics and dynamics of a rigid body, multi-rigid-body systems, and robot manipulators. Topics include Newton’s and Euler’s laws, Lagrange’s equations, Hamilton’s equations, and variational principles.

ME 230. Computer-Aided Engineering Design (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): Graduate standing or consent of instructor. Introduces fundamentals of interactive computer graphics, three-dimensional representations of curves and surfaces, Bezier parameterizations, and optimization methods. Demonstrates applications of computer graphics and computational geometry to mechanical system simulations, computer-aided design, and engineering design.

ME 231. Pen-Based Computing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor; computer programming experience. Introduces pen-based user interfaces. Covers fundamental issues such as ink segmentation, sketch parsing, and shape recognition. Explores the topic of sketch understanding, including reasoning about context and correcting errors, and issues related to building practical pen-based systems. Includes a project in which students build a pen-based application. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

ME 230. Computer-Aided Engineering Design (4) Lecture, 4 hours. Prerequisite(s): consent of instructor. Introduction to fluid mechanics. Explores equations of motion, stress tensor, the Navier-Stokes equations, boundary conditions, exact solutions, vorticity, and boundary layers.

ME 240B. Fundamentals of Fluid Mechanics (4) Lecture, 4 hours. Prerequisite(s): ME 240A or consent of instructor. Introduction to fluid mechanics. Explores equations of motion, stress tensor, and boundary layers. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

ME 240A. Fundamentals of Fluid Mechanics (4) Lecture, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to fluid mechanics. Explores equations of motion, stress tensor, and boundary layers.

ME 241A. Fundamentals of Heat and Mass Transfer (4) Lecture, 4 hours. Prerequisite(s): ME 240A or consent of instructor. Introduces in-depth derivations of equations and principles governing heat and mass transfer with an emphasis on formulation of problems. Topics include chemical reaction thermodynamics and kinetics of fuel-air mixtures, governing equations for reacting flows, premixed flame structure and propagation, diffusion flame analysis, ignition theory, droplet and spray combustion, pollutant formation in internal combustion engines, pollution control, principles of air pollution, and atmospheric transport.

ME 250. Seminar in Mechanical Engineering (1 or 2) Seminar, 1-2 hours. Prerequisite(s): graduate standing. Seminar in selected topics in mechanical engin...
neering presented by graduate students, staff, faculty, and invited speakers. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

ME 261. Theory of Elasticity (4) Lecture, 4 hours. Prerequisite(s): ME 110 or consent of instructor. Introduction to tensors, strain, equations of motion, and constitutive equations. Topics include typical boundary value problems of classical elasticity, problems of plane strain and plane stress, and variational principles.

ME 266. Mechanics and Physics of Materials (4) Lecture, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces the structure and properties of materials; the characterization and modeling of mechanical, thermal, electric, and magnetic properties of materials; and coupling properties. Topics include phase transformations and brittle-to-ductile transitions.

ME 267. Finite Element Methods in Solid Mechanics (4) Lecture, 4 hours. Prerequisite(s): ME 261 or consent of instructor. Covers the formulation and implementation of finite element methods, including the Galerkin and energy methods. Topics include the static and dynamic analysis of mechanical and multiphysical systems and techniques of automatic mesh generation.

ME 270. Introduction to Microelectromechanical Systems (4) Lecture, 4 hours. Prerequisite(s): ME 110, ME 114, or equivalents. An introduction to the design and fabrication of microelectromechanical systems (MEMS). Topics include bulk and surface micro-machining processes; material properties; mechanisms of transduction; applications in mechanical, thermal, optical, radiation, and biological sensors and actuators; fabrication of microfluidic devices; BioMEMS and applications; packaging and reliability concepts; and metrology techniques for MEMS. Also discusses directions for future research.

ME 272. Nanoscale Science and Engineering (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 01H or consent of instructor. An overview of the machinery and science of the nanometer scale. Topics include patterning of materials via scanning probe lithography; electron beam lithography; nanomprinting; self-assembly; mechanical, electrical, magnetic, and chemical properties of nanoparticles, nanotubes, nanowires, and biomolecules (DNA, protein); self-assembled monolayers; and nanocomposites and synthetic macromolecules.

ME 278. Imperfections in Solids (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing in Chemical and Environmental Engineering or Computer Science or Electrical Engineering or Mechanical Engineering. Covers fundamentals of crystal structures and crystal defects, including the generation of point defects; nucleation and propagation of dislocations; perfect and partial dislocations; twins, stacking faults, and transformations; mechanics of semiconductor and metallic thin films and multilayered structures.

ME 290. Directed Studies (1-6) Individual study, 1-6 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Individual study, directed by a faculty member, of selected topics in mechanical engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units.

ME 297. Directed Research (1-4) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Research conducted under the supervision of a faculty member on selected problems in mechanical engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units.

ME 299. Research for the Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Research in mechanical engineering for the M.S. thesis or Ph.D. dissertation. Graded satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

ME 302. Apprentice Teaching (1-4) Seminar, 1-4 hours. Prerequisite(s): appointment as a teaching assistant or an associate in Mechanical Engineering. Topics include effective teaching methods, such as those involved in leading discussion sections and preparing and grading examinations, and student-instructor relations in lower- and upper-division Mechanical Engineering courses. Required each quarter of teaching assistants and associates in Mechanical Engineering. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Media and Cultural Studies

Subject abbreviation: MCS
College of Humanities, Arts, and Social Sciences

Toby Miller, Ph.D., Chair
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Professors
Dick Heldige, M.A.
D. Charles Whitney, Ph.D. (Creative Writing)

Associate Professors
Keith Harris, Ph.D. (English)
Timothy Labor, Ph.D. (Music)

Assistant Professors
Derek Burrill, Ph.D.
Lan Duong, Ph.D.
Kenneth Rogers, Ph.D.
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Cooperating Faculty
Susan Antebi, Ph.D. (Hispanic Studies)
Alicia Arrizon, Ph.D. (Women's Studies)
Mariam Bivey-Lam, Ph.D. (Comparative Literature and Foreign Languages)
Michelle Bloom, Ph.D. (Comparative Literature and Foreign Languages)
Jayna Brown, Ph.D. (Ethnic Studies)
Amalia Cabezas, Ph.D. (Women's Studies)
Ferial Cheri, Ph.D. (Political Science)
Sabine Doran, Ph.D. (Comparative Literature and Foreign Languages)
Jalyn Doyle, Ph.D. (English)
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Catherine Gudis, Ph.D. (History)

George Haqgert, Ph.D. (English)
Stephanie Hammer, Ph.D. (Comparative Literature and Foreign Languages)
Steven Helfand, Ph.D. (Economics)
Erin Jaffe-Berg, Ph.D. (Theatre)
Martin Johnson, Ph.D. (Political Science)
Jodi Kim, Ph.D. (Ethnic Studies)
John Namjun Kim, Ph.D. (Comparative Literature and Foreign Languages)
Katherine Kinney, Ph.D. (English)
Margherita Long, Ph.D. (Comparative Literature and Foreign Languages)
Tiffany Lopez, Ph.D. (English)
Rene Lysloff, Ph.D. (Music)
Patricia Morton, Ph.D. (Art History)
Voris Nunley, Ph.D. (English)
Marina Pianca, Ph.D. (Spanish/Portuguese)
Michelle Raheja, Ph.D. (English)
Rebekah Richert, Ph.D. (Psychology)
Dylan Rodriguez, Ph.D. (Ethnic Studies)
Robin Russin, Ph.D. (Theatre)
Christina Schwenkel, Ph.D. (Anthropology)
Anna Scott, Ph.D. (Dance)
Theda Shapiro, Ph.D. (Comparative Literature and Foreign Languages)
Maurya Simon, Ph.D. (Creative Writing)
Priya Srinivasan, Ph.D. (Dance)
Erika Suderburg, Ph.D. (Art)
Anne Sutherland, Ph.D. (Anthropology)
James Tokias, Ph.D. (English)
Carole-Anne Tyler, Ph.D. (English)
Marguerite Waller, Ph.D. (Comparative Literature and Foreign Languages/Women's Studies)
Jonathan Walton, Ph.D. (Religious Studies)
Jane Ward, Ph.D. (Sociology)
Ellen Wartella, Ph.D. (Psychology)
Devra Weber, Ph.D. (History)
Raymond Williams, Ph.D. (Hispanic Studies)
Andrew Winer, M.F.A. (Creative Writing)
Deborah Wong, Ph.D. (Music)
Victor Zordan, Ph.D. (Computer Science and Engineering)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major

The Department of Media and Cultural Studies offers the B.A. in Media and Cultural Studies, an interdisciplinary examination of film, video, television, multimedia, and visual culture with a primary emphasis on history and theory and a secondary focus on production. The major consists of three curricular tracks, in one of which students may concentrate:
1. Film and Visual Media
2. Film, Literature, and Culture
3. Ethnography, Documentary, and Visual Culture

The Media and Cultural Studies major combines the breadth of an interdisciplinary major with a precise focus on visual media. Its interdisciplinary structure brings together approaches to visual media that would usually be separated by discipline. Students have a unique opportunity to acquire critical skills in the reading and analysis of media texts together with those involved in various modes of media production. This applied experience includes training in creative, documentary, and ethnographic video; photography; multimedia production;
and screenwriting. Familiarity with media, either for its academic or industrial applications, enhances one's understanding of any field in the humanities or social sciences today.

### University Requirements
See Undergraduate Studies section.

### College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

### Major Requirements
The B.A. in Media and Cultural Studies involves three possible tracks of courses, each with different emphases in curriculum. The requirements are as follows:

For all three tracks:
- **Lower-division units:** 16 units
- **Upper-division units:** 40 units

#### Track 1: Film and Visual Media
This track gives the student comprehensive coverage in film and media studies, covering history, theory, non-Hollywood cinema and screenwriting. Familiarity with media, either for its academic or industrial applications, enhances one's understanding of any field in the humanities or social sciences today.

1. **Lower-division requirements (4 lower-division courses [at least 16 units]):**
   - a) Introduction to Film Studies: MCS 020
   - b) Media Production: 1 course chosen from ART 003, ART 070 (E-Z), CS 008, CS 010, DNCE 014, MCS 004/ART 004, MCS 007/ART 007, MCS 028/ART 029/THEA 038, MCS 039/CRWT 040, MCS 066/CRWT 066/THEA 066, THEA 010
   - c) Two additional courses chosen from 1.b) above or from the following:
     - AST 048/CHN 048, MCS 006/ART 006, MCS 008/ART 008, MCS 009/MUS 007, MCS 015, MCS 021/CPLT 021, MCS 022/AST 022/JPN 022, MCS 023/AHS 020, MCS 024/CPLT 024, MCS 025/ENGL 021/THEA 021, MCS 026/CPLT 026/EUR 026, MCS 033/ENGL 033, MCS 036/CPLT 027, MCS 038/CLA 045, MCS 042/GER 045, MCS 043/RUSN 045, MCS 044/ITAL 045, MCS 045/FREN 045, SPN 046/MCS 046, MCS 049/AST 064/VNM 064
   - Upper-division requirements (10 upper-division courses [at least 40 units]):

#### Track 2: Film, Literature, and Culture
While this track also offers a disciplinary foundation in film and visual media studies, its focus is on the interrelations among film and visual media, literature, and culture in international cinemas and literatures. The methodologies stressed here are less formally and more thematically and/or culturally based.

1. **Lower-division requirements (4 lower-division courses [at least 16 units]):**
   - a) Introduction to Film Studies: MCS 020
   - b) Comparative Film, Media, and Literature Studies (1 course), chosen from MCS 021/CPLT 021, MCS 025/ENGL 021/THEA 021, MCS 033/ENGL 033, MCS 036/CPLT 027, MCS 038/CLA 045, MCS 039/CRWT 040, MCS 042/GER 045, HASS 022B, HASS 022C
   - c) Non-Hollywood Cinema and Alternative Media (1 course) chosen from AST 048/CHN 048, MCS 015, MCS 022/AST 022/JPN 022, MCS 024/CPLT 024, MCS 026/CPLT 026/EUR 026, MCS 042/GER 045, MCS 043/RUSN 045, MCS 044/ITAL 045, MCS 045/FREN 045, MCS 046/SPN 046, MCS 049/AST 064/VNM 064
   - d) Additional 1 course chosen from 1.b) or 1.c) above, or from the following Media Production courses:
     - ART 003, ART 070 (E-Z), CS 008, CS 010, DNCE 014, MCS 004/ART 004, MCS 006/ART 006, MCS 007/ART 007, MCS 008/AHS 008, MCS 009/MUS 007, MCS 023/AHS 020, MCS 028/ART 028/THEA 038, MCS 066/CRWT 066/THEA 066, THEA 010

2. **Upper-division requirements (10 upper-division courses [at least 40 units]):**


d) Studies in Film, Literature, and Culture (4 courses):

1. Lower-division requirements (4 lower-division courses [at least 16 units]):

a) Introduction to Film Studies: MCS 020
b) Media Production (1 course) chosen from ART 003, ART 070 (E-Z) CS 008, CS 010, DNCE 014, MCS 004/ART 004, MCS 007/ART 007, MCS 028/ART 028/ THEA 038, MCS 039/CRWT 040, MCS 066/CRWT 066/THEA 066, THEA 010

c) Cultural Anthropology (1 course) chosen from ANTH 001, ANTH 001H
d) One (1 additional course chosen from 1.b) above or from MCS 007, AST 049/CHN 049, HASS 022B, HASS 022C, MCS 006/ART 006, MCS 008/ART 008, MCS 009/MUS 007, MCS 015, MCS 021/CPLT 021, MCS 022/ART 022/JP 022, MCS 023/ART 023, MCS 024/CPLT 024, MCS 025/ART 025/JP 025, MCS 026/CPLT 026/EUR 026, MCS 033/ENGL 033, MCS 036/CRWT 036, MCS 038/CLA 045, MCS 042/GER 042, MCS 043/RUSN 043, MCS 044/TATL 044, MCS 045/FREN 045, MCS 046/SPN 046, MCS 049/AST 064/VNM 064, MCS 066/ANTH 066, SOC 001, WMST 010

2. Upper-division requirements (10 upper-division courses [at least 40 units]):


d) Ethnography and Documentary: Production, Theories, and Texts (4 courses)

1. Production (at least 2 courses) chosen from ART 140, ART 142, ART 145, ART 146 (E-Z), ART 155, ART 167, ART 169, ART 169 (E-Z), ART 175, CS 133, CS 143/GER 143, MCS 131/ART 131, MCS 150/ ART 150, MCS 161/DNCE 161, MCS 162/DNCE 162, MCS 166/CRWT 166A/THEA 166A, MCS 166B/CRWT 166B/THEA 166B, MCS 166C/CRWT 166C/THEA 166C, MCS 175/ART 175, MCS 175/AST 175, MCS 179/LNST 179, MCS 182/AHS 121/ CPLT 138/EUR 138/GER 138, MCS 185/LNST 105/SPN 185, POSC 146, SPN 102A, SPN 102B

3. Media Production (no required units but 1 course may be taken) chosen from ART 140, ART 142, ART 145, ART 146 (E-Z), ART 155, ART 167, ART 169, ART 169 (E-Z), ART 175, CS 133, CS 143/GER 143, MCS 131/ART 131, MCS 150/ART 150, MCS 161/DNCE 161, MCS 162/DNCE 162, MCS 165A/CRWT 166A/THEA 166A, MCS 166B/CRWT 166B/THEA 166B, MCS 166C/CRWT 166C/THEA 166C, MCS 175/ART 175, MCS 179/LNST 179, MCS 182/AHS 121/CPLT 138/EUR 138/GER 138, MCS 185/LNST 105/SPN 185, POSC 146, SPN 102A, SPN 102B

4. Literary and Cultural Theory (no required units but up to 1 course may be taken) chosen from CPLT 110 or ENGL 101
1. Lower-division requirements (1 course and five upper-division courses) are
necessary, in order to develop media literacy. The Media and Cultural Studies minor provides
an interdisciplinary examination of film, television, digital multimedia, and visual culture, with
an emphasis on history and theory, rather than production, in order to develop media literacy.
A minimum of 24 units (one lower-division course and five upper-division courses) are
required. No course can be used to satisfy more than one requirement.

1. Lower-division requirements (1 course [at least 4 units]) chosen from the following:
MCS 004/ART 004, MCS 015, MCS 020, MCS 021/CPLT 021, MCS 033/ENGL 033

2. Upper-division requirements (a minimum of 5 courses [at least 20 units])

   a) One course from each of the following three groups:

   (1) Film, Photography, and Media History: AHS 182, HIST 191X, MCS 110 (E-Z),
MCS 114/CPLT 134/GER 134/JPN 134, MCS 115/CPLT 115/GER 134/JPN 134,
MCS 137/AHS 136, MCS 138/AHS 137, MCS 145E/ENGL 145E, MCS 145-I,
ENGL 145-I, MCS 170/CPLT 135/GER 135, MCS 173 (E-Z)/CPLT 173 (E-Z),
MCS 174 (E-Z)/CPLT 174 (E-Z), MCS 176/AHS 176, MCS 186/AHS 186,
MCS 104/ENGL 104, DNCE 171K, DNCE 172J, DNCE 172M, DNCE 173J, DNCE 173K,
MCS 118 (E-Z)/GER 118 (E-Z), MCS 121 (E-Z)/CPLT 171 (E-Z), MCS 126/CPLT 126/GER 126,
MCS 142/WMST 122, MCS 143 (E-Z)/ENGL 143 (E-Z), MCS 144 (E-Z)/ENGL 144 (E-Z),
MCS 145F/ENGL 145F, MCS 145G/ENGL 145G, MCS 145-I/ENGL 145I,
MCS 146 (E-Z)/ENGL 146 (E-Z), MCS 160/ART 160, MCS 172, MCS 181/CPLT
181/FREN 181, MCS 187/AHS 187

   (2) Non-Hollywood Cinema and Alternative Media: DNCE 171M, DNCE 172K,
MCS 118 (E-Z)/GER 118 (E-Z), MCS 121 (E-Z)/CPLT 171 (E-Z), MCS 125 (E-Z)/LNST 125 (E-Z)/
SPN 125 (E-Z), MCS 126/CPLT 126/GER 126, MCS 135/ART 135, MCS 136/ART 136,
MCS 142/WMST 122, MCS 144/ENGL 144K, MCS 146E/ENGL 146E, MCS 146F/ENGL
146F, MCS 146G/ENGL 146G, MCS 167/AST 167, MCS 168/AST 168, MCS 169/AST 185/CHN 185,
MCS 170/CPLT 135/GER 135, MCS 171/SPN 171, MCS 173 (E-Z)/CPLT 173 (E-Z),
MCS 178/B, MCS 120/CPLT 110B/EUR 110B/GER 110B, MCS 179/LNST 109/
SPN 179/WMST 179, MCS 182/AHS 121/CPLT 138/EUR 138/GER 138, MCS 183 (E-Z)/
FREN 185 (E-Z), MCS 184/AST 184/EN 184, MCS 185/LNST 105/SPN 185

   (3) Film and Media Theory: DNCE 171F, DNCE 171G, DNCE 171J or

Focus is on broadly defined cultural practices, including painting, photography, video, architecture, and
film. Introduces major historical, aesthetic, and theoretical issues in twentieth-century visual culture with
an eye toward political and social themes relevant to contemporary life. Cross-listed with AHS 008. Fulfills
the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 009. Music in Movies and TV (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none.
An exploration of popular film and TV soundtrack music, emphasizing drama and musical style. Scene study
features such films as The Matrix, Casablanca, The X-Files, and Altered States. Cross-listed with MUS 007. Fulfills
the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 015. Introduction to Television Studies (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none.
An introduction to the study of television, including its stylistic conventions, primary genres,
modes of production, economics, and important critical methodologies. Fulfills the Humanities requirement
for the College of Humanities, Arts, and Social Sciences.

MCS 020. Introduction to Film Studies (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none.
An introduction to formal and narrative principles of film construction and to various critical approaches
to the cinema, such as auteur and genre theory. Provides an overview of world cinemas. Fulfills the
Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 021. Introduction to Film, Literature, and Culture (4) Lecture, 3 hours; screening, 3 hours.
Prerequisite(s): none. Surveys critical approaches to the cinema such as author and genre theory. Studies
literature and film, national cinemas, and film movements. Cross-listed with CPLT 021. Fulfills the Humanities requirement
for the College of Humanities, Arts, and Social Sciences.

MCS 022. Introduction to Japanese Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none.
An introduction to Japan's major directors and to watching and writing about Japanese film. Works studied
range from the samurai epics of Kurosawa to recent anime. All films have subtitles. No previous knowledge
of Japanese language or culture is required. Cross-listed with AST 022 and JPN 022. Fulfills the Humanities requirement
for the College of Humanities, Arts, and Social Sciences.

MCS 023. Introduction to Media Art (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An
introduction to the impact of media technology on the visual arts, from photography to the Internet.
Addresses mechanical reproduction, perception, gender, sexuality, identity, interactivity, cybernetics, and
popular culture. Cross-listed with AHS 020. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 024. World Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Introduction to
world cinema as a fusion of national and international, culturally specific, and globally universal characteris-
tics. Topics include realism, war films, Hollywood's global reach, alternative aesthetics of third-world cinemas, cross-fertilization between
Europe and Asia, and the function of international film festivals and the international film market. Cross-listed with CPLT 024. Fulfills the Humanities requirement
for the College of Humanities, Arts, and Social Sciences.

MCS 025. Culture Clash: Studies in Latino Theatre and Film (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none.
Prerequisite(s): none. An introduction to Latino theatre and film from 1965 to the present. Examines the major works of playwrights and important films and videos. Cross-listed with ENGL 021 and THEA 021. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 026. New European Cinemas: Experiment and Innovation (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An introduction to a succession of New Waves in European Cinema: Neorealism in Italy, New Wave in France, and New Cinema in Germany, Russia, and Britain. Study of political engagements and technical innovations. Topics include the concept of the auteur, key manifestos, and attempts to define European cinema in film theory. Cross-listed with CPLT 026 and EUR 026. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 028. From Hamlet to Babylon 5: Introduction to Design in Film, Television, and Theatre (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. An introduction to the design process for film, television, and theatre. Addresses the influence design has on the viewer, as well as how looks are achieved in different media. Cross-listed with ART 028 and THEA 038. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 033. Introduction to Comparative Media Studies (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Comparative introduction to the study of two or more media, such as film and television, or digital media, and to various critical approaches to the media (formalism, feminism, Marxism, etc.). Special attention is paid to the "heretic" of media, media similarities and differences, and cross-media borrowing. Cross-listed with ENGL 033. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 036. Food in Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Explores the representation of food, cooking, and restaurants in films from different national traditions. Includes gender roles, sensuality and sexuality, social class, and the economics of food; excess and lack. Cross-listed with CPLT 027. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

MCS 038. The Ancient World in Film and Television (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. A study of representations of Greece and Rome in film, television, and other modern media. Introduces these "visual texts" both as popular art forms on their own and in relation to their ancient and modern literary sources. Cross-listed with CLA 045. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 039. Fiction and Film (4) Lecture, 3 hours; screening, 3 hours; practice writing, 1 hour. Prerequisite(s): none. A study of twentieth-century fiction and film from a writer's point of view, emphasizing narrative elements and literary techniques found in both. Explores how novels are translated into films. Cross-listed with CRWT 040. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 042. Introduction to German Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Introduction to the history of German cinema from the advent of the studio system to the present. Covers film in Germany, Switzerland, and Austria. Attention is paid to the work of German-speaking filmmakers living in other parts of the world. Instruction is in English; all films have subtitles. Cross-listed with GER 045. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 043. Soviet Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. A survey of the Soviet cinema, beginning with the film innovations of the 1920s and continuing with representative films from each of the ensuing periods of Soviet culture. All work done in English. Cross-listed with RUSN 045. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 044. Italian Cinema (4) Lecture, 1.5 hours; discussion, 1.5 hours; screening, 3 hours. Prerequisite(s): none. Covers major works of the Italian cinema from Neo-Realism to the present, with emphasis on their historical evolution and representation of major elements of Italian culture. Knowledge of Italian not required. Cross-listed with ITAL 045. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 045. French Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Covers masterpieces of French cinema. Examines the historical evolution of French cinema as an art form, with emphasis on major themes and directors. Cross-listed with FREN 045. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 046. Introduction to Latin American Film (5) Lecture, 3 hours; screening, 3 hours; discussion, 1 hour. Provides an historical overview of Latin American film production. Introduces students to film industries, revolutionary cinema, the role of television, and recent international co-productions. Cross-listed with SPN 046. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 049. Introduction to Vietnamese and Diasporic Film Culture (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): none. Engages students in critical viewing strategies and analytical visual critique. Explores the revival of film production in Vietnam following the Vietnam War, with a focus on the means of production, state control, and international distribution. Films are in English. Cross-listed with AST 064 and VNM 064. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 066. Screenwriting: How Movies Work (4) Lecture, 3 hours; discussion, 1 hour; screening, 2 hours. Prerequisite(s): none. An introduction to the craft of screenwriting. Discusses how screenwriting differs from other styles of writing. Examines the various techniques that writers use to create their “blueprints” for movies in a variety of genres. Cross-listed with CRWT 066 and THEA 066. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

Upper-Division Courses

MCS 103. Introduction to Visual Anthropology (4) Seminar, 3 hours; outside research and projects, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or consent of instructor. An introduction to the field of visual anthropology. Examines the similarities and differences between ethnographic film, critical studies, and written ethnographies. Explores the politics of representing other cultures visually. Cross-listed with ANTH 103. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 104. Film and Media Theory (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers different types of film and media theory. Addresses formalist, psychoanalytic, Marxist, feminist, and other approaches to the cinema and/or other media. Cross-listed with ENGL 104. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 110 (E-Z). Topics in Film and Media History (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers topics in the history of film and media with attention to their aesthetic, socio-political, and economic contexts. E. Film and Media History through World War II; J. Film and Media History after World War II. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 114. Cinematic War Memory (4) Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines cinematic confrontations involving World War II in Germany and Japan. Topics include desire between victims and perpetrators, representation of trauma, and ethical responsibility. All screenings have English subtitles. Cross-listed with CPLT 134, GER 134, and JPN 134. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 115. Modern German History through Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores twentieth-century German history through film. Includes World Wars I and II, inflation and polarization of classes, Nazi Germany, representations of the Holocaust, and a divided and reunited Germany. Cross-listed with CPLT 115, GER 163, and HISE 163. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 118 (E-Z). Topics in German Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of selected films, directors, and movements in German film. Films are in German with English subtitles. No knowledge of German is required. Cross-listed with GER 118 (E-Z). Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 120. Major Figures in Film and Media (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Intensive analysis of the work of a major figure in film, television, or other media who functions as an “auteur,” such as an influential director, star, or producer. Course is repeatable as topics change to a maximum of 8 units. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 121 (E-Z). Auteurs and Auteur Theory (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Critical studies on a director or group of directors that deal with a substantial portion of their works. E. Fassbinder; I. Fellini; T. Truffaut. Cross-listed with CPLT 171 (E-Z).

Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 125 (E-Z). Topics in Latin American Film and Media (5) Lecture, 3 hours; screening, 3 hours; extra reading, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of a theme or issue in Latin American film and media. E. Indigenous Video and Latin America. Cross-listed with Media and Cultural Studies / 325
LNST 125 (E-Z) and SPN 125 (E-Z). Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 126. From Novel to Screen: Film Adaptations of German Literature (4) Lecture, 3 hours; screening, 2 hours; individual study, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An introduction to classic works of German literature and their film adaptations. Explores adaptations by film directors such as Welles, Kubrick, Visconti, and Fassbinder. Studies the nexus between literature, film, and theatre. Course conducted in English. Cross-listed with CPLT 126 and GER 126. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 127. Chicana/o Cultural Studies and Gender Politics (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the field of Chicana/o cultural studies and investigates the gender politics that attest to its intersectional approach. Considers how power and gendered portrayals impacted the restructuring of the split subject in Chicana/o cultural studies. Cross-listed with WMST 166. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 131. Intermediate Photography and Digital Technology (4) Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): ART 003, ART 007/MCS 007. Covers the complete cycle of photographic production from scanning to output. Emphasizes developing skill in creating digital photographic imagery for creative, cultural expression. Software and some digital equipment are provided. Students are required to furnish their own 35mm single lens reflex (SLR) or digital cameras and zip disks. Course is repeatable to a maximum of 8 units. Cross-listed with ART 131. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 132. The Effects of Mass Media (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. A sociological approach to “media effects” including the history of effects research, theory, loci of effects studies, and social policy. Cross-listed with SOC 138. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

MCS 135. Intermedia: Art, Media, and Culture (4) Lecture, 2 hours; screening, 6 hours. Prerequisite(s): AHS 136 or upper-division standing or consent of instructor. A study of performance, photography, video, film, television, installation, and other related “intermedia.” Focuses on artworks within and without the mass media: how they are constructed, documented, analyzed, and viewed in the larger context of culture. Cross-listed with ART 135. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 136. Installation and Site-Specific Art (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): consent of instructor. Focuses on performance, photo installation, computer art, video/film, site-specific installation, sculpture, and/or other intermedia. Concentrates on production and analysis of site-specific art. Course is repeatable to a maximum of 8 units. Cross-listed with ART 136. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 137. History of Video Art (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Traces the evolution of video art from the invention of the Portapak and early video collectives to the current ubiquity of video installation, single-channel, and multi-media art. Emphasis is on video art in the United States. Cross-listed with AHS 136. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 138. History of Experimental Cinema (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. A survey of cinema outside of the economic, institutional, and aesthetic imperatives of mainstream film production. Covers an array of alternative film movements, including surrealism and dada, Soviet avant-garde, the Cine 16 Group, French new wave, North American avant-garde, and the artist’s film. Cross-listed with AHS 137. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 139. Mass Media and Popular Culture (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. A comparative analysis of the television, radio, record, cinema, and journalism industries as social institutions and a discussion of contemporary developments in mass communications theory. A study of the relationship between the social processes of modern society and the content of popular culture. Cross-listed with SOC 139. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

MCS 142. Gender in Southeast Asian Diasporic Literature and Film (5) Lecture, 3 hours; screening, 3 hours; written work, 1 hour; extra reading, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on performance, photography, video, film, television, installation, and other related “intermedia.” Examines the field of Chicana/o cultural studies and investigates the gender politics that attest to its intersectional approach. Considers how power and gendered portrayals impacted the restructuring of the split subject in Chicana/o cultural studies. Cross-listed with WMST 122. Fulfills the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

MCS 143 (E-Z). Gender, Sexuality, and Visual Cultures (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on performance, photography, video, film, television, installation, and other related “intermedia.” Examines the field of Chicana/o cultural studies and investigates the gender politics that attest to its intersectional approach. Considers how power and gendered portrayals impacted the restructuring of the split subject in Chicana/o cultural studies. Cross-listed with WMST 122. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 144 (E-Z). Race, Ethnicity, and Visual Culture (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An investigation of the representation of race and ethnicity in mass media, film, television, and visual culture. Focuses on the representation of race and ethnicity in television, film, and visual culture. Prerequisite(s): ART 006/MCS 006 and ART 160/MCS 160. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 145 (E-Z). Special Topics in Film and Visual Culture (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Intensive formal, historical, and theoretical analysis of a theme or issue in film, media, television, and visual culture. Prerequisite(s): ART 006/MCS 006 and ART 160/MCS 160. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 146 (E-Z). Special Topics in Technoculture and Digital Media (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Advanced study of topics and practices of reader and audience interaction with technologies of cultural production in general and digital media in particular. Includes praxis-oriented composition or research. E. Identities and Interactions; F. Cultures and Technologies of the Virtual; G. Cultures and Technologies of the Aural; I. Advanced Composition and Rhetoric for Digital Media Authors. Cross-listed with ENGL 146 (E-Z). Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 150. Intermediate Video Art (5) Lecture, 3 hours; studio, 3 hours; screening, 3 hours. Prerequisite(s): ART 004/MCS 004. Designed to continue work done in ART 004/MCS 004. Covers advanced editing techniques and theory, storyboard, and sound design. Application of media arts to contemporary art practice and new genres, including installation, documentary, experimental, and performance. Equipment provided. Course is repeatable to a maximum of 10 units. Cross-listed with ART 150. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 160. Intermediate Art Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ART 005/MCS 005. Addresses current critical and theoretical issues in modern and contemporary art. Examines student's art production in light of contemporary art practice and in relation to the interpretation and creation of art. Includes issues of race, gender, politics, aesthetics, class, and sexuality. Cross-listed with ART 160. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 161. Choreographing the Screen (4) Lecture, 3 hours; screening, 2 hours; term paper, 1 hour. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Focuses on choreographing for the camera and the screen. Topics include video art, classic film choreography, music video, and digital dance technologies. Students prepare a choreographed piece for the camera as a final project. Cross-listed with DNCE 161. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 162. Tool, Technology, Technique (4) Lecture, 1 hour; practicum, 3 hours; screening, 3 hours; laboratory, 3 hours. Prerequisite(s): DNCE 019 (may be taken concurrently) or consent of instructor. Practicum in video and digital production, with an emphasis on capturing and editing the moving body. Students learning the tools of the craft. Focuses on editing the moving body. Equipment will be available. Cross-listed with DNCE 162. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 163. Special Topics in Art Criticism and Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ART 006/MCS 006 and ART 160/MCS 160 with grades of “C” or better or consent of instructor. Advanced topics in contemporary currents in art theory and criticism. Examines the critical reception, analysis, and theoretical underpinning of works of art via selected topics from contemporary and historical issues in the visual arts. Course is repeatable to a maximum of 12 units. Cross-listed with ART 161."
Explores traumatic memory, cultural transfer, exile and displacement in films by German filmmaker refugees including Fritz Lang and Billy Wilder. Cross-listed with CPLT 135 and GER 135. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 171. Reel to Real: Latin American Film and Social Change (4) Seminar, 3 hours; individual study, 1 hour; screening, 1.5 hours; term paper, .5 hours. Prerequisite(s): SPN 110. Introduces Latin American film as it articulates with contemporary history and current events. Cross-listed with SPN 171. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 172. Topics in Film and Media Genres (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Topics may include study of a specific film or media genre such as melodrama; comparative genre studies, including a survey of the history and theory of two or more genres; or analysis of the idea of genre in film and media studies. Each segment is repeatable as its content changes to a maximum of 8 units. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 173 (E-Z). International Cinemas (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Considers non-Hollywood cinemas in the national, historical, political, and cultural contexts which produced them. E. Experimental and Avant-Garde Film; F. French New Wave; G. New German Cinema; I. Italian Neorealism; T. Third World Cinema; V. Global Perspectives on the Vietnam War. Cross-listed with CPLT 173 (E-Z). Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 174 (E-Z). Comparative Studies in Film (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Considers film in the context of the other arts. Compares the treatment of various themes or problems in film and literature in the Avant-Garde. Cross-listed with CPLT 174 (E-Z). Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 175. Advanced Digital Imaging (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ART 007/MCS 007; knowledge of Macintosh interface and Adobe Photoshop. Builds upon techniques initiated in ART 007/MCS 007. Emphasizes the use of computer and electronic technology as a tool for making art. Addresses issues related to making art and the cultural implications of digital technology. Includes lectures by visiting artists, field trips, and critiques of work in progress. Course is repeatable to a maximum of 8 units. Cross-listed with ART 170. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 176. Pictorialism to New Media: A History of Twentieth-Century Photography (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS D7C or upper-division standing or consent of instructor. A study of photographic practices from 1900 to the present. Topics include pictorialist “art” photographs created around 1900, the subsequent refinement of styles and content in modernism, and the expansion of photographic practices into the digital realm. Examines technological, aesthetic, economic, and social issues. Cross-listed with AHS 176. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.
MCS 185. Imagining the Nation: Film and Media in Latin America (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): MCS 020 or upper-division standing or consent of instructor. Study of the role of media and film in creating a national imaginary in Latin America. Focus is on one region or nation—such as the Andes, the Caribbean, Mexico, Argentina, or Chile—relating local history to the global context. Course is repeatable as topics change to a maximum of 8 units. Cross-listed with LNST 105 and SPN 185. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 186. Media and Movements: Film, Video, Photography, and the Visual Arts (4) Lecture, 3 hours; screening, 3 hours. Prerequisite(s): AHS 017C or upper-division standing or consent of instructor. Focuses on key cultural movements or developments in Europe and the United States over the past century. Provides a thematic history of the avant-garde and experimental arts, including painting, sculpture, photography, video, film, performance, installation, and new media art. Cross-listed with AHS 186. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 187. Visual Culture and Art History (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017A or AHS 017B or AHS 017C or AHS 021/URST 021 or upper-division standing or consent of instructor. Examines the broader concept of visual culture as it relates to the history of the visual arts. Focuses on four conceptual areas: visuality, identity, media culture, and politics/ethics. Cross-listed with AHS 187. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

MCS 190. Special Studies (1-5) Consultation, 1 hour; individual study, 3-12 hours; term paper or project, 1-3 hours. Prerequisite(s): upper-division standing; consent of instructor and program chair. Faculty-driven individual study to meet special curricular needs. Requires a final paper or creative project. Course is repeatable to a maximum of 15 units. See the Student Affairs Office in the College of Humanities, Arts, and Social Sciences for breadth requirement information.

MCS 198. Individual Internship in Media and Cultural Studies (1-3) Consultation, 1 hour; internship, 2-8 hours; individual study, 1-3 hours; term paper, 1-3 hours. Prerequisite(s): upper-division standing; consent of instructor and the Film and Visual Culture Chair. An internship in a professional organization or with an individual to gain skills and experience for a career in the visual media. Requires a final paper or a creative project. Course is repeatable to a maximum of 12 units. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

Graduate Courses

MCS 290. Directed Studies (1-8) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and department chair. A directed studies course designed to address special curricular problems. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade if specialized topics are studied. Course is repeatable.

MCS 292. Concurrent Analytical Studies in Media and Cultural Studies (1-4) Outside research, 3-12 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. To be taken concurrently with a 100-series course, but on an individual basis. Limited to research, criticism, and written work. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade if specialized topics are studied. Course is repeatable.

Microbiology

Subject abbreviation: MCBL

College of Natural and Agricultural Sciences

Program Office, 1140 Batchelor Hall
(800) 735-0717 or (951) 827-5913
microbiology.ucr.edu

The Microbiology Graduate Program is not currently accepting new students. For more information, contact the Biological Sciences Graduate Student Affairs Center, 1140 Batchelor Hall, (800) 735-0717.

Professors

James E. Adasavage, Ph.D. Biology, Epidemiology, and Ecology of Pathogenic Fungi (Plant Pathology)
Michael Allen, Ph.D. Biology and Ecology Microbial-Plant Interactions (Plant Pathology)
Nancy E. Beckage, Ph.D. Molecular Host-Parasite Pathogen Interactions (Entomology/Cell Biology and Neurosciences)
Katherine A. Borkovich, Ph.D. Fungal Cell and Molecular Biology (Plant Pathology)
James G. Borneman, Ph.D. Microbial Ecology of Soil-borne Plant Pathogens (Plant Pathology)
Wilfred Chen, Ph.D. President’s Chair, Microbial Engineering (Chemical and Environmental Engineering)
Michael D. Coffey, Ph.D. Phytophthora Taxonomy and Genetics (Plant Pathology)
Donald A. Cooksey, Ph.D. Bacterial Copper Resistance (Plant Pathology)
David E. Crowley, Ph.D. Rhizosphere Microbiology, Bioremediation (Environmental Sciences)
Marc A. Deshusses, Ph.D. Biodegradation, Biofilm- and Bioremediation of Pollutants (Chemical and Environmental Engineering)
Shou-Wei Ding, Ph.D. Molecular Biology of Plant Viruses and Genetic Engineering (Plant Pathology)
J. Allen Dodds, Ph.D. Molecular Virus-Host Interactions (Plant Pathology)
A. Federici, Ph.D. Molecular Biology of Insect Pathogens (Entomology)
William T. Frankenberger, Ph.D. Microbial Transformation of Metals and Metalloids (Environmental Sciences)
Garrett S. Gill, Ph.D. Bacterial Toxic Action (Cell Biology and Neuroscience)
Howard S. Judelson, Ph.D. Molecular Genetics of Fungi (Plant Pathology)
Ashok Mutichiand, Ph.D. Microbial Engineering, Biosensors, and Biodecontamination (Chemical and Environmental Engineering)
Edward G. Platzner, Ph.D. Host-Parasite Interactions (Nematology/Biology)
Li-Ning Rao, Ph.D. Molecular Plant-Virus Interactions (Plant Pathology)
Neal L. Schiller, Ph.D. Human Host-Bacterial Pathogen Interactions (Biomedical Sciences)
Michael Stanghellini, Ph.D. Ecology, Epidemiology, and Control of Soil-borne Pathogens (Plant Pathology)
Marylynn V. Yates, Ph.D. Water and Wastewater Microbiology (Environmental Sciences)

Professor Emeritus

Dennis F. Focht, Ph.D. (Plant Pathology)

Major

The Microbiology program participates in the Biological Sciences major. See Biological Sciences, Microbiology Track.

Upper-Division Courses

MCBL 120. Introduction to Plant Pathology (3) F Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 050A, BIOL 050B, BIOL 050C, CHEM 001C or CHEM 010HC, CHEM 112C, MATH 009B or MATH 094B, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. An introduction to the study of plant diseases. Topics include diseases and disease-causing agents, host-pathogen interaction during disease development, and strategies for disease management. An optional, separate laboratory is offered. Cross-listed with BIOL 120 and PLPA 120. Stanghellini

MCBL 120L. Introduction to Plant Pathology Laboratory (1) F Laboratory, 4 hours. Prerequisite(s): BIOL 005A, BIOL 050B; concurrent enrollment in BIOL 120/MCBL 120/PLPA 120 or consent of instructor; BIOL 121/MBCL 121 and BIOL 124/MCL 124 recommended. Covers fundamentals in the use of laboratory instruments and techniques for the detection, isolation, and identification of representative infectious agents that cause disease in plants. Cross-listed with BIOL 120L and PLPA 120L. Stanghellini

MCBL 121. Introductory Microbiology (4) F, W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 050A, BIOL 050B, BIOL 050C, CHEM 001C or CHEM 010HC, CHEM 112C, MATH 009B or MATH 094B, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A (BCH 100 or BCH 110A may be taken concurrently); or consent of instructor. An intensive introduction to the fundamental physiology and molecular biology of bacteria and viruses. Covers evolutionary origins of metabolic diversity, bacterial and viral molecular genetics, and an introduction to microbial pathogenesis. Cross-listed with BIOL 121.

Borkovich, Stein
properties, molecular and genetic characteristics, and modes of replication. Cross-listed with BIOL 123 and PLPA 123. Ding, Rao

MCBL 124. Pathogenic Microbiology (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 121/MCBL 121 with a grade of "C-" or better or consent of instructor. Introduction to nonpathogenic microorganisms in the environment. Topics include an introduction to microbial biology and microbial and metabolic genetic diversity; methods; symbiotic interactions; biofilms; and geomicrobiology and biogeochemistry. Explores life in extreme environments and the effects of the physical and chemical environment on microbes. Cross-listed with ENSC 133 and SWSC 133. Lanell

MCBL 133. Environmental Microbiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 05SB, BIOL 005C; or consent of instructor. Introduction to nonpathogenic microorganisms in the environment. Topics include an introduction to microbial biology and microbial and metabolic genetic diversity; methods; symbiotic interactions; biofilms; and geomicrobiology and biogeochemistry. Explores life in extreme environments and the effects of the physical and chemical environment on microbes. Cross-listed with ENSC 133 and SWSC 133. Lanell

MCBL 141. Public Health Microbiology (4) Lecture, 4 hours. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 05LA, BIOL 05SB, BIOL 005B; upper-division standing, or consent of instructor. Introduction to transmission of human pathogenic microorganisms through environmental media, including drinking water, wastewater, and air. Topics include characterization of environmentally transmitted pathogens, microbial risk assessment, sampling and detection methods for microorganisms in environmental samples, waterborne disease outbreaks, recycling or reuse of wastewater, microbial regulations and standards, and indoor air microbiology. Cross-listed with ENSC 141 and SWSC 141. Yates

MCBL 188. Microbiology Diagnostics (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 121/MCBL 121, BIOL 121/MCBL 121L. Covers microscopic and molecular diagnostic procedures used in a clinical/forensics microbiology laboratory. Utilizes in a research lab setting selected live microbial material (including bacteria and fungi). Addresses techniques employed in the processing and identification of pathogenic microbes, including safe laboratory practices for working with biohazards. Coffey

MCBL 197. Research for Undergraduates (1-4) directed research, 3-12 hours. Prerequisite(s): consent of instructor; upper-division standing. Individual research in microbiology performed under the guidance of the staff or faculty. Letter grades are assigned to students to discuss current issues of molecular biology and genomics of vector insects and pathogens they transmit. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with CMBD 210 and ENTM 210.

MCBL 211. Microbial Ecology (3) S, Odd Years Lecture, 2 hours; seminar, 1 hour. Prerequisite(s): consent of instructor. Covers the molecular aspects of vectors transmitting most dangerous human diseases. Involves lectures and student presentations about current issues in molecular biology and genomics of vector insects and pathogens they transmit. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with CMBD 210 and ENTM 210.

MCBL 212. Microbial Genetics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 110C or BIOL 107A or BIOL 107A; BIOL 102. In-depth coverage of the genetics of microbes with emphasis on the primary data and the foundation of modern techniques using Escherichia coli and other prokaryotic systems. Includes genome organization, plasmids, restriction-modification systems, mutation, transposable elements, regulation of gene expression, viruses, recombination, repair, and responses to stress. Cross-listed with BIOL 221 and PLPA 226. Borkovich

MCBL 241. Special Topics (2) Lecture, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Oral presentations and intensive small-group discussion of selected topics in each faculty member’s area of specialization. Course content emphasizes recent advances in the special topic area and varies accordingly. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with PLPA 241.

MCBL 250. Seminar in Microbiology (1) S Seminar, 1 hour. Prerequisite(s): graduate standing. Formal seminars by graduate students, faculty, and invited scholars on selected topics in microbiology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MCBL 262. Seminar in Molecular Biology and Genomics of Disease Vectors (1) Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Seminar series, sponsored by the Center for Disease-Vector Research at the Institute for Integrative Genome Biology, provides an opportunity for graduate students to discuss current issues of molecular biology and genomics of vector insects and pathogens they transmit with guest speakers. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with ENTM 262.

MCBL 290. Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Experimental or literature studies on specifically selected topics conducted under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MCBL 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing. Directed research in microbiology performed prior to advancement to candidacy in preparation for thesis or dissertation projects. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MCBL 299. Research for Thesis or Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): graduate standing. Original research in the area selected for the advanced degree. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Music

Subject abbreviation: MUS

College of Humanities, Arts, and Social Sciences

Walter Aaron Clark, Ph.D., Chair
Department Office, 121 Arts
(951) 827-3343; music.ucr.edu

Professors
Byron Adams, D.M.A.
Walter Aaron Clark, Ph.D.
Deborah A. Wong, Ph.D.

Professors Emeriti
Frederick K. Gable, Ph.D.
Anthony F. Ginter, Ph.D.
Donald C. Johns, Ph.D.

Associate Professors
Timothy Labor, Ph.D.
René T.A. Lysloff, Ph.D.
Leonora Sawedra, Ph.D.

Assistant Professors
Paulo C. Chagas, Ph.D.
Renee Coulombe, Ph.D.
Jonathan Ritter, Ph.D.

Lecturers
Janet Beazley, D.M.A. Collegium Musicum
Barbara A. Bennett, D.M.
Edward Bruner, D.M.A. Choral Society
Ruth Charlott, D.M.A. Orchestra and Chamber Singers
Tagumpay de Leon, M.S. Rondalla Ensemble
Willie F. Heims, M.A. Jazz and Concert Band
Rev. Shuichi Thomas Kurai, B.S., Taiko Ensemble
Audrey J. Lamprey, M.M.
Frances C. Moore, M.A. Chamber Music
Laura Sobrino, B.A. Mariachi Mexicat

Lecturers in Vocal and Instrumental Instruction
Kimberly K. Amin, M.M. Piano
Catherine Card, M.M. Voice
William Casale, Ph.D. Double Bass Viol
Ralph Cato, D.M.A. Voice
David W. Christensen, M.M.
Organ and Carillon
Robert D. Dominguez, Percussion
Timothy Emmons, B.A. Double Bass
Lisa Geering, B.A. Oboe
Larry Fihlave, Jazz Piano
William Hanrahan, M.A. Voice

Microbiology / Music / 329
of electronic resources is provided through MELVLV (the UC online catalog) and the library's electronic catalog, INNOPAC.

Music Major
A Music major not only gains a knowledge and awareness of music as a worldwide cultural phenomenon but develops critical acumen through a manifold approach to sound in its many cultural settings. Historical, ethnographic and critical studies are complemented and deepened by music-writing and auditory skills (developed largely in the context of Western music), and by ensemble performance (available in Indonesian, Philippine, Japanese and Latin American as well as traditional Western forms) and by individual instrumental or vocal study.

Music and Culture Major
The Music and Culture major offers an approach predominantly scholarly and critical to music as culture from the perspective of research, criticism, and interpretation, with an emphasis on historical and ethnographic approaches. It is oriented primarily toward understanding music as a culturally expressive form. Courses in music and/or dance performance are required but are positioned more broadly within the major as a means to explore interrelationships between music and other forms of performance.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements

Music Major
The major requirements for the B.A. degree in Music are as follows:

1. Lower-division requirements (13-15 units plus keyboard proficiency)
   a) MUS 030A, MUS 030B, MUS 030C
   b) MUS 031A, MUS 031B, MUS 031C or proficiency for MUS 131A
   c) Keyboard proficiency
2. Upper-division requirements (63 units plus quarter ensemble)
   a) MUS 112A, MUS 112B, MUS 112C
   b) MUS 130A, MUS 130B
   c) MUS 131A, MUS 131B, MUS 131C or proficiency
   d) Six quarters of MUS 180 (E-Z) or MUS 181 (E-Z)
   e) Twenty-eight (28) additional upper-division units from the following. (No performance courses numbered MUS 160 to MUS 181 (E-Z) may be used to satisfy this requirement.)

Music and Culture Major
All majors must enroll in at least one music...
ensemble each quarter. However, students may enroll in DNCE 067A through DNCE 075B instead of, or in addition to, any of the music ensemble courses.

In addition, the major requirements for the B.A. degree in Music and Culture are as follows:

1. Lower-division requirements (17–19 units)
   a) MUS 030A, MUS 030B, MUS 030C
   b) MUS 031A, MUS 031B, MUS 031C
   c) ANTH 001, SOC 001, DNCE 005, or DNCE 007

2. Upper-division requirements (59 units)
   a) Music courses (39–49 units)
      (1) Western Music History: MUS 112A, MUS 112B, MUS 112C, MUS 114, MUS 116, MUS 117, MUS 136, MUS 191 (E-Z)
      (3) Individual Study: MUS 190, MUS 194, MUS 195, MUS 199H
      b) Other upper-division courses (12–24 units)
         (1) Dance History (4–8 units): DNCE 130/ANTH 130, DNCE 141, DNCE 142, DNCE 171 (E-Z), DNCE 172 (E-Z), DNCE 173 (E-Z)
         (2) Anthropology or Sociology (4–8 units)
         (3) English or Media and Cultural Studies (4–8 units)
         (4) Other courses in the Social Sciences, Humanities, or Arts could count towards these units if the students petition and an advisor’s permission is granted.

Minor

The minor in Music is designed for students who wish to continue their musical studies while pursuing another major. Within the required 24 upper-division units, the minor provides basic skills in music theory and first-level studies in music history and literature while still offering modest flexibility to pursue individual interests.

1. Lower-division preparation (16 units)
   a) MUS 001 or equivalent
   b) MUS 030A, MUS 030B, MUS 030C

2. Upper-division requirements (24 units)
   a) Eight (8) units from MUS 112A, MUS 112B, MUS 112C
   b) Four (4) units from MUS 122-129
   c) Eight (8) units selected from MUS 122-129, MUS 130A, MUS 130B, MUS 133-139, MUS 191 (E-Z)
   d) Four (4) additional units in ensemble performance

As a freshman or sophomore, the student should complete MUS 030A, MUS 030B, MUS 030C (Harmony). This is a prerequisite for all later studies in the minor. Harmony has a prerequisite of MUS 001 (Introduction to Basic Musical Concepts) or the equivalent.

The comprehensive examination can be passed at the M.A. or at the Ph.D. level. Passing the exam at the PhD level is a requirement for students intending to pursue a PhD. Failure to pass the comprehensive examinations after two opportunities constitutes grounds for dismissal from the program.

2. Foreign Language Requirement. Students must demonstrate a reading knowledge of a foreign language, of use in scholarship within their discipline or chosen to support their research and creative interests, with the approval of the department. The requirement can be satisfied by examination or by enrolling in 4 quarters of a language course with a grade of “B” or better.

Additional track requirements. By winter quarter of their second year, composition students must have composed two complete and performable compositions under the supervision of a member of the composition faculty and had two public performances. Additionally, they must present a portfolio with one finished composition, one polished seminar paper and one documented performance. Musicology and ethnomusicology students must present a portfolio containing their CV, and representative seminar and conference papers. The portfolio offers the student a chance to organize their work in a manner that shows both their past performance and their future potential.

The comprehensive examination can be passed at the M.A. or at the Ph.D. level. Passing the exam at the PhD level is a requirement for students intending to pursue a PhD.

3. Additional track requirements. By winter quarter of their second year, composition students must have composed two complete and performable compositions under the supervision of a member of the composition faculty and had two public performances. Additionally, they must present a portfolio with one finished composition, one polished seminar paper and one documented performance. Musicology and ethnomusicology students must present a portfolio containing their CV, and representative seminar and conference papers. The portfolio offers the student a chance to organize their work in a manner that shows both their past performance and their future potential.

4. Course Work Each area requires a minimum of 48 units of graduate (200 series) or upper-
division undergraduate courses (100 series), these may include up to 8 units of MUS 299 (Thesis Preparation). Twenty four units must be graduate level. None may be MUS 291. Performance courses (MUS 160-181) do not count toward the degree, with the exception of 4 units in world music ensembles required of ethnomusicology students (see requirements below). The courses comprising the remaining required units are disposed differently in each of the three areas as specified below.

1. Composition
   a) Core requirements
      MUS 137 Seminar in free composition or MUS 258 Seminar in free composition (repeatable)
      MUS 200 Music bibliography
      MUS 201 Proseminar in the analysis of Western music
      MUS 206 Proseminar in musicology or MUS 207b Current Approaches in Ethnomusicology
      MUS 250 Seminar in music theory
   b) Two of the following repeatable courses:
      MUS 132 Film Music Workshop
      MUS 139 Sequencer composition
      MUS 142 Notation for composers
      MUS 253 Seminar in advanced music theory
      MUS 256 Computer music composition
   c) One of the following non-repeatable courses:
      MUS 251 Music in computer gaming
      MUS 254 Seminar in music and technology
      MUS 259 Music and semiotics: Approaches to Meaning and Form
      MUS 262 (E-Z) Seminar in Western music history
      MUS 263 (E-Z) Seminar in special topics in musicology
      MUS 270 Special topics in ethnomusicology

2. Ethnomusicology
   a) Core courses
      MUS 200 Music bibliography
      MUS 207a The Development of Ethnomusicology
      MUS 207b Current Approaches in Ethnomusicology
      MUS 255 Field Methods in Ethnomusicology
   b) At least two quarters of the following courses:
      MUS 270 Special topics in ethnomusicology
      MUS 271 Area studies research in music
      c) Two of the following courses:
         MUS 113 Brazilian music
         MUS 117 Music and ritual
         MUS 118 Music, politics and social movements
         MUS 119 Javanese music and culture
         MUS 120 Contemporary Native American music
         MUS 122 Music and performance in the Andes
         MUS 123 Southeast Asian performance
         MUS 124 Music of Asian America
         MUS 126 Gender, sexuality and music in cross cultural perspectives
         MUS 127 Music cultures of Southeast Asia
         MUS 128 Performing arts of Asia
         MUS 129 Music cultures of Africa
         MUS 140 American Musical Subcultures: A Genealogy of Rock
         MUS 146 Genealogy of Electronica
   d) One course in musicology or composition theory
   e) Two courses outside the department; may use directed studies (MUS 290) for one.
   f) Four units in one of the following ensembles:
      MUS 168 Javanese Gamelan Ensemble
      MUS 169 Japanese Taiko Ensemble
      MUS 170 Filipino Rondalla Ensemble
      MUS 174 Latin American Music Ensemble
      MUS 175 Mexican Music Ensemble
      MUS 176 Bagpipe ensemble

3. Musicology
   a) Core requirements
      MUS 200 Music bibliography
      MUS 201 Proseminar in the analysis of western music
      MUS 206 Proseminar in musicology
      MUS 207b Current Approaches in Ethnomusicology
   b) Three courses in the 260s series:
      MUS 262 (E-Z) Seminar in western music history
      MUS 263 (E-Z) Seminar in special topics in musicology
   c) Two courses outside the Music Department; may use directed studies (MUS 290)
   d) Two of the following courses:
      MUS 118 Music, politics and social movements
      MUS 126 Gender, sexuality and music in cross cultural perspectives
      MUS 137 Seminar in free composition
      MUS 153 Music and homosexuality
      MUS 207a The Development of Ethnomusicology
      MUS 207b Current Approaches in Ethnomusicology
      MUS 250 Seminar in music theory
      MUS 255 Field methods in ethnomusicology
      MUS 259 Music and semiotics: Approaches to Meaning and Form
      MUS 270 Special topics in ethnomusicology

Thesis Students whose degree objective is a terminal M.A. must write a thesis as part of the requirements for graduation. The M.A. thesis consists of an essay of substantial scope that makes an original contribution to the field. For composition students the thesis consists of two parts: a musical composition of substantial scope and a prose essay. Composition students who are continuing toward the Ph.D. and do not seek an M.A. degree are not required to complete a thesis. Normative time to degree 6 quarters

Doctoral Program

The Department of Music offers the Ph.D. degree in Music. Students are invited by the faculty to continue toward candidacy for the Ph.D. degree on the basis of performance in courses and seminars, the quality of their portfolios, passing the comprehensive examination at the Ph.D. level, satisfactory completion of the M.A. requirements, and the recommendation of the faculty in their track (composition, musicology or ethnomusicology), in consultation with the graduate advisor. Composition students who are invited to continue do not have to write an M.A. thesis as part of the requirements for the Ph.D. degree.

Students with an M.A. degree from other universities are eligible for admission. The process of admission is the same as for students with a B.A.

Requirements

1. Foreign language requirement

Students must demonstrate a reading knowledge of a second foreign language, of use in scholarship within their discipline or chosen to support their research and creative interests. Musicology and ethnomusicology students with an M.A. from other universities who did not have to meet a foreign language requirement must demonstrate a reading knowledge of two foreign languages during their residency at UCR. Composition students are required to demonstrate a reading knowledge of one foreign language.

2. Coursework

Students continuing toward the PhD must take
36 additional units earned in seminars and in MUS 291 and MUS 299 studies geared toward preparation for the qualifying examinations. Students with an M.A. must take a minimum of 48 units earned in seminars and directed studies (MUS 290) for the musicology and ethnomusicology tracks and a minimum of 36 units for the composition track. These must include the following required courses, although waiver may be granted for specific courses on an individual basis, depending on the student’s prior graduate training and pending faculty approval. Students are encouraged to take additional seminars and MUS 291 and MUS 299 courses geared toward preparation for the qualifying examinations.

Ethnomusicology students must meet the course requirements of the M.A. as stated above. Composition students are required to take:

a) Core requirements

MUS 200 Music bibliography
MUS 201 Proseminar in the analysis of Western music
MUS 206 Proseminar in musicology or MUS 207b Current Approaches in Ethnomusicology

b) One of the following repeatable courses:

MUS 132 Film Music Workshop
MUS 137 Seminar in free composition
MUS 139 Sequencer composition
MUS 142 Notation for composers
MUS 250 Seminar in music theory
MUS 253 Seminar in advanced music theory
MUS 256 Computer music composition
MUS 258 Seminar in free composition

Musicology students are required to take:

a) Core requirements

MUS 200 Music bibliography
MUS 201 Proseminar in the analysis of western music
MUS 206 Proseminar in musicology
MUS 207b Current Approaches in Ethnomusicology or MUS 255 Field methods in ethnomusicology

b) Three courses in the 260s series:

MUS 262 (E-Z) Seminar in western music history
MUS 263 (E-Z) Seminar in special topics in musicology

3. Qualifying examinations

Students must take the qualifying examinations, both written and oral, supervised by a faculty committee as stipulated in the regulations of the Graduate Division. The qualifying examinations concentrate on testing advanced skills and knowledge of specialized fields. Qualifying examinations are normally taken in the ninth quarter for students entering with a B.A., and in the sixth quarter, for students entering with an M.A.

4. Dissertation prospectus

Students must write a dissertation prospectus as part of the written qualifying examinations. Advancement to candidacy for the Ph.D. degree Students advance to candidacy for the Ph.D. degree once they have passed all coursework and the written and oral qualifying examinations.

Dissertation and final oral examination A dissertation to be presented as prescribed by the Graduate Council is prepared under the direction of the candidate’s dissertation committee. After completion of the dissertation, the candidate may be examined in its defense by the dissertation committee.

Normative time to degree. 15 quarters for students entering with a B.A. degree; 12 quarters for students entering with an M.A. degree.

The descriptions of many courses listed below carry the phrase “or consent of instructor.” This is meant to encourage musically qualified students who are not majors to participate in the courses and activities of the department. Any nonmajor having interest in a specific course should confer with the instructor about the qualifications for enrollment.

Lower-Division Courses

MUS 001. Basic Musical Concepts (4) Lecture, 3 hours; discussion, 1 hour. Fundamentals of music, including notation, rhythm, major and minor scales, intervals, tonality, triads. Includes ear training, sight singing, and elementary analysis. Designed for students who need basic musical literacy. Open to nonmajors and those with no previous musical background.

MUS 002. Introduction to Western Music (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A survey of the major styles and genres of Western music. Emphasis on creative and analytical listening without the use of musical notation. Designed for the general student with an interest in music and cultural practice. No previous musical background required.

MUS 003. Introduction to Opera (4) Seminar, 3 hours; assigned listening, 3 hours. Explores social, political, gender-related, and moral issues represented in 10 major operas between the seventeenth and twentieth centuries. Introduces dramatic and musical structures of opera, value of performance, and operatic conventions shared by composers, singers, and audience.

MUS 005. Women in Music (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A survey course designed primarily for nonmajors. Examines representative works by women composers from antiquity to the present.

MUS 006. Introduction to World Music (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A survey of people, identity, and music making. Includes listening to music from many cultural contexts. Also covers a variety of scholarly topics in world music. Cross-listed with ANTH 006.

MUS 007. Music in Movies and TV (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An exploration of popular film and TV soundtrack music, emphasizing drama and musical style. Scene study features such films as The Matrix, Casablanca, The X-Files, and Altered States. Cross-listed with MGS 000.

MUS 008. Popular Music Cultures of the United States (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Explores the so-called popular music and music cultures of the United States and the social history of these cultures to provide students with a sonic understanding of these extremely fractured, ever reconstructed “United States.”

MUS 009. Introduction to Digital Music (4) Lecture, 2 hours; workshop, 2 hours. Teaches basic theory and practical skills for understanding digital audio, recording, editing, and processing sound. Students work with audio and MIDI sequencers with the goal of writing musical compositions with computer notation programs.

MUS 010. Advanced Fundamentals (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 001 or a passing score on an equivalent examination or consent of instructor. A study of advanced musical fundamentals.

MUS 014. Popular Musics of the World (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to issues surrounding popular and urban musics of the world, focusing on three major geopolitical areas: Africa, Asia, and the Americas. Emphasizes the relationship between mass-mediated music and issues of cultural hegemony, resistance, and subversion. Analyzes the cultural impact of media technology on music performance and reception. Cross-listed with ETST 014 and URST 014.

MUS 015. Latin American Folk and Popular Styles (4) Lecture, 2 hours; discussion, 1 hour; assigned listening, 3 hours. Prerequisite(s): none. Introduction to the vast array of folk and popular styles of music in Latin America, with an emphasis on cultural and ethnic interaction and exchange in the context of Latin American history, politics, and society. Cross-listed with LNST 015.

MUS 016. Latin American Classical Heritage (4) Lecture, 2 hours; discussion, 1 hour; assigned listening, 3 hours. Prerequisite(s): none. Survey of the rich heritage of Latin American classical music from Renaissance sacred polyphony to contemporary styles. Emphasis on the gradual emergence of Latin American music from European domination and the establishment of distinctive national traditions in the post-colonial era. Cross-listed with LNST 016.

MUS 017. Music of Mexico (4) Lecture, 3 hours; extra reading, 2 hours; assigned listening, 1 hour. Prerequisite(s): musical training and knowledge of Spanish is useful but not required. Surveys the rich traditional and art music of Mexico from the early 1500s to the present. Explores changes in social and political function, in time and across social classes and ethnicity. Cross-listed with LNST 017.

MUS 020. Music of Scotland (4) Seminar, 3 hours; term paper, 1 hour; assigned listening, 2 hours. Examines the rich heritage of Scottish music from the Middle Ages to the modern day, including folk, popular, and classical traditions. Emphasis is on the music of the Scottish highlands and the bagpipe. Explores the role of music during war and peace within the context of Scottish history.
MUS 030A. Harmony (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 010 or a passing score on an equivalent examination or consent of instructor; concurrent enrollment in MUS 031A or MUS 031B or MUS 031C or MUS 131A or MUS 131B or MUS 131C. The study of harmony through melodic and rhythmic practices.

MUS 030B. Harmony (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 030A or consent of instructor; concurrent enrollment in MUS 031A or MUS 031B or MUS 031C or MUS 131A or MUS 131B or MUS 131C. Diatonic and chromatic harmony of the common practice period.

MUS 030C. Harmony (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 030B or consent of instructor; concurrent enrollment in MUS 031A or MUS 031B or MUS 031C or MUS 131A or MUS 131B or MUS 131C. Diatonic and chromatic harmony of the common practice period.

MUS 031A. Musicianship I (2) Studio, 2 hours; discussion, 1 hour. Prerequisite(s): MUS 001 or MUS 010 or a passing score on an equivalent examination or consent of instructor. Covers melodic reading, rhythmic reading, and ear training. Includes basic keyboard harmony.

MUS 031B. Musicianship I (2) Studio, 2 hours; discussion, 1 hour. Prerequisite(s): MUS 031A or consent of instructor. Covers melodic reading, rhythmic reading, and ear training. Includes basic keyboard harmony.

MUS 031C. Musicianship I (2) Studio, 2 hours; discussion, 1 hour. Prerequisite(s): MUS 031B or consent of instructor. Covers melodic reading, rhythmic reading, and ear training. Includes basic keyboard harmony.

MUS 073A. Dance of Mexico (2) Studio, 3 hours; extra reading, 1 hour; screening, 1 hour; individual studio, 1 hour. Prerequisite(s): none. Traditional dances of Mexico at the beginning level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Recommended for nondancers and dancers. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with DNCE 073A and LNST 073A.

MUS 073B. Dance of Mexico (2) Studio, 3 hours; extra reading, 1 hour; screening, 1 hour; individual studio, 1 hour. Prerequisite(s): DNCE 073A/LNST 073A/MUS 073A is recommended. Traditional dances of Mexico at the intermediate level. Outside-of-class assignments include attending dance concerts, viewing dance videos, and regular individual practice sessions. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with DNCE 073B and LNST 073B.

MUS 080 (E-Z). Private Instruction: Voice, Keyboard, and Strings (1-2) Studio, 5-1 hour; individual practice, 5-10 hours. Prerequisite(s): MUS 001 or equivalent; consent of instructor. Students take a half- or one-hour lesson and practice 5 to 10 hours each week (see the note regarding fees under the Major Requirements section). Offered as demand indicates.

MUS 081 (E-Z). Private Instruction: Brass, Woodwinds, Percussion, and Other Instruments (1-2) Studio, 5-1 hour; individual practice, 5-10 hours. Prerequisite(s): MUS 001 or equivalent; consent of instructor. Students take a half- or one-hour lesson and practice 5 to 10 hours each week (see the note regarding fees under the Major Requirements section). Offered as demand indicates. E. Trumpet; F. Trombone; G. Tuba; I. French Horn; J. Flute; K. Oboe; L. Clarinet; M. Bassoon; N. Saxophone; O. Recorder; P. Percussion; Q. Rondalla instruments; R. Bagpipe; S. Scottish Snare Drum; T. Timpani. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of performance before a jury or at a recital. Segments are repeatable.

Upper-Division Courses

MUS 112A. History of Western Music: Middle Ages to 1774 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MUS 030A, MUS 030B, MUS 030C, or consent of instructor. An intensive survey of music history and literature from the Middle Ages to 1700. Involves score reading, listening, and analysis of pieces with emphasis on historical characteristics.

MUS 112B. History of Western Music: 1700-1900 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MUS 030A, MUS 030B, MUS 030C, or consent of instructor. An intensive survey of music history and literature from the 1700 to 1900. Involves score reading, listening, and analysis of pieces with emphasis on historical characteristics.

MUS 112C. History of Western Music: Twentieth Century (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MUS 030A, MUS 030B, MUS 030C, or consent of instructor. An intensive survey of music history and literature from 1900 to the present. Involves score reading, listening, and analysis of pieces with emphasis on historical characteristics.

MUS 113. Brazilian Music (4) Lecture, 3 hours; extra reading, 2 hours; assigned listening, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduces the music of Brazil, focusing on the history and the current variety of musical languages, styles, and forms of the present. Analyzes the crucial question of national identity in Brazilian culture and society through the study of its music.

MUS 114. Opera (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Study of selected operas from the Western repertory for 1600 to the present.

MUS 115. Renaissance and Baroque Music of Latin Europe and Latin America (4) Lecture, 3 hours; individual study. Prerequisite(s): MUS 112A, MUS 112B, MUS 112C; or upper-division standing and consent of instructor. Study of the sacred and secular musics of Italy, France, the Iberian Peninsula, and Latin America, 1450-1750. Emphasis is on the reper- toires, styles, and genres that are relevant to understanding the musical past of the Americas, from (Alta) California to South America.

MUS 116. Music of J. S. Bach (4) Lecture, 3 hours; individual study. Prerequisite(s): upper-division standing or consent of instructor. Critical and analytical exploration of selected works by J. S. Bach. Usually devoted to specific genres within his output viewed in their musical and cultural context.

MUS 117. Music and Ritual (4) Lecture, 3 hours; written work, 1 hour; fieldwork, 20 hours per quarter. Prerequisite(s): upper-division standing or consent of instructor. Examines music cross-culturally in a ritual context. Incorporates readings from ethnomusicology, anthropology, folklore, and performance studies. Addresses how music operates within specific ritual events and how it relates to cosmology. Also examines the role of music in achieving altered states (dreams, meditation, trance, and possession), as well as helping to constitute gendered authority.

MUS 118. Music, Politics, and Social Movements (4) Lecture, 3 hours; extra reading, 2 hours; assigned listening, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the role of music in social and political movements. Emphasis is on understanding the textual and musical features of politically engaged music within its historical, social, and cultural context.

MUS 119. Javanese Music and Culture (4) Lecture, 3 hours; term paper, 1 hour; online discussion and listening, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines Javanese traditional and contemporary music. Focuses on the music of the Javanese gamelan and its relation to larger cosmological themes. Other topics include rural versus court traditions, popular music, mass media, piracy, Hindu roots, modernity, and local practices versus global trends.

MUS 120. Contemporary Native American Music (4) Lecture, 3 hours; extra reading, 2 hours; listening to prepared audio examples of music, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores the music of Native American peoples today, the contexts and behaviors with which such music is associated, and the ways these elements are discussed within Native communities. Emphasis is on “Pan Indian” music, including music for pow wows and syncretic religious music, and Native popular music, including folk, country, rock, and hip-hop.

MUS 122. Music and Performance in the Andes (4) Lecture, 3 hours; extra reading, 2 hours; assigned listening, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the musical practices of the central Andean countries, including indigenous, mestizo, Creole, and Afro-Andean traditions. Music is presented as part of a broader realm of performance in the Andes, incorporating dance, ritual, drama, and popular culture, and its relationship with notions of identity, nationalism, modernity, folklore, and politics.

MUS 123. Southeast Asian Performance (4) Lecture, 3 hours; screening, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduction to the roles and genres of expressive culture in Southeast Asia, including dance, music, theater, film, and digital culture. Performance is discussed both as a time-honored and as a contemporary medium for cultural production, from the courts to everyday experience. Material will be drawn from the Philippines, Malaysia, Indonesia, Thailand, Laos, Cambodia, Vietnam, Burma, Singapore, and the Southeast Asian diaspora. Cross-listed with ANTH 126, AST 123, and DNCE 123.

MUS 124. Music of Asian America (4) Lecture, 3 hours; music listening, 1 hour; individual study, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores music as a window on the cultural politics of Asian America. Examines expressive culture as a constitutive site for ethnic identities and emergent political formations. Covers musics of Asian immigrants and of subsequent generations, including Asian American jazz and hip-hop. Cross-listed with AST 124.
MUS 125. Music of Central America, Mexico, and the Caribbean (4) Lecture, 3 hours; extra reading and listening to prepared tapes of music, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of different musical traditions from Central America, Mexico, and the Caribbean, with an emphasis on popular music. Examines the impact of intercultural contact on the musical styles of these regions. A background in Western music is not required.

MUS 126. Gender, Sexuality, and Music in Cross-Cultural Perspectives (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of gendered performance genres from a number of cultures. Seeks to familiarize the student with gender-specific music and notions of gender that are often constructed, maintained, transmitted, and transformed through music and performance. Designed for students interested in music, anthropology, and gender studies. Cross-listed with ANTH 177 and WMST 126.

MUS 127. Music Cultures of Southeast Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in the Philippines, Indonesia, Malaysia, Thailand, Myanmar (Burma), Laos, Cambodia, and Vietnam. Designed for the student interested in the performing arts and cultures of mainland and insular Southeast Asia. No Western music background is required. Cross-listed with ANTH 176, AST 127, DANCE 127, and ETST 172.

MUS 128. Performing Arts of Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theatre, and ritual in four major geocultural regions of Asia: Central, East, South, and Southeast. No Western music training is required. Course is repeatable to a maximum of 8 units. Cross-listed with ANTH 128, AST 128, DANCE 128, and THEA 176.

MUS 129. Music Cultures of Africa (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of African performance, addressing the large culture areas of the continent. Emphasizes African aesthetics. Special attention is paid to contemporary popular music, its roots in older genres, and its ongoing role in postcolonial politics. Cross-listed with ETST 118.

MUS 130A. Counterpoint (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 13B, concurrent enrollment in MUS 031A or MUS 031B or MUS 031C or MUS 131A or MUS 131B or MUS 131C. Study of contrapuntal techniques. Analysis of models centering on the sixteenth century, with exercises to develop manipulative skills in modal counterpoint.

MUS 130B. Counterpoint (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): concurrent enrollment in MUS 031A or MUS 031B or MUS 031C or MUS 131A or MUS 131B or MUS 131C, MUS 130A. Study of counterpointal techniques. Analysis of models centering on the eighteenth century, with exercises to develop manipulative skills in tonal counterpoint.

MUS 131A. Musicianship II (1) Laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): MUS 031C. Sight-singing and ear-training laboratory including keyboard harmony.

MUS 131B. Musicianship II (1) Laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): MUS 131A. Sight-singing and ear-training laboratory including keyboard harmony.

MUS 131C. Musicianship II (1) Laboratory, 2 hours; individual study, 1 hour. Prerequisite(s): MUS 131B. Sight-singing and ear-training laboratory including keyboard harmony.

MUS 132. Film Music Workshop (4) Workshop, 3 hours; studio, 2 hours. Prerequisite(s): piano proficiency, upper-division standing, consent of instructor. Introduction to scoring with narrative underscoring: its conception, modeling, and implementation. Students study classic underscoring for dramatic effect, experiment with music used in film and live-scripted situations, and produce a piece of recorded music for film.

MUS 133. Instrumentation (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 030A, MUS 030B, MUS 030C, or consent of instructor. Investigation of the technical and color possibilities of various instruments, with scoring projects.

MUS 134. Orchestration (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 133 or consent of instructor. Advanced scoring projects with emphasis on stylistic aspects and relationship of orchestral color to form.

MUS 136. Jazz Theory (4) Lecture, 3 hours; extra reading and listening to music tapes, 3 hours. Prerequisite(s): MUS 030A; MUS 031A or MUS 031B or MUS 031C; or consent of instructor. Examines concepts and practices in harmony, melody, rhythm, and form as they relate to jazz and other popular idioms. Provides basic ear training for the recognition of changes in traditional jazz tunes, primary blues forms, modulations, and classic jazz bridges.

MUS 137. Seminar in Free Composition (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): MUS 030A, MUS 030B, MUS 030C, or consent of instructor. Assists in the successful composition of pieces in a variety of genres and media. Includes compositional models and the creation of musical scores. Course is repeatable to a maximum of 12 units.

MUS 138. Form and Analysis in Western Music (4) Lecture, 3 hours; assigned special projects, 3 hours. Prerequisite(s): MUS 030A, MUS 030B, MUS 030C, or consent of instructor. Different approaches to analysis using works in contrasting styles. Study of the dynamic design produced by the musical elements functioning in context.

MUS 139. Sequencer Composition (4) Lecture, 3 hours; individual study, 3 hours; extra reading, 3 hours. Prerequisite(s): MUS 030A or MUS 030B or MUS 030C (may be taken concurrently). Students learn music sequencing techniques in the context of the creation of an original piece of music. Topics covered include basic computer skills, benchmarking a digital orchestra, composing using a click track, and techniques of musical composition specific to the editorial potential inherent in music sequencing.

MUS 140. American Musical Subcultures: A Genealogy of Rock (4) Lecture, 3 hours; extra reading, 0-2 hours; listening, 2-3 hours. Prerequisite(s): upper-division standing or consent of instructor. A historical and cultural overview of the genre of American popular music known as “rock.” Covers themes ranging from musical form and structure, aesthetics, and audio technology to community and individuality, gender and racial identity, political resistance, and the music industry. Cross-listed with HISA 139.

MUS 142. Notation for Composers (4) Lecture, 1 hour; discussion, 1 hour; workshop, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Familiarizes the beginning composer with proper music notation, presentation, and score production. Surveys notation techniques used in the composition of a variety of music, from traditional arrangements through the most complex contemporary hybrid scores. Teaches established practice through the study of published scores and recordings.

MUS 145. Introduction to Digital Audio (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. College math is recommended. An introduction to the theory and practice of manipulating digital sound. Provides students with an understanding of digital audio devices associated with media production and of audio processing in general. Topics covered include basic psychoacoustics, digital audio theory, and digital audio editing.

MUS 146. Genealogy of Electronic Music (4) Lecture, 3 hours; term paper, 1 hour; online discussion and listening, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the history of electronic and electronic music. Focuses on particular issues, including youth culture, dance and ecstatic trance, subcultures and club cultures, hallucinogenic drugs and psychedelic aesthetics, globalization, audio piracy, media and audio technologies, music and politics, and gender and sexuality.

MUS 150A. Instrumental Technique: Strings (2) Lecture, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of basic techniques of orchestral string instruments.

MUS 150B. Instrumental Technique: Woodwinds (2) Lecture, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of basic techniques of orchestral woodwind instruments.

MUS 150C. Instrumental Technique: Brass (2) Lecture, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of basic techniques of orchestral brass instruments.

MUS 150D. Instrumental Technique: Percussion (2) Lecture, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Study of basic techniques of orchestral percussion instruments.

MUS 151. Orchestral Conducting (4) Lecture, 3 hours; studio, 2-3 hours. Prerequisite(s): consent of instructor. Fundamentals of baton technique, score study, transposition, and stylistic analysis as they relate to problems of conducting.

MUS 152. Choral Conducting (4) Lecture, 3 hours; studio, 2-3 hours. Prerequisite(s): consent of instructor. Study of choral repertoire, rehearsal methods, voice production, and techniques of conducting.

MUS 153. Homosexuality and Music (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Uses a topical rather than a chronological approach to investigate homosexuality on the part of composers, performers, critics, theorists, and historians and how this has shaped the history of music in the West. Cross-listed with LGBS 153.

MUS 154 (E-Z). Critical Approaches to the Western Canon (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): MUS 112A, MUS 112B, MUS 112C, or upper-division standing and consent of instructor. Critical study of selected repertoires within Western music, and the multiple and potentially problematic aspects of their construction as iconic and paradigmatic. E. Beethoven: The Music and the Myth.

MUS 155 (E-Z). Seminar in Dance and Music (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces relationships and representa-
Performance Courses 160–181

MUS 160. Orchestra (1-2) Studio, 2-6 hours. Prerequisite(s): consent of instructor. Study and performance of standard orchestral literature. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. May be repeated for credit.

MUS 161. Collegium Musicum (1-2) Activity, 2-6 hours. Prerequisite(s): consent of instructor. Study and performance of Medieval, Renaissance, and Baroque music. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. May be repeated for credit.

MUS 162. Choral Society (1-2) Studio, 2-6 hours. Prerequisite(s): consent of instructor. Study and performance of standard choral literature. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. May be repeated for credit.

MUS 163. Chamber Singers (1-2) Studio, 2-6 hours. Prerequisite(s): consent of instructor. Study and performance of works selected from different genres and periods. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

MUS 164. Jazz Ensemble (1-2) Studio, 2-6 hours. Prerequisite(s): consent of instructor. Study and performance of literature for large jazz ensemble and stage band, and preparation of improvised solos. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

MUS 165. Concert Band (1-2) Studio, 2-6 hours. Prerequisite(s): consent of instructor. Study and performance of literature for the concert band. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

MUS 166 (E-Z). Chamber Music (1-2) Studio, 3-6 hours. Prerequisite(s): admission by audition. Study and performance in chamber small ensembles. E. Musical Instrument Digital Interface (MIDI) Ensemble; F. Improvisatory Ensemble; G. Chamber Music. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Segments are repeatable.

MUS 167. Recital (1-2) rehearsals, 6-12 hours. Prerequisite(s): approval of music faculty; limited to advanced performers only. Preparation and presentation of a formal recital. Graded Satisfactory (S) or No Credit (NC).

MUS 168. Javanese Gamelan Ensemble: Beginning (2) Studio, 6 hours. Prerequisite(s): upper-division standing and consent of instructor. Study and performance of the Central Javanese gamelan, consisting mainly of gongs and gong-chime instruments. Readings and discussions focus on Javanese culture. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with AST 168.

MUS 169. Taiko Ensemble (1) Studio, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Study and performance of Japanese drumming. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with AST 169.

MUS 170. Rondalla Ensemble (1-2) Studio, 2-4 hours. Prerequisite(s): upper-division standing or consent of instructor. Study and performance of the Filipino rondalla, an ensemble consisting of various sizes of lute-like and guitar-like instruments. Discussions focus on Filipino culture. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable. Cross-listed with AST 170.

MUS 171. Gospel Choir (1-2) Studio, 2-4 hours. Prerequisite(s): upper-division standing or consent of instructor. Offers students practical performance experience in an ensemble as well as a background in different genres of gospel music ranging from the early 1900s to the present day. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable.

MUS 172. Chamber Orchestra (1) Studio, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Participation in a performance ensemble comprised mainly of strings, with occasional winds and horns as needed. Includes string techniques instruction. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable to a maximum of 4 units.

MUS 173. Music Recording (1-2) Workshop, 2 hours; studio, 2-4 hours. Prerequisite(s): consent of instructor. Introduces students to the practical aspects of classical music recording in a digital audio workstation, including mixing, session organization, and subsequent editing and mastering. Students may sign up as either a performer or an engineer, with the instructor's permission. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of the nature of the project. Course is repeatable.

MUS 174. Latin American Music Ensemble (1-2) Studio, 2-6 hours. Prerequisite(s): upper-division standing or consent of instructor. Study and performance of select Latin American folk music traditions, with special emphasis on the Andean region. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work. Course is repeatable.

MUS 175. Mexican Folkloric Ensemble (1-2) Studio, 2 hours; practicum, 1 hour; individual studio, 0 to 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Study and performance of select Mexican folk-music traditions, with special emphasis on mariachi and son jarocho and including popular corridos and rancheras. Students who participate in a performance receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

MUS 176. Bagpipe Ensemble (1) Studio, 2 hours. Prerequisite(s): consent of instructor. Study and performance of Scottish bagpipe music. Students who participate in a performance receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

MUS 180 (E-Z). Private Instruction: Voice, Keyboard, and Strings (2) Studio, 1 hour; individual practice, 5-10 hours. Prerequisite(s): upper-division or graduate standing in Music. Offered as demand indicates. E. Voice; F. Classical Piano; G. Jazz Piano; I. Harpsichord; J. Carillon; K. Jazz Guitar; L. Electric Bass Guitar; M. Lute; N. Classical Guitar; O. Viola da gamba; P. Piano Proficiency; Q. Organ; R. Violin; S. Viola; T. Violoncello; U. Double Bass Viol. Undergraduate students receive letter grades only; graduate students receive Satisfactory (S) or No Credit (NC) grades only. Course is repeatable.

MUS 181 (E-Z). Private Instruction: Brass, Woodwinds, Percussion, and Other Instruments (2) Studio, 1 hour; individual practice, 5-10 hours. Prerequisite(s): upper-division or graduate standing in Music. Offered as demand indicates. E. Trumpet; F. Trombone; G. Tuba; I. French Horn; J. Flute; K. Oboe; L. Clarinet; M. Bassoon; N. Saxophone; O. Recorder; P. Percussion; Q. Rondalla instruments. Undergraduate students receive letter grades only; graduate students receive Satisfactory (S) or No Credit (NC) grades only. Segments are repeatable.

MUS 187. Improvisation Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Presents the emergent field of improvisation studies, moving beyond traditional genre boundaries to explore improvisation as a cultural phenomenon and social practice. Draws from jazz studies, ethnomusicology, music theory, musicology, American studies, and the histories of dance, theatre, and the visual arts. Cross-listed with DNCE 187.

MUS 190. Special Studies (1-5) To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable to a maximum of 12 units.

MUS 191 (E-Z). Seminar in Music (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): MUS 112A, MUS 112B, MUS 112C; or consent of instructor. Topics dealing with aspects of individual composers and genres studies. F. Music of Beethoven; H. Construction of Early Instruments; I. Performance Practice; J. Music of Haydn; K. Interpretation of Symphonic Literature; M. Russian Romantic Music; N. Early American Music; O. Music of Mozart; R. Survey of Sonatas from the Seventeenth through the Twentieth Centuries; S. The Evolution and Practice of Jazz; U. Music Criticism; V. Studies in Twentieth-Century Music.

MUS 194. Independent Reading (1-2) Prerequisite(s): junior standing. Independent reading in materials not covered in course work. Normally begun in the junior year. May be repeated for credit. Total credit for course 194 may not exceed 4 units.

MUS 195. Senior Thesis (1-4) Required for students who are candidates for honors in music. Open to other music majors by invitation. Total credit may not exceed 6 units.

MUS 198-L. Individual Internship (1-12) variable hours. Prerequisite(s): upper-division standing; evidence of
MUS 200. Music Bibliography (4) Seminar, 3 hours; outside research, 1 hour. Fundamentals of music bibliography. Emphasis on reference materials and other standard bibliographical tools.

MUS 201. Proseminar in the Analysis of Western Music (4) Seminar, 3 hours; individual guided research, 3 hours. Prerequisite(s): graduate standing. Analysis of selected musical works from various periods exploring different music-theory models.

MUS 206. Proseminar in Musicology (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 200. Study of significant issues and recent developments in musicology and criticism. Study and practice of expository writing about music.

MUS 207. Proseminar in Ethnomusicology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Explores ethnomusicology as a discipline, focusing on the relationships between ethnomusicology and musicology, and on ethnomusicology as an interdisciplinary field drawing on performance studies, ethnomusicology, postmodernism, translation studies, and postcolonialism.

MUS 250 (E-Z). Seminar in Music Theory (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): MUS 200 and MUS 201 or consent of instructor. Historical study of the theory of western music. F. History of Theory; G. Neo-Classicism; H. Twentieth Century Theorists. I-Z: topics to be announced.

MUS 251. Music in Computer Gaming (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to the history and theory of music use in computer games, including the development of commercial gaming and game design and the related use of dramatic music. Topics cover adventure game history, narrative underscoring, commercial computer game genres, and contemporary issues related to interactivity, performance, and reception.

MUS 253. Seminar in Advanced Music Theory (4) Seminar, 3 hours; written work, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Presents a survey of serial techniques developed in the twentieth and twenty-first centuries for use both in the composition of new works and analysis of existing repertoire. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

MUS 254. Seminar in Music and Technology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the use of technology in real-time performance and in the making of electronic music, studio music, computer music, and performance art. Surveys musical technoculture and examines music technology from both creative and consumer points of view. Also investigates the students’ interests in music technology.

MUS 255. Field Methods in Ethnomusicology (4) Seminar, 3 hours; outside research, 1 hour; field, 2 hours. Prerequisite(s): graduate standing. A theoretical and practical introduction to fieldwork in music and performance. Each student focuses on a different performance group and documents its activities. Covers interviewing, audiotaping, videotaping, transcribing music and dance, and describing performance events.

MUS 256. Computer Music Composition (4) Seminar, 3 hours; laboratory, 3 hours. Prerequisite(s): graduate standing or consent of instructor; MATH 004 or equivalent is recommended. Students learn classic computer music techniques for sound processing in the context of the development of an original piece. Topics include computer music history, digital audio theory and processing, and electronic and computer music composition, including synthesis techniques and real-time instrument design.

MUS 258. Seminar in Free Composition (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Individual projects and issues in musical composition. Course is repeatable to a maximum of 12 units.

MUS 259. Musical Semiotics: Approaches to Meaning and Form (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Study of musical semiotics focusing on recent theories and related areas such as cybernetics, cognitive science, and theory of systems. Examines questions of meaning and form in the domains of aesthetics, musical theory, analysis, composition, performance, and new approaches of digital media and music.

MUS 261. Seminar in Performance Practice (4) Seminar, 3 hours; consultation, 1 hour. Prerequisite(s): MUS 200 and MUS 201, or consent of instructor. Investigations into the historically accurate performance styles of music based on information contemporary with the music. Topics and content will vary each quarter depending on student interest. May be repeated for up to 8 units.

MUS 262 (E-Z). Seminar in Western Music History (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): MUS 206, graduate standing, or consent of instructor. Selected issues in the history of music in the context of social, political, religious and intellectual culture of the West during different periods.

MUS 263 (E-Z). Seminar in Special Topics in Musicology (4) Seminar, 3 hours; individual guided research, 3 hours. Prerequisite(s): MUS 206, graduate standing, or consent of instructor. Addresses such topics as Music and Culture, Music and Poetry, Nationalism, Gender and Sexuality in Music, Individual Genres and Composers. Course is repeatable.

MUS 270. Special Topics in Ethnomusicology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): MUS 207, graduate standing, or consent of instructor. Focuses on current scholarship in ethnomusicology and related fields. Theme varies, but emphasis is usually on theory and methodology or the study of particular regions or performance traditions. For further information, see Department. Course is repeatable to a maximum of 8 units.

MUS 271. Area Studies Research in Music (4) Seminar, 3 hours; extra reading, 2 hours; listening, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Focuses on historical and ethnohistoric literature of particular geographical areas. Discusses scholarly literature on music (and expressive culture generally, including dance, theater, and ritual) of a particular geocultural region. Course is repeatable as topics change to a maximum of 8 units.

MUS 290. Directed Studies (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

MUS 291. Individual Study in Coordinated Areas (1-6) Individual study. 6-25 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. A program of study designed to assist graduate candidates who are preparing for M.A. comprehensive or Ph.D. qualifying examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

MUS 292. Concurrent Analytical Studies in Music (1-4) Prerequisite(s): graduate standing; approval of instructor and graduate advisor. Each 292 course will be taken concurrently with some 100-series course but on an individual basis. It will be devoted to research, criticism, and written work of a graduate order commensurate with the number of units elected. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

MUS 297. Directed Research (1-6) Prerequisite(s): graduate status and consent of instructor and graduate advisor. Individual graduate student research under the sponsorship of specific faculty members, on topics and selected problems in theoretical and historical research in music not directly related to student’s thesis. Graded Satisfactory (S) or No Credit (NC).

MUS 299. Research for Thesis or Dissertation (1-12) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Natural and Agricultural Sciences / 337

Subject abbreviation: NASC
College of Natural and Agricultural Sciences

Lower-Division Courses

NASC 091. Freshman Advising Seminar in the Natural and Agricultural Sciences (1) Seminar, 1 hour. Prerequisite(s): first-year freshman standing in the College of Natural and Agricultural Sciences (CNAS). Introduction to UCR for students in the sciences. Includes selection of majors, curriculum planning,
career options and goals in the sciences, opportunities for undergraduate research, development of learning and study skills, ethics in research and education, and an introduction to the faculty and professional academic advisors in CNAS. Graded Satisfactory (S) or No Credit (NC). Course is repeatable for only one of BCH 095, NASC 091, or NASC 093.

Upper-Division Courses

NASC 191S. Seminar in Sacramento (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Center at Sacramento Program. Examines aspects of the Sacramento area, including cultural, political, and governmental institutions and the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Sacramento. Required of participants in the UCR Center at Sacramento Program. Cross-listed with ENGR 191S and HASS 191S.

NASC 191W. Seminar in Washington, D.C. (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Washington Center Program. Examines aspects of the Washington, D.C., area, including cultural, political, and governmental institutions as well as the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Washington, D.C. Required of participants in the UCR Center at Washington Program. Cross-listed with ENGR 191W and HASS 191W.

NASC 192. Careers in Science and Mathematics Education (1) Seminar, 1 hour. Prerequisite(s): upper-division standing or consent of instructor; consent of instructor is required for students repeating the course. Covers preparation for a career in mathematics and science teaching. Includes job search strategies. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 2 units.

NASC 198-I. Individual Internship in the Natural and Agricultural Sciences (1-12) Internship, 2-24 hours; written work, 1-12 hours. Prerequisite(s): upper-division standing in the College of Natural and Agricultural Sciences (CNAS); consent of instructor. An internship to provide CNAS students with on-the-job experience in government, industry, or clinical laboratories. Each individual project must be approved by the CNAS associate dean and the laboratory director where the internship is to be carried out. Requires a written report. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Nematology

Subject abbreviation: NEM

College of Natural and Agricultural Sciences

James G. Baldwin, Ph.D., Chair
Department Office, 2317 Webber Hall (951) 827-2583
www.nematology.ucr.edu

Professors
James G. Baldwin, Ph.D.
Edward G. Platzer, Ph.D. (Nematology/Biology)
Philip A. Roberts, Ph.D.

Professors Emeriti
Reinhold Mannau, Ph.D.
Seymour S. Van Gundy, Ph.D. (Nematology/Plant Pathology)

Associate Professors
Paul De Ley, Ph.D.
Isgouhi Kaloshian, Ph.D.

Lecturers
J. Ole Becker, Ph.D.
Michael V. McKenny, Ph.D.
Anton T. Ploeg, Ph.D.

Affiliated Faculty
John D. Radewald, Ph.D. (Agronomist Emeritus)

Cooperating Faculty
Bradley C. Hyman, Ph.D. (Biology)
Morris F. Maduro, Ph.D. (Biology)

Nematology is the study of roundworms, the most genetically diverse invertebrate phylum that occurs worldwide in virtually every environment. Only about 3 percent of all species have been studied or identified, and these include significant parasites of humans, animals, and plants. A primary mission of the Department of Nematology is to develop environmentally sound approaches to manage nematodes that widely cause nearly $100 billion annual damage to crops. Other objectives are to use nematodes that benefit agriculture and the environment as agents of nutrient cycling and soil fertility and for biological control of some insect pests. Additional objectives focus on nematodes as fundamental models for addressing basic biological questions in genetics, development, and molecular biology. The department offers graduate and postgraduate opportunities in biocontrol, ecology, genetics, molecular biology, physiology, and systematics. It offers specific expertise in applied nematode problems of subtropical and desert agriculture.

A graduate program in Nematology is offered within a broad biological context. Students are enrolled in a more general department or interdepartmental program that provides a core of graduate courses. The general departments may include Biology, Botany and Plant Sciences, Entomology, Plant Pathology and Microbiology, and Environmental Sciences as well as a wide range of interdepartmental programs. Dissertation research opportunities, major research professor, curriculum advisor, and specific courses are provided by the Department of Nematology to complement requirements of the more general department or program.

Upper-Division Courses

NEM 120. Soil Ecology (3) Lecture, 3 hours. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 005B; both CHEM 010C and CHEM 011C or both CHEM 01HC and CHEM 1HLC. Examination of soil biota and their relationships with plants and the soil environment. Emphasis is on soil biotic interactions that influence soil fertility, plant disease, and plant growth. Examines the importance of the different microbial and faunal groups from the rhizosphere to the ecosystem level. Cross-listed with ENSC 120 and SWSC 120. Crowley, DeLey

NEM 159. Biology of Nematodes (3) W Lecture, 2 hours; discussion and demonstration, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, BIOL 005C, CHEM 010C or CHEM 01HC, CHEM 112C, MATH 0098 or MATH 09H, PHYS 002C, PHYS 02LC, BCH 100 or BCH 110A; one course in statistics. An introduction to the biology of nematodes. Topics include the morphology, physiology, development, genetics, behavior, and ecology of nematodes from parasitic and free-living habitats. In the discussion and demonstration section, students observe the comparative morphology and biology of nematodes and give oral presentations on selected nematode life histories. Cross-listed with BIOL 159. Baldwin, Platzer

NEM 190. Special Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): consent of instructor and Department Chair. Individual study, directed by a faculty member, to meet special curricular needs. A written report is required. Course is repeatable.

NEM 197. Research for Undergraduates (1-4) Laboratory, 3-12 hours. Prerequisite(s): upper-division standing. Research in nematology with the guidance of a Nematology faculty member. A written report is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

NEM 199. Senior Research (2-4) F, W, S Laboratory, 6-12 hours. Prerequisite(s): senior standing, a grade of “B+” or better in an upper-division Nematology course; or consent of instructor. Individual research on a problem relating to nematology. A written proposal signed by the supervising faculty member must be approved by the major advisor and the department chair and a written report filed with the supervising faculty member. Course is repeatable to a maximum of 9 units.

Graduate Courses

NEM 205. Identification of Plant Parasitic Nematodes (1) Summer (one week only) Lecture, 5 hours; laboratory, 25 hours. Prerequisite(s): graduate standing or consent of instructor. Five-day lecture and laboratory course on morphological identification of economically important plant parasitic nematodes in
NEM 250. Seminar in Nematology (1) Seminar, 1 hour; laboratory, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Recognition, diagnosis, biology, and control of major nematode diseases of plants. Laboratory covers identification techniques, soil sampling and processing techniques, and process of pathogenesis. Cross-listed with PLPA 206. Roberts

NEM 250. Seminar in Nematology (1) Seminar, 1 hour; laboratory, 3 hours. Prerequisite(s): consent of instructor. Lectures and discussions by visiting scientists, staff and graduate students on topics in nematology. Normally graded Satisfactory (S) or No Credit (NC) only, but students may petition-instructor for a letter grade on the basis of presentation of a formal seminar.

NEM 270. Special Topics in Nematology (1) Seminar, 2 hours. Prerequisite(s): consent of instructor. Discussion of current literature within special areas of nematology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

NEM 290. Directed Studies (1-6) Individual studies on specially selected topics in nematology under the direction of a staff member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

NEM 297. Directed Research (1-6) Individual studies on specially selected topics in nematology under the direction of a staff member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Neuroscience Undergraduate Major

Subject abbreviation: CBNS
College of Humanities, Arts, and Social Sciences
College of Natural and Agricultural Sciences

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Curt Burgess, Ph.D. (Psychology)
Christine Chiarello, Ph.D. (Psychology)
Scott Currie, Ph.D. (Cell Biol & Neuroscience)
Glenn Hatton, Ph.D. (Cell Biol & Neuroscience)
Peter Hickmott, Ph.D. (Psychology)
B. Glenn Stanley, Ph.D. (Cell Biol & Neuroscience)
Raphael Zidovetzki, Ph.D. (Neuroscience/Biology)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio
Steven R. Angle, Ph.D.
Dean, College of Natural and Agricultural Sciences, ex officio

Major
The Neuroscience major is an intercollegiate major offered by the colleges of Humanities, Arts, and Social Sciences and Natural and Agricultural Sciences. It offers upper-division courses that contribute to an academic program emphasizing the functioning of nervous systems at the molecular, cellular, system, behavioral, and cognitive levels. Some of the topics covered include neuroanatomy, neurophysiology, and neurochemistry in humans and other animals; neural mechanisms underlying sensory system function and perception; neural organization of behavior; development of the nervous system; and neural mechanisms of learning and memory.

Both a B.A. and a B.S. degree are offered by each college. When students declare the major, they choose from which college they wish to have their degree awarded. Students whose degrees are awarded by the College of Humanities, Arts, and Social Sciences are advised in and have their records maintained by the Department of Psychology; students whose degrees are awarded by the College of Natural and Agricultural Sciences are advised in and have their records maintained by the CNAS Academic Advising Center. Breadth requirements vary by college; and students must fulfill the breadth requirements of the college they choose.

For information about student advising, contact the CNAS Academic Advising Center, (951) 827-7294, or the Department of Psychology, (951) 827-5386, University of California, Riverside, Riverside, CA 92521.

University Requirements
See Undergraduate Studies section.

College Requirements
College breadth requirements vary depending on which college is chosen to award the degree. For details on breadth requirements, see the Colleges and Programs section of this catalog. Students are urged to consult their advisor regarding requirements.

The following restrictions and additions apply to college breadth requirements for the Neuroscience major.

For the College of Humanities, Arts, and Social Sciences

Humanities
Foreign language at level 4 or above for the B.A. may be used to fulfill up to 8 units of the Humanities breadth requirement.

Social Sciences
Psychology courses may not be used as part of the Social Sciences breadth requirement if a Biology course is used to meet any part of the Natural Sciences and Mathematics breadth requirement.

Foreign Language
In fulfilling the Foreign Language breadth requirement for both the B.A. and B.S. degrees, a modern language such as Spanish, Russian, Chinese, German, or French must be used.

Natural Sciences and Mathematics
The Neuroscience Core in the Neuroscience major satisfies the Natural Sciences and Mathematics breadth requirement.

For the College of Natural and Agricultural Sciences

Humanities
For the B.S. degree, 16 units instead of 12 units are required to fulfill the Humanities breadth requirement. PHIL 134 and PHIL 137 are recommended.

Social Sciences
For the B.S. degree, 16 units instead of 12 units are required to fulfill the Social Sciences breadth requirement. Psychology courses not required or approved for the Neuroscience major may be used in meeting the Social Sciences breadth requirement.

Foreign Language
In fulfilling the Foreign Language breadth requirement for the B.A. degree, a modern language such as Spanish, Russian, Chinese, German, or French must be used. Further, fourth-quarter level proficiency in one foreign language (not level 2 in two languages) is required.

Natural Sciences and Mathematics
The Neuroscience Core in the Neuroscience major satisfies the Natural Sciences and Mathematics breadth requirement.

Major Requirements

1. Neuroscience Core (66-72 units; satisfies the Life Sciences Core requirement for some majors in the College of Natural and Agricultural Sciences). Up to 12 units of upper-division life sciences courses (for this major, courses from the departments of Biochemistry, Biology, Cell Biology and Neuroscience, and Entomology) not being used to satisfy the core may be used to fulfill upper-division units in excess of these 12 units.

a) BIOL 005A, BIOL 05LA, BIOL 05LB, BIOL 005C (BIOL 002 and BIOL 003 may be substituted for BIOL 005A, BIOL 05LA, and BIOL 005B with advisor’s approval.)
b) PSYC 011 or STAT 040 or STAT 100A
c) MATH 008B or MATH 009A or MATH 09HA, MATH 090B or MATH 09HB
d) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC (or CHEM 01HA and CHEM 1HLA, CHEM 01HB and CHEM 1HLC, CHEM 01HC and CHEM 1HLD); CHEM 122A, CHEM 112B, CHEM 112C
e) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 02LA, PHYS 02LB, PHYS 02LC; or PHYS 040A, PHYS 040B, PHYS 040C
f) BCH 100 or BCH 110A

2. Upper-division requirements
a) First Tier (14 units)
(1) CBNS 106
(2) CBNS 120/PSYC 120
(3) CBNS 120L/PSYC 120L
(4) CBNS 124/PSYC 124

Nematology / Neuroscience Undergraduate Major / 339
Sample Program Bachelor of Arts

Bachelor of Science

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<th>Year</th>
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<th>Winter</th>
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<td>Total Units</td>
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Minor

A minor in Neuroscience is available. For more information on minor requirements, refer to the discussion of minors in the appropriate college section of the General Catalog.

1. First tier (14 units)
   a) CBNS 106
   b) CBNS 120/PSYC 120
   c) CBNS 120/PSYC 120L
   d) CBNS 124/PSYC 124

2. Second tier (6 units)

Select additional units from the list below so that the units from the First Tier combined with the units from the Second Tier equal at least 20.

BIOL 178; CBNS 101, CBNS 116, CBNS 121/PSYC 121, CBNS 125/PSYC 125, CBNS 126/PSYC 126, CBNS 127/PSYC 127; PSYC 129

Descriptions for all courses used in the Neuroscience major and minor may be found in the appropriate department section.
Mechanisms of neuronal death in Alzheimer's disease, stroke, and other disorders

Admission

Applicants must meet the general admissions requirements of the Riverside Division of the Academic Senate and the UCR Graduate Council as set forth in the Graduate Studies section of this catalog, including completion of an undergraduate degree (B.S. or B.A.). They should have an adequate background in biological and physical sciences, ideally including courses in the following or equivalent areas: General Biology, Genetics, General Chemistry, Organic Chemistry, Physics, Calculus, and Statistics. Additionally, at least 20 quarter-units of courses distributed among the following areas are required, although applicants may be admitted with limited course work deficiencies and required to make up deficiencies as specified by the admissions committee: Biochemistry; Cell Biology; Molecular Biology; Physiology; Behavioral Biology; Learning and Memory; Perception; Computer Science; and Neuroscience, Neurobiology, or Physiological Psychology, with laboratory.

Doctoral Degree

Course Work

Core requirements include:

1. NRSC 200A/PSYC 200A, NRSC 200B/PSYC 200B, NRSC 200C/PSYC 200C
2. One Research Methods course selected from CBNS 120/L/PSYC 120/L, CHEM 125, CHEM 221A, CHEM 221B, CHEM 221C, CHEM 221D, NRSC 201, PHYS 139L, PSYC 211
3. Two courses or one course sequence selected from the following: BCH 110A, BCH 110B, BCH 110C, BCH 241/CHM 241, BIOL 200/CMDB 200, BIOL 201/CMDB 201, BIOL 203, CBNS 120/PSYC 120, CBNS 127/PSYC 127, ENMT 206, PSYC 203A, PSYC 203B, PSYC 203C

The course option most appropriate to the student's career goals is determined by the student in consultation with his/her guidance committee.

4. During each quarter in academic residence every student enrolls and participates in the Colloquium in Neuroscience (CMDB 257 or NRSC 287/PSYC 287), and, until passing the oral qualifying examination, every student takes at least two seminars, Special Topics in Neuroscience (NRSC 289, 2 units), during each year of academic residence. One seminar per year is required after the qualifying examination is passed.

5. After completing the course requirements and no later than the ninth quarter in residence, the student is given a two-part qualifying examination, one written and one oral.

6. Regardless of whether financial support comes from fellowships or research assistantships, etc., students must be teaching assistants for at least two quarters in Neuroscience or related-area courses, such as those taught by their mentors.

7. Within three months of advancement to candidacy, the student must submit a written dissertation proposal to the dissertation committee for comments and approval. Before the dissertation is given final approval, the student must present a public lecture on the dissertation research to faculty and students in the program. Following the public lecture, the student meets with the dissertation committee for an oral defense in accordance with the regulations of the Graduate Division.

Normative Time to Degree

16 quarters

Graduate Courses

NRSC 200A. Fundamentals of Neuroscience (3)

Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. The fundamentals of neuroscience in molecular and cellular mechanisms, neural and hormonal systems, and neural control of behavior. Cross-listed with PSYC 200A.

NRSC 200B. Fundamentals of Neuroscience (3)

Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor; NRSC 200A/PSYC 200A. The fundamentals of neuroscience in molecular and cellular mechanisms, neural and hormonal systems, and neural control of behavior. Cross-listed with PSYC 200B.

NRSC 200C. Fundamentals of Neuroscience (3)

Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor; NRSC 200B/PSYC 200B. The fundamentals of neuroscience in molecular and cellular mechanisms, neural and hormonal systems, and neural control of behavior. Cross-listed with PSYC 200C.

NRSC 201. Neuroscience Laboratory (4) F Laboratory, 6 hours; lecture, 2 hours. Prerequisite(s): NRSC 200A/PSYC 200A; graduate standing or consent of instructor. Presents theoretical and practical aspects of modern methods and techniques used in nervous system research. Faculty teach modules on methods in which they have special expertise. Methods include, but are not limited to, light and fluorescence microscopy, imaging ion concentrations within cells, immunocytochemistry, and electrophysiology of model systems.

NRSC 287. Colloquium in Neuroscience (1)

Colloquium, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Involves oral presentations on current research topics in neuroscience by visiting scholars, faculty, and students. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with PSYC 287.

NRSC 288. Special Topics in Neuroscience (2)

Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. An interdisciplinary seminar consisting of student presentations and discussion of selected topics in neuroscience. Content and instructor(s) vary each time course is offered. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BCH 289, BIOL 289, CHEM 289, ENMT 289, and PSYC 289.

NRSC 290. Directed Studies (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Individual study, directed by a faculty member, of specially selected topics in neuroscience. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
knowledge, the nature of the mind and of the physical world, science, and language. The program provides a rigorous background in the history of Western philosophy, and studies contemporary approaches (both analytic and Continental) to philosophical issues. The B.A. degree in Philosophy prepares students for graduate study in philosophy, and is also excellent preparation for law school. For students interested in a double major, philosophy also serves as an excellent complement to psychology, mathematics, political science, and the natural sciences.

The Philosophy/Law and Society major offers students a means of understanding complex relationships between social institutions and provides a strong basis for graduate studies in areas related to law and philosophy. The Philosophy/Law and Society curriculum is sound background for students planning on pursuing the study of law.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The department offers two majors: the traditional Philosophy major, and a Philosophy/Law and Society major.

Philosophy Major
The major requirements for the B.A. degree in Philosophy are as follows:

- Fifty-six (56) units of course work in Philosophy including at least 36 upper-division units.
  1. PHIL 007 or PHIL 007H and PHIL 008 or PHIL 008H
  2. PHIL 100 (Sophomore-Junior Seminar)
  3. Three courses in the history of philosophy, at least one of which must be in ancient Greek or Roman philosophy. Select courses from PHIL 030 (E-Z), PHIL 120 (E-Z), PHIL 121 (E-Z), PHIL 122 (E-Z); a specific list is provided by the Philosophy Department. Not more than two courses may be from PHIL 030 (E-Z)
  4. At least two courses in metaphysics, epistemology, or philosophy of language: PHIL 130 through PHIL 152, PHIL 159.

Students are urged to consult the department's undergraduate advisor in preparing their course of study each quarter while at UCR.

Philosophy/Law and Society Major
Major requirements for a B.A. degree in Philosophy/Law and Society are as follows:

1. Philosophy requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) Three courses in the history of philosophy (two of which must be upper-division): PHIL 030 (E-Z), PHIL 120 (E-Z), PHIL 121 (E-Z), PHIL 122 (E-Z)
   c) Five courses in moral and political philosophy: PHIL 108, PHIL 116, PHIL 117, PHIL 159, and PHIL 161 through PHIL 169 (E-Z)

2. Law and Society requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWSO 100
   c) One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
   d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
   e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, POSC 186, SOC 147, SOC 149, SOC 180
   f) LWSO 193, Senior Seminar

Note: For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (Philosophy Department requirements and Law and Society requirements). The department has its own Philosophy/Law and Society undergraduate advisor, and each student is urged to consult the advisor in preparing a course of study each quarter while at UCR.

Minor
A student may minor (24 units) in Philosophy by taking either PHIL 007, PHIL 007H, PHIL 008 or PHIL 008H, four upper-division philosophy courses, and one other philosophy course at any level.

Students may also choose to do a Philosophy minor with special emphasis, taking their four upper-division courses from one of the areas listed below:

1. Philosophy, Literature, and History of Philosophy: PHIL 120 (E-Z), PHIL 121 (E-Z), PHIL 122 (E-Z), PHIL 132, PHIL 151, PHIL 152, PHIL 150, PHIL 159
2. Philosophy and Cognitive Science: PHIL 125, PHIL 126, PHIL 130, PHIL 131, PHIL 132, PHIL 133, PHIL 134, PHIL 135
3. Philosophy and the Natural Sciences: PHIL 117, PHIL 130, PHIL 134, PHIL 137, PHIL 140, PHIL 151, PHIL 167

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.
Graduate Program
The Department of Philosophy offers the M.A. and Ph.D. degrees in Philosophy.

Admission
Domestic applicants must supply GRE scores for the aptitude tests. All applicants must submit a statement of interest and a writing sample.

Upon entering the program, students are assigned a committee of two faculty advisors. Students consult with the graduate advisor and their advisory committees twice a year, in September and January, to discuss their individual course of study, progress in the program, and recent performance. In the first year, students (whether they have entered with an M.A. or a B.A.) take three proseminars for first-year graduate students, two in Metaphysics and Epistemology, and one in Moral Philosophy (PHIL 275A, PHIL 275B, PHIL 275C). The proseminars are designed to acquaint first-year students with the current state of discussion in central areas of contemporary philosophy and to impart the skills needed to conduct their own research.

Master's Degree
The Department of Philosophy offers the M.A. degree in Philosophy under Plan I (Thesis).

Course Work
Students must complete, with a grade of “B” or better, course work totaling 48 units of graduate credit in philosophy. Of these, 12 units must be in the three proseminars for first-year graduate students, and an additional 12 units must be seminars and workshops in the 272-283 series. Up to 24 units may be in the 100-series or 220–266 series courses, depending on the student’s interests and background. These courses are to be chosen only in consultation with the student’s advisory committee and the graduate advisor.

Courses taken on a Satisfactory (S)/No Credit (NC) basis cannot be used to satisfy course requirements.

Students should note that although they need not complete distributional requirements or a language requirement to acquire the M.A. degree, there are strict distributional and language requirements for the Ph.D. degree, as well as a colloquium and professional development workshop requirement (described below under the Ph.D. requirements). Students who expect to continue on in the Ph.D. program must begin to fulfill these requirements immediately upon entering the program if they expect to acquire the Ph.D. degree within the prescribed period of time.

M.A. Logic Requirement
The logic requirement for the M.A. degree is completion of PHIL 124 with a grade of “B” or better. Students may be excused from this requirement if they show sufficient knowledge of logic upon entering the graduate program, as indicated by an optional diagnostic examination administered at the start of each academic year. Students who are unsure about the adequacy of their background are encouraged to take the test for diagnostic purposes.

M.A. Paper
Students select a paper to submit to the graduate advisor as their M.A. paper no later than the end of the spring quarter of their second year. M.A. papers can be seminar papers, revised seminar papers, or any other paper that the student has written (of 25 pages or less). Further information on what constitutes an acceptable paper is available from the graduate advisor.

Upon the submission of this paper, the graduate advisor selects three faculty members to serve as the M.A. committee, which conducts an oral examination on the paper. Normally the oral examination will be completed before the end of the student’s second year, but it may be postponed until the fall quarter of the student’s third year. Failure to pass the M.A. oral examination after two opportunities constitutes grounds for dismissal from the program. In addition, completion of the M.A. requirements does not guarantee permission to continue in the Ph.D. program.

Doctoral Degree
The Department of Philosophy offers the Ph.D. degree in Philosophy.

Admission
Students are invited to continue toward candidacy for the Ph.D. degree on the basis of performance in courses and seminars, satisfactory completion of the M.A. requirements, and the recommendation of their advisory committee in consultation with the graduate advisor. A student’s course of study is supervised by an advisory committee, in consultation with the graduate advisor until the student’s dissertation committee is appointed. Students with a master’s degree in Philosophy from other universities are eligible for admission. These students must enroll in the first-year proseminars.

Course Work
Students must complete 12 more units in philosophy, with a grade of “B” or better, in addition to the 48 units for the M.A. degree. Of the student’s 60 graduate units in philosophy, 12 units must be in the area of the history of philosophy, with 4 of these in ancient philosophy, 4 units in addition to the proseminar (PHIL 275A, PHIL 275B) in the area of metaphysics and epistemology, and 8 units in addition to the proseminar (PHIL 275C) in the area of ethics, political philosophy, and aesthetics.

Thirty-two of these 60 units must be seminars and workshops in the 272-283 series. Courses taken on a Satisfactory (S)/No Credit (NC) basis cannot be used to satisfy course requirements.

Colloquia and Professional Development Workshop Requirement
Students must register for the PHIL 270 (Philosophy Colloquia) during each quarter of their first and second years. Students must register for PHIL 400 (Research and Professional Development Workshop) during each quarter of their second and third years.

Language Requirement
Students must show the competence necessary to work in one of four foreign languages: French, German, Latin, or Greek. Another language may be substituted upon approval of the faculty if it agrees better with the student’s area of their research.

Logic Requirement
To satisfy the logic requirement, students must pass PHIL 125 (Intermediate Logic) with a grade of “B” or better.

Proposition Requirement
All Ph.D. students must complete an acceptable proposition normally during their third year in the program. A proposition is a paper, no more than forty pages in length, devoted to a significant problem in philosophy. It should show the ability to mount a sustained thesis and to work with the relevant primary or secondary literature.

Written and Oral Qualifying Examinations
Students must write a dissertation prospectus and pass a qualifying oral examination before advancing to candidacy. This examination, which is supervised by a faculty committee as stipulated in the regulations of the Graduate Division, concentrates on the students’ preparation for writing a dissertation as indicated by the dissertation prospectus. It must be taken after the student has passed the M.A. language and proposition requirements and normally occurs within two quarters of the completion of these requirements.

Dissertation and Final Oral Examination
A dissertation to be presented as prescribed by the Graduate Council is prepared under the direction of the candidate’s dissertation committee. After completion of the dissertation, the candidate is examined in its defense by the dissertation committee.

Normative Time to Degree
18 quarters

Lower-Division Courses

PHIL 001. Introduction to Philosophy (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introductory exploration into the nature of the individual, his/her place in the universe, and the forces that shape his/her destiny. Credit is awarded for only one of PHIL 001 or PHIL 001H.

PHIL 001H. Honors Introduction to Philosophy (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 001. An introductory course designed to explore a small number of classical texts central to philosophy and the liberal arts and sciences. Students examine issues surrounding the nature of knowledge, the foundations of moral philosophy, and the relation of both to the development of the human and natural sciences. Texts may vary from year to year and include works by such authors as Plato, Aristotle, Descartes, Hobbes, Hume, and Kant. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of PHIL 001 or PHIL 001H.

PHIL 002. Contemporary Moral Issues (4) Lecture, 2 hours; discussion, 1 hour; consultation, 1 hour. Prerequisite(s): none. Philosophical analysis of contemporary moral issues such as: abortion, discrimina-
tion, sexual morality, punishment, the obligation to obey the law, suicide, euthanasia, war, privacy. Credit is awarded for one only of PHIL 002 or PHIL 002H.

PHIL 002H. Honors Contemporary Moral Issues (4) Lecture, 2 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 002. Philosophical analysis of contemporary moral issues such as abortion, discrimination, sexual morality, punishment, the obligation to obey the law, suicide, euthanasia, war, and privacy. Satisfactory (S) or No Credit (NC) grading is not available. Credit is only awarded for one of PHIL 002 or PHIL 002H.

PHIL 003. Ethics and the Meaning of Life (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Approaches one of the basic questions of value: How should one live? Covers classical and contemporary discussions of issues such as the human good, human virtue, the role of pleasure and happiness, egoism and altruism, duty, the relativity and objectivity of value, the meaning of life, death, autonomy, integrity, and conscience. Credit is awarded for only one of PHIL 003 or PHIL 003H.

PHIL 003H. Honors Ethics and the Meaning of Life (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 003. Approaches one of the basic questions of value: How should one live? Covers classical and contemporary discussions of issues such as the human good, human virtue, the role of pleasure and happiness, egoism and altruism, duty, the relativity and objectivity of value, the meaning of life, death, autonomy, integrity, and conscience. Satisfactory (S) or No Credit (NC) grading is not available. Credit is only awarded for one of PHIL 003 or PHIL 003H.

PHIL 004. Introduction to the Philosophy of Race (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to the philosophy of race from classical theorists to contemporary critical race theory. Topics covered include: the Enlightenment, discussions of race in the founding of the American Republic, Supreme Court decisions from Dred Scott to recent affirmative action decisions, and the concept of race as a social construction.

PHIL 005. Evil (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introductory discussion of the nature of evil, its motivation, and its origins. Examines these themes through a variety of sources, including both classical philosophical texts, and contemporary films.

PHIL 006. Reason, Belief, and Truth (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introductory examination of the nature of reason, rationality, argument, proof, and persuasion and the nature of truth, belief, faith and conviction, and truth and falsity. Discusses the various bodies of belief and modes of inquiry, such as the natural and social sciences, the humanities, morality, religion, and mathematics.

PHIL 007. Introduction to Critical Thinking (4) Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): none. A practical examination of reasoning and argument, typically illustrated. Satisfactory (S) or No Credit (NC) grading is not available. Credit is only awarded for one of PHIL 007 or PHIL 007H.

PHIL 007H. Honors Introduction to Critical Thinking (4) Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 007. A practical examination of reasoning and argument, typically illustrated. Satisfactory (S) or No Credit (NC) grading is not available. Credit is only awarded for one of PHIL 007 or PHIL 007H.

PHIL 008. Introduction to Logic (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to symbolic logic. Teaches how to distinguish, in a precise way, valid deductive arguments from those that are invalid; includes learning to use logical symbols, truth tables, and formal deductions. Credit is awarded for only one of PHIL 008 or PHIL 008H.

PHIL 008H. Honors Introduction to Logic (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 008. An introduction to symbolic logic. Teaches how to distinguish, in a precise way, valid deductive arguments from those that are invalid; includes learning to use logical symbols, truth tables, and formal deductions. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of PHIL 008 or PHIL 008H.

PHIL 009. Biomedical Ethics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduces the major camps in ethical theory - utilitarianism, deontology, virtue ethics, and feminist ethics. Applies these theories to critically examine contemporary issues in bioethics. Includes stem-cell research, assisted reproductive technologies, contract gestation, maternal-fetal conflicts, genetic and pharmaceutical enhancements, access to health care, and physician-assisted suicide. Credit is awarded for only one of PHIL 009 or PHIL 009H.

PHIL 009H. Honors Biomedical Ethics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 009. Introduces the major camps in ethical theory - utilitarianism, deontology, virtue ethics, and feminist ethics. Applies these theories to critically examine contemporary issues in bioethics. Includes stem-cell research, assisted reproductive technologies, contract gestation, maternal-fetal conflicts, genetic and pharmaceutical enhancements, access to health care, and physician-assisted suicide. Satisfactory (S) or No Credit (NC) grading is not available. Credit is only awarded for one of PHIL 009 or PHIL 009H.

PHIL 010. Language, Mind, and Reality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Explores the nature of language, communication, and mentality and their role in shaping our thought and experience of the world. Tackles questions about the innateness of concepts, the social and rational norms governing communication, the nature of speech acts and their connection to hate speech and pornography, and the scope of mentality. Credit is awarded for only one of PHIL 010 or PHIL 010H.

PHIL 010H. Honors Language, Mind, and Reality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to PHIL 010. Explores the nature of language, communication, and mentality and their role in shaping our thought and experience of the world. Tackles questions about the innateness of concepts, the social and rational norms governing communication, the nature of speech acts and their connection to hate speech and pornography, and the scope of mentality. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of PHIL 010 or PHIL 010H.

PHIL 012. Introductory Seminar in Moral Philosophy (4) Seminar, 3 hours; extra reading, 2 hours. Prerequisite(s): none. An introduction to a small number of central moral issues: Small class size in order to provide for substantial discussion and close supervision of written papers.

PHIL 030 (E-Z). Introduction to the History of Philosophy (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introductionary surveys of important periods and subjects in the history of Western philosophy. Topics include: Greek philosophy; Pre-Socrates through Aristotle; F. Hellenistic Philosophy; Epicureans, Stoics, and Skeptics; G. Medieval Philosophy; I. Early Modern Philosophy; J. Late Modern Philosophy; K. Nineteenth-Century Philosophy; M. History of Ethics; N. History of Political Philosophy.

Upper-Division Courses

PHIL 100. Sophomore-Junior Seminar (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): one course in philosophy; sophomore, junior, or senior standing in Philosophy or Philosophy/Law and Society. A writing-intensive seminar designed to introduce students to philosophical analysis and writing through an in-depth focus on a philosophical text or issue. Content varies.

PHIL 107. Languages and Minds (4) Lecture, 3 hours; extra reading, 2 hours. Written work, 1 hour. Prerequisite(s): one course in philosophy or consent of instructor. An investigation of interrelated issues in the philosophy of mind and language, including the mind-body relation, theories of meaning, how thoughts and language represent states of affairs in the world, and the nature of consciousness.

PHIL 108. Philosophical Issues of Race and Gender (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigates philosophical issues concerning race and gender. Themes include the role of cultural and biological criteria in defining these concepts; the roles of race and gender in personal identity; the nature of racism, sexism, and their variants; and policy implications such as affirmative action and the civil status of homosexual relationships. Cross-listed with WMST 108.

PHIL 110. Asian Philosophy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A general introduction to philosophy as well as a survey of Asian contributions to philosophy, focusing on the Indian and Chinese traditions. Examines questions concerning how best to live one’s life, what can be known, the relation between mind and body, whether there are minds and bodies, and the nature of the universe.

PHIL 111. Philosophy, Film, and Reflective Popular Culture (4) Lecture, 3 hours; screening, 1 hour; extra reading, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines a number of philosophical themes as depicted in film and/or other media of reflective popular culture. Four or five films are screened; each is examined for the philosophical issues it raises. Themes may include integrity, love, spirituality, meaning, identity, and morality.

PHIL 112. Mortal Questions (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on aspects of our distinctively human capacity to lead a meaningful life, especially investigating aspects of the nature of the mind and human freedom. The nature of death and its place in the context of a meaningful life is discussed.

PHIL 113. God (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. Topics include examination of the nature of divinity and the nature of evil, the influence of the concept of God upon philosophical history, ideals, and values, and the middle of an after-life.
PHIL 114. Science and Human Understanding (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Discusses how contemporary philosophers have examined human understanding as exemplified in science.

PHIL 115. The Care of the Soul (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A historical and contemporary examination of the role philosophy has played in nurturing the human spirit in the face of other philosophical efforts to demythologize the soul into neural functions or even mere congeries of atoms in motion in the void.

PHIL 116. Business Ethics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An inquiry into some of the moral issues arising from business life, such as conflicts of interest, responsibility to consumers, corporate culture and character, and the morality of competition. Also considers the history of ethics and the history business as an institution.

PHIL 117. Environmental Ethics (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. A philosphic consideration of ethical problems that arise from the use and exploitation of the environment. Topics covered include workplace pollution hazards; environmental pollution and protection of collective natural resources; the rights of future generations; the rights of animals; the protection of endangered species.

PHIL 118. Personhood and Personal Identity (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Develops the basic elements of the concept of personhood, and how persons are alleged to be crucially different from non-human animals. Various theories are considered about what is essential to us as individuals and what makes us the same person over time. Explores the relationship between these metaphysical issues and moral issues, such as euthanasia, animals' rights, and abortion.

PHIL 119. Economics and Philosophy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102B or consent of instructor. Examines issues on the boundary of economics and philosophy. Topics include social choice theory and economic justice; foundations of utility theory, rational choice, and economic welfare; epistemology and the philosophies of science of Popper, Kuhn, and others. Cross-listed with ECON 117.

PHIL 120 (E-Z). Ancient Philosophy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Each segment covers a major figure in ancient Greek or Roman philosophy. E. Plato; F. Aristotle; G. Plato and Aristotle; I. Cicero; J. Seneca; K. Plutarch. Credit is awarded for only one of PHIL 120 (E-Z) or PHIL 220 (E-Z).

PHIL 121 (E-Z). Major Philosophers (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Each segment covers a major figure in the history of medieval, early modern, or late modern philosophy. E. Aquinas; F. Descartes; G. Leibniz; I. Spinoza; J. Locke; K. Hume; M. Reid; N. Kant; O. Hegel; G. Nietzsche; R. Royce; S. Freud; T. Heidegger; V. Wittgenstein; X. Kripke. Credit is awarded for only one of each of the corresponding lettered segments of PHIL 121 (E-Z) and PHIL 221 (E-Z).

PHIL 122 (E-Z). Topics in History of Philosophy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Topics include E. Ancient Philosophy; F. Medieval Philosophy; I. French Renaissance Philosophy; J. Early Modern Philosophy; M. Moral Theories of Hume and Kant; N. Nineteenth-Century Philosophy; O. Kant and Post-Kantian European Moral Philosophy; P. Logical Philosophy; R. Origins of Analytical Philosophy. Credit is awarded for only one of each of the corresponding lettered segments of PHIL 122 (E-Z) and PHIL 222 (E-Z).

PHIL 124. Formal Logic (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 120/EE 120A or CS 150 or MATH 112 or PHIL 008 or PHIL 008H or consent of instructor. An introduction to first-order logic, the core of the logic often used in contemporary philosophy, mathematics, computer science, and linguistics.

PHIL 125. Intermediate Logic (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): PHIL 124 or consent of instructor. The basic meta-theory of first-order logic; with an emphasis on the precise relation between its syntax (formulas, rules of inference, and proofs) and semantics (interpretations, truth, validity), leading to the soundness and completeness theorems.

PHIL 126. Advanced Logic (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): PHIL 125. Advanced meta-theory of first-order logic, leading to a discussion of some of the important incompleteness, undecidability and non-expressability results of twentieth-century logic (Godel, Church, Turing, etc.).

PHIL 130. Theory of Knowledge (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An inquiry into the nature of human knowledge—its possibility, criteria, scope, and limitations. Credit is awarded for only one of PHIL 130 or PHIL 230.

PHIL 131. Twentieth-Century Analytic Philosophy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. A discussion of some major issues and thinkers in the tradition dominant in twentieth-century British and American philosophy. Philosophers discussed might include Frege, Russell, Carnap, Quine, Kripke, and D. Lewis. Credit is awarded for only one of PHIL 131 or PHIL 231.

PHIL 132. Philosophy of Language (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of some of the traditional issues in the philosophy of language, such as analyticity, theories of reference, truth, speech act theory, and philosophical theories of formal grammars. Credit is awarded for only one of PHIL 132 or PHIL 232.

PHIL 133. Metaphysics (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An investigation of some of the traditional problems in Western philosophy that have been labeled metaphysical, such as the existence of God, the relationship between mind and body, the determinism versus free will debate, and the nature of time and space. Credit is awarded for only one of PHIL 133 or PHIL 233.

PHIL 134. Philosophy of Mind (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. A study of several theories of the nature of mind and an analysis of particular issues occasioned by them: the mind-body problem, personal identity, emotions, human action, self-knowledge, knowledge of other minds, and explanations of human behavior. Credit is awarded for only one of PHIL 134 or PHIL 234.

PHIL 135. Philosophy of Psychology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Examines philosophical issues arising in the context of empirical psychology. Topics may include moral development, artificial intelligence and the modeling of cognition, the nature of perception and memory, fallacies in human reasoning, mechanisms of self-understanding, and mental illness and personhood. Credit is awarded for only one of PHIL 135 or PHIL 235.

PHIL 137. Philosophy of Science (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Topics discussed include understanding scientific objectivity in the light of history and sociology of science; realism and anti-realism about scientific theories; scientific methodology and its logic; and the nature of scientific explanation. Credit is awarded for only one of PHIL 137 or PHIL 237.

PHIL 138. Philosophy of Agency (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An investigation of problems that arise in attempts to understand human agency: the nature and peculiarities of action, intention, free will and moral responsibility, and weakness of will. Credit is awarded for only one of PHIL 138 or PHIL 238.

PHIL 139. Philosophy of Mathematics (4) Lecture, 3 hours; extra reading, written work, homework problems, 3 hours. Prerequisite(s): PHIL 124 or one mathematics course or consent of instructor. Discusses topics such as the abstract nature of mathematical objects, the sources of mathematical knowledge, the relation between mathematics and logic, and the infinite in mathematics. Considers the development of some selected parts of mathematics (especially arithmetic, geometry, algebra, and set theory) and of various corresponding philosophical positions (platonism, formalism, intuitionism, structuralism). Course is repeatable as content changes. Credit is awarded for only one of PHIL 139 or PHIL 239.

PHIL 140. Topics in Metaphysics (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An in-depth discussion of selected issues in contemporary metaphysics, such as abstract objects, essentialism and identity, laws of nature, free will, and determinism. Course is repeatable as content changes.

PHIL 142. Advanced Topics in the Philosophy of Language (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): PHIL 107 or PHIL 132 or consent of instructor. An in-depth study of a particular topic in the philosophy of language. Potential topics include context-sensitivity (how the meaning of a sentence depends upon nonlinguistic facts about context); theories of meaning (e.g., the Frege-Russell account in terms of propositions, the Lewis-Stalnaker possible worlds account, and Davidson's truth theory account). Courses is repeatable as content changes to a maximum of 8 units. Credit is awarded for only one of PHIL 142 or PHIL 242.

PHIL 144. Advanced Topics in Philosophy of Mind (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): PHIL 107 or PHIL 134 or consent of instructor. Examines a selected topic in philosophy of mind. Potential topics include consciousness and self-consciousness; intentionality and theories of mental content; mental causation; consciousness and...
PHIL 150. Philosophy in Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. An examination of philosophical issues raised by selected novelists, poets, and playwrights.

PHIL 151. Existentialism (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An inquiry into the nature of criminal law, democracy, natural rights, justice, equality, and civil disobedience. Credit is awarded for only one of PHIL 151 or PHIL 251.

PHIL 152. Twentieth-Century Continental Philosophy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Examines the character and consequences of several recent movements in continental philosophy, including hermeneutics, structuralism, deconstruction, and critical theory. Authors discussed include Heidegger, Gadamer, Habermas, Derrida, and Foucault. Credit is awarded for only one of PHIL 152 or PHIL 252.

PHIL 153. Marxist Critique (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of the ideas central to the tradition of Western Marxism: ideology, critique, refutation, instrumental reason, the domination of nature, and communicative action. Theorists discussed typically include Hegel, Marx, Lukacs, Adorno, Horkheimer, Benjamin, and Habermas. Credit is awarded for only one of PHIL 153 or PHIL 253.

PHIL 159. Philosophy of Religion (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A historical, critical examination of the concepts and arguments involved in the Judeo-Christian God-hypothesis, and the influence of this world view upon the ideals and values of the Western world. Credit is awarded for only one of PHIL 159 or PHIL 259.

PHIL 161. Ethics (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. A study of the major classical moral philosophers in the Western tradition and of some selected problems of metaethics. Credit is awarded for only one of PHIL 161 or PHIL 261.

PHIL 163. Political Philosophy (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An inquiry into some of the major philosophical issues arising from political life, such as the nature and justification of authority, democracy, natural rights, justice, equality, and civil disobedience. Credit is awarded for only one of PHIL 163 or PHIL 263.

PHIL 164. Justice (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A philosophical analysis of the concept of justice. Credit is awarded for only one of PHIL 164 or PHIL 264.

PHIL 165. Philosophy of Law (4) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An inquiry into the nature of criminal law, the relation between law and morality, the nature of legal responsibility, and the obligation to obey the law. Credit is awarded for only one of PHIL 165 or PHIL 265.

PHIL 166. Philosophy of Feminism (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analysis of current concepts and debates in feminist philosophy including gender equality, gender difference, and the relation of sex and gender. Situates various approaches to these topics in the history of philosophy. Credit is awarded for only one of PHIL 166 or PHIL 266.

PHIL 167. Biomedical Ethics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A philosophical discussion of newly emerging issues, both ethical and social, in biomedicine. An exploration of the ways in which feminist theory provides insight on contemporary issues in bioethics. Topics include women in clinical research, cosmetic surgery, abortion, contract gestation, fetal protection policies, and the politics of mental illness. Cross-listed with WMST 141.

PHIL 168. Ethics and Families (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analysis of some of the ethical issues that arise in and with regard to families of different kinds. Issues may include gender relations in "traditional marriages"; the ethics of same-sex marriage; the morality of abortion, surrogate mothering, and cloning; the justice of school vouchers; the grounds for universal health care; and possible gender inequalities in divorce. Cross-listed with WMST 141.

PHIL 169 (E-Z). Topics in Value Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): one course in philosophy or consent of instructor. Topics include E. Ethics; F. Aesthetics; G. Political Philosophy; I. Social Philosophy; J. Philosophy of Law.

PHIL 171. Feminist Bioethics (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An analysis of the ways in which feminist theory provides insight on contemporary issues in bioethics. Topics include women in clinical research, cosmetic surgery, abortion, contract gestation, fetal protection policies, and the politics of mental illness. Cross-listed with WMST 106.

PHIL 190. Special Studies (1-5) To be taken with the approval of the department Chair as a means of meeting special curricular problems. Course is repeatable to a maximum of 16 units.

PHIL 193. Senior Seminar (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): two upper-division courses in philosophy, senior standing in Philosophy or Philosophy/Law and Society or consent of instructor. Advanced seminar for Philosophy majors. Course is repeatable as content changes to a maximum of 8 units.

PHIL 195. Senior Thesis (1-4) Prerequisite(s): enrollment by request of student with approval of department chair. Course is graded In Progress (IP) until the thesis is completed. Course is repeatable to a maximum of 8 units.

PHIL 198. Individual Internship in Philosophy (2-8) Internship, 4-16 hours; written work, 2-8 hours. Prerequisite(s): upper-division standing; consent of instructor. An intern assignment in government, education, science, business, or other field related to philosophy. Students write a substantive philosophical paper pertaining to the work done in the internship. Course is repeatable to a maximum of 8 units.

PHIL 202 (E-Z). Ancient Philosophy (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Each segment covers a major figure in ancient Greek or Roman philosophy. E. Plato; F. Aristotle; G. Plato and Aristotle; I. Cicero; J. Seneca; K. Plutarch. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a satisfactory (S) or no credit (NC) grade. Credit is awarded for only one of each of the corresponding lettered segments of PHIL 210 (E-Z) and PHIL 220 (E-Z).

PHIL 221 (E-Z). Major Philosophers (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Each segment covers a major figure in the history of medieval, early modern, or late modern philosophy. E. Aquinas; F. Descartes; G. Leibniz; I. Spinoza; J. Locke; K. Hume; M. Reid; N. Kant; O. Hegel; Q. Nietzsche; R. Royce; S. Freud; T. Heidegger; V. Wittgenstein; K. Kriste. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a satisfactory (S) or no credit (NC) grade. Credit is awarded for only one of each of the corresponding lettered segments of PHIL 212 (E-Z) and PHIL 222 (E-Z).

PHIL 222 (E-Z). Topics in History of Philosophy (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Topics include E. Ancient Philosophy; F. Medieval Philosophy; I. French Renaissance Philosophy; J. Early Modern Philosophy; M. Moral Theories of Hume and Kant. N. Nineteenth-Century Philosophy; O. Kant and Post-Kantian European Moral Philosophy; Q. Political Philosophy; R. Origins of Analytical Philosophy. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a satisfactory (S) or no credit (NC) grade. Credit is awarded for only one of each of the corresponding lettered segments of PHIL 122 (E-Z) and PHIL 222 (E-Z).

PHIL 230. Theory of Knowledge (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An inquiry into the nature of human knowledge—including possibility, criteria, scope, and limits. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a satisfactory (S) or no credit (NC) grade. Credit is awarded for only one of PHIL 130 or PHIL 230.

PHIL 231. Twentieth-Century Analytic Philosophy (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. A discussion of some major issues and thinkers in the tradition dominant in twentieth-century British and American philosophy. Philosophers discussed might include Frege, Russell, Carnap, Quine, Kripke, and D. Lewis. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a satisfactory (S) or no credit (NC) grade. Credit is awarded for only one of PHIL 131 or PHIL 231.

PHIL 232. Philosophy of Language (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. A study of some of the traditional issues in the philosophy of language, such as analyticity, theories of reference, truth, speech act theory, and philosophical theories of formal grammar. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a satisfactory (S) or no credit (NC) grade. Credit is awarded for only one of PHIL 132 or PHIL 232.
PHIL 233. Metaphysics (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An investigation of some of the traditional problems in Western philosophy that have been labeled metaphysical, such as the existence of God, the relationship between mind and body, the determinism versus free will debate, and the nature of time and space. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 133 or PHIL 233.

PHIL 234. Philosophy of Mind (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. A study of several theories of the nature of mind and an analysis of particular issues occasioned by them: the mind-body problem, personal identity, emotions, human action, self-knowledge, knowledge of other minds, and explanations of human behavior. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 134 or PHIL 234.

PHIL 235. Philosophy of Psychology (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Examines philosophical issues arising in the context of empirical psychology. Topics may include moral development, artificial intelligence and the modeling of cognition, the nature of perception and memory, fallacies in human reasoning, mechanisms of self-understanding, and mental illness and personhood. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 135 or PHIL 235.

PHIL 237. Philosophy of Science (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Topics discussed include understanding scientific objectivity in the light of the history and sociology of science; realism and antirealism about scientific theories; scientific methodology and its logic; and the nature of scientific explanation. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 137 or PHIL 237.

PHIL 238. Philosophy of Agency (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An investigation of problems that arise in attempts to understand human agency, such as the nature and explanation of action, intention, free will and moral responsibility, and weakness of will. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 138 or PHIL 238.

PHIL 239. Philosophy of Mathematics (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Discusses topics such as the abstract nature of mathematical objects, the sources of mathematical knowledge, the relation between mathematics and logic, and the infinite in mathematics. Considers the development of some selected parts of mathematics (especially arithmetic, geometry, algebra, and set theory) and of various corresponding philosophical positions (platonism, formalism, intuitionism, structuralism). Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes. Credit is awarded for only one of PHIL 139 or PHIL 239.

PHIL 242. Advanced Topics in the Philosophy of Language (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An in-depth study of a particular topic in the philosophy of language. Topics include: truth, reference, meaning, the meaning of a sentence depends upon nonlinguistic facts about context; theories of meaning (e.g., the Frege-Russell account in terms of propositions, the Lewis-Stalnaker possible worlds account, and Davidson’s truth theory account). Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 142 or PHIL 242.

PHIL 244. Advanced Topics in Philosophy of Mind (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Examines a selected topic in philosophy of mind. Potential topics include consciousness, free will, self-consciousness, artificial minds, and animal minds. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as content changes to a maximum of 8 units. Credit is awarded for only one of PHIL 144 or PHIL 244.

PHIL 251. Existentialism (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An examination of philosophical and literary works which deal with the significance of some fundamental human experiences: identity crises, choice and commitment, anxiety and death, the experience of meaningless, and alienation. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 151 or PHIL 251.

PHIL 252. Twentieth-Century Continental Philosophy (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Examines the character and consequences of several recent movements in continental philosophy. Topics include Heidegger, Gadamer, Habermas, Derrida, and Foucault. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 152 or PHIL 252.

PHIL 253. Marxist Critique (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An examination of the ideas central to the tradition of Western Marxism: ideology, critique, refutation, instrumental reason, the domination of nature, and communicative action. Theorists discussed typically include Hegel, Marx, Lukacs, Adorno, Horkheimer, Benjamin, and Habermas. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 153 or PHIL 253.

PHIL 254. Marxist Critique (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Analyzes concepts and debates in Marxist philosophy including economic equality, gender difference, and the relation of sex and gender. Situates various approaches to these topics in the history of philosophy. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 154 or PHIL 254.

PHIL 260. Philosophy of Science (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. Close reading of a philosophical text or texts on a single topic. May be undertaken as a one-, two-, or three-quarter course (PHIL 272A, PHIL 272B, PHIL 272C). Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned. PHIL 272A, PHIL 272B, and PHIL 272C are repeatable as their contents change to a maximum of 12 units on one topic and to a maximum of 36 units for the three courses.

PHIL 262. Philosophy of Religion (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): consent of instructor. Close reading of a philosophical text or texts on a single topic. May be undertaken as a one-, two-, or three-quarter course (PHIL 272A, PHIL 272B, PHIL 272C). Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned. PHIL 272A, PHIL 272B, and PHIL 272C are repeatable as their contents change to a maximum of 12 units on one topic and to a maximum of 36 units for the three courses.

PHIL 265. Philosophy of Law (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An inquiry into the nature of criminal law, the relation between law and morality, the nature of legal responsibility, and the obligation to obey the law. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 164 or PHIL 264.

PHIL 266. Philosophy of Feminism (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): graduate standing. An analysis of current concepts and debates in feminist philosophy including gender equality, gender difference, and the relation of sex and gender. Situates various approaches to these topics in the history of philosophy. Students who complete all writing assignments, including a term paper, receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Credit is awarded for only one of PHIL 165 or PHIL 265.

PHIL 270. Philosophy Colloquium (1) Colloquium, 1 hour. Prerequisite(s): graduate standing. Visiting scholars give oral reports on current research in philosophy and discuss them with students and faculty. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
gle topic. May be undertaken as a one-, two-, or three-quarter course (PHIL 272A, PHIL 272B, PHIL 272C). Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned. PHIL 272A, PHIL 272B, and PHIL 272C are repeatable as their contents change to a maximum of 12 units on one topic and to a maximum of 36 units for the three courses.

PHIL 272C. Workshop in Philosophy (2-4) Workshop, 2-3 hours; outside research, 1-3 hours. Prerequisite(s): PHIL 272B, consent of instructor. Close reading of a philosophical text or texts on a single topic. May be undertaken as a one-, two-, or three-quarter course (PHIL 272A, PHIL 272B, PHIL 272C). Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Graded In Progress (IP) until the last quarter is completed, at which time a final grade is assigned. PHIL 272A, PHIL 272B, and PHIL 272C are repeatable as their contents change to a maximum of 12 units on one topic and to a maximum of 36 units for the three courses.

PHIL 275A. Proseminar for First-Year Graduate Students: Metaphysics and Epistemology (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): PHIL 275A; first-year standing in the graduate program in Philosophy. One course in a three-term sequence designed to introduce new graduate students to current issues and methods of research in metaphysics and epistemology.

PHIL 275B. Proseminar for First-Year Graduate Students: Morals and Ethics (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): PHIL 275A; first-year standing in the graduate program in Philosophy. One course in a three-term sequence designed to introduce new graduate students to current issues and methods of research in metaphysics and epistemology.

PHIL 275C. Proseminar for First-Year Graduate Students: Moral Philosophy (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): PHIL 275A; first-year standing in the graduate program in Philosophy. One course in a three-term sequence designed to introduce new graduate students to current issues and methods of research.

PHIL 280. Seminar in Philosophical Problems (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Considers an important philosophical problem. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

PHIL 281. Philosophical Texts (1-4) Seminar, 1-3 hours; consultation, 1 hour. Prerequisite(s): graduate standing. Involves focused reading and discussion of common text on research topics in philosophy. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

PHIL 282. Seminar in Individual Philosophers (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Considers a major figure in the history of philosophy. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

PHIL 283. Seminar in Contemporary Philosophy (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers an aspect of contemporary philosophy. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable.

PHIL 290. Directed Studies (1-6) Term paper, 3-18 hours. Prerequisite(s): consent of instructor and graduate advisor. Directed study to meet special curricular needs. Course is repeatable.

PHIL 291. Individual Studies in Coordinated Areas (2-4) Prerequisite(s): graduate standing. A program of studies designed to advise and assist candidates who are preparing for the Comprehensive Examinations. Open to M.A. students only; does not count toward the unit requirement for the M.A. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PHIL 292. Concurrent Analytical Studies in Philosophy (1-4) Prerequisite(s): consent of instructor. Each 292 course will be taken concurrently with some 100-series course, approved by the Graduate Advisor, but on an individual basis. It will be devoted to completion of a graduate paper based on research or criticism related to the 100-series course. Faculty guides and evaluations will be provided throughout the quarter. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

PHIL 297. Directed Research (1-6) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PHIL 299. Research for Thesis or Dissertation (1-12) Prerequisite(s): graduate standing. A series of presentations and workshops designed to advise and assist candidates who are preparing for the Comprehensive Examinations. Open to M.A. students only; does not count toward the unit requirement for the M.A. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PHIL 300. Directed Studies in the Teaching of Philosophy (1) Seminar, 1 hour. Prerequisite(s): graduate standing. A program of orientation, lectures, and workshops designed to enhance the Teaching Assistant’s understanding of teaching methods in philosophy. Does not count toward the unit requirement for the M.A. degree. Course is repeatable.

PHIL 301. Teaching Practicum (1-4) Prerequisite(s): employment as Teaching Assistant or Associate. Supervised teaching in lower-division courses and LWSO 101. Required of all new Teaching Assistants. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

PHIL 400. Research and Professional Development Workshop (1) Workshop, 8 hours per quarter; extra reading, 8 hours per quarter. Prerequisite(s): graduate standing. A series of presentations and workshops focusing on a variety of issues in research, professional development, and teaching. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 18 units.

Physics and Astronomy

Subject abbreviation: PHYS

College of Natural and Agricultural Sciences

Harry W.K. Tom, Ph.D., Chair
John A. Ellison, Ph.D., Vice Chair
Department Office, 3047 Physics
(951) 827-5331; physics.ucr.edu

Professors
Kenneth N. Barish, Ph.D.
Robert B. Clare, Ph.D.
Bipin R. Desai, Ph.D.
John A. Ellison, Ph.D.
J. William Gary, Ph.D.
Gail G. Hanson, Ph.D.
Ernest S. Ma, Ph.D.
Allen P. Mills, Ph.D.
Bahram Mobasher, Ph.D.
Umar Mohiudeen, Ph.D.
Richard K. Seto, Ph.D.
Jing Shi, Ph.D.
Harry W.K. Tom, Ph.D.
Chandra M. Varma, Ph.D.
Stephen J. Wippeny, Ph.D.
Jose Wudka, Ph.D.
Jory A. Yarmoff, Ph.D.

Professors Emeriti
Frederick W. Cummings, Ph.D.
Sun-Yiu Fung, Ph.D.
Peter E. Kaus, Ph.D.
Anne Kernan, Ph.D.
Nai-Li H. Liu, Ph.D.
Donald C. McCollum, Ph.D.
John C. Nickel, Ph.D.
Douglas E. MacLaughlin, Ph.D.
Raymond L. Orbach, Ph.D.
Michael Pollak, Ph.D.
Eugen S. Simanek, Ph.D.
R. Stephen White, Ph.D.
Allen D. Zych, Ph.D.

Associate Professors
Ward Beyermann, Ph.D.
Owen Long, Ph.D.
Leonid P. Pryadko, Ph.D.
Gillian Wilson, Ph.D.

Assistant Professors
E. Gabriela Canalizo, Ph.D.
Roland Kawakami, Ph.D.
Chun Ning “Jeanie” Lau, Ph.D.
Kirill Shengel, Ph.D.
Shan-Wen Tsai, Ph.D.
Roya Zandi, Ph.D.

Major

The Department of Physics and Astronomy offers two degrees: the B.A. and B.S. in Physics. The B.S. program is designed for students with a strong interest in the sciences or engineering who wish to emphasize this aspect of their education and training. The B.S. degree provides a strong background in science or to pursue a career combining business management opportunities with a knowledge in science and...
technology.

The extensive course offerings and modern facilities within the Department of Physics and Astronomy, coupled with close, personal counseling by faculty advisors, provide students with a physics program that is characterized by its breadth and flexibility.

Career Opportunities

Graduates with a bachelor's degree in Physics generally begin their careers in government or industry. Professions include research and development, system modeling and analysis, and sales in a large variety of fields. A Physics degree provides one of the most flexible qualifications with direct applications to materials science, advanced electronics, lasers and microwave devices, computing and communications.

The federal government and national laboratories employ many physicists as do industries in medical and scientific instruments, computers, audio and telecommunications equipment, financial analysis and investments, material science, and engineering.

The bachelor’s degree programs in the UCR Department of Physics and Astronomy are well suited for continued education in graduate school and for preparation in technical and professional careers. Colleges or universities, national laboratories, industry, and governmental agencies employ students with graduate training.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college's breadth requirements. Consult with a department advisor for course planning.

Major Requirements

The major requirements for the B.S. and B.A. degrees in Physics are as follows:

1. Lower-division requirements (63-64 units)
   a) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   c) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   d) PHYS 045A, BIOL 005B, BIOL 005C, BIOL 051A

2. Upper-division requirements (55 units)
   a) PHYS 130A, PHYS 130B, PHYS 134, PHYS 135A, PHYS 135B, PHYS 136, PHYS 156A, PHYS 156B
   b) PHYS 139L, PHYS 142L. An approved senior thesis (PHYS 195A, PHYS 195B, PHYS 195C, PHYS 195D) in experimental physics at a government or industrial laboratory can be used in place of up to 3 units of PHYS 142L.
   c) A student may take up to a maximum of 8 units of undergraduate research in pursuit of a senior thesis (PHYS 195A, PHYS 195B, PHYS 195C, PHYS 195D).
   d) During the junior or senior years, a Physics internship (PHYS 198-I) of up to 12 units can be taken at an approved government or industrial laboratory. A maximum of 3 out of the 12 units may be used to satisfy the major requirements.
   e) Three elective courses to be taken in consultation with a faculty advisor.

Specialized skills can be developed by taking physics electives from the following:

PHYS 111 (Astrophysics and Stellar Astronomy)
PHYS 150A, PHYS 150B (Introduction to Condensed Matter Physics)
PHYS 151 (Topics in Modern Condensed Matter Physics)
PHYS 163 (Atomic Physics and Spectroscopy)
PHYS 164 (Introduction to Nuclear Physics)
PHYS 165 (Introduction to Particle Physics)
PHYS 166 (Cosmology)
PHYS 168 (Environmental Physics)
PHYS 177 (Computational Methods for Physical Sciences)

Biophysics option (B.S. degree only)

1. Lower-division requirements (76-77 units)
   a) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   c) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   d) PHYS 045A, BIOL 005B, BIOL 005C, BIOL 051A
   e) STAT 155
   f) CHEM 112A, CHEM 112B, CHEM 112C
   g) BIOL 105
   h) BCH 110A, BCH 110B, BCH 110C. Students may substitute BIOL107A for BCH110C

2. Upper-division requirements (88 units)
   a) PHYS 130A, PHYS 130B, PHYS 134, PHYS 135A, PHYS 135B, PHYS 136, PHYS 156A, PHYS 156B
   b) PHYS 139L, PHYS 142L (3 units)
   c) Two electives from the following list (8 units): PHYS 111, PHYS 145A, PHYS 145B, PHYS 145C, PHYS 150A, PHYS 150B, PHYS 151, PHYS 163, PHYS 164, PHYS 165, PHYS 166, PHYS 168, PHYS 177
   d) EDUC 100B, EDUC 109, EDUC 110, EDUC 116, EDUC 139, EDUC 174, EDUC 177A
   e) 12 units of elective courses (chosen after consultation with a faculty advisor)

Physics Education option

1. Lower-division requirements (73-74 units)
   a) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E
   b) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
   c) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 011A, CHEM 011B, CHEM 011C
   d) EDUC 003, EDUC 004
   e) LING 020 or LING 021

2. Upper-division requirements (75 units)
   a) PHYS 130A, PHYS 130B, PHYS 134, PHYS 135A, PHYS 135B, PHYS 136, PHYS 156A, PHYS 156B
   b) PHYS 139L, PHYS 142L (3 units)
   c) Two electives from the following list (8 units): PHYS 111, PHYS 145A, PHYS 145B, PHYS 145C, PHYS 150A, PHYS 150B, PHYS 151, PHYS 163, PHYS 164, PHYS 165, PHYS 166, PHYS 168, PHYS 177
   d) EDUC 100B, EDUC 109, EDUC 110, EDUC 116, EDUC 139, EDUC 174, EDUC 177A

3. Upper division recommendations (4 units)
   a) EDUC 104/MATH 104

Students seeking an emphasis in environmental physics or chemical physics should consult with an advisor. The physics electives may be selected on an individual basis to stress one of these concentrations.

Students continuing on to graduate school are encouraged to take additional upper-division courses in Mathematics, such as MATH 146A, MATH 146B, MATH 146C, MATH 165A, MATH 165B, and MATH 113.

To graduate, a minimum grade point average of 2.00 (C) is necessary overall and in the upper-division courses taken for the major (courses listed under 2.).

Although no foreign languages are required for the B.S. degree, the student who is planning to proceed to graduate work is reminded that reading proficiency in one or more foreign languages is required in some physics graduate programs.

Bachelor of Arts

For the B.A. degree, additional units are required in Humanities, Social Sciences, and a foreign language to meet the breadth requirements.

Minor

The minor in Physics consists of 26 upper-division units in Physics. A minimum of 16 units must be unique to the minor and may not be used to satisfy major requirements.

1. First Tier (16 units)
a) PHYS 130A  
b) PHYS 134  
c) PHYS 135A  
d) One Physics elective from PHYS 111,  
PHYS 150A, PHYS 164,  
PHYS 165, PHYS 166, PHYS 177  

2. Second Tier: at least 10 units from any  
upper-division Physics courses not chosen in  
The First Tier. The combined units from  
The First and Second Tiers should add to at  
least 26.  

3. No more than 4 units of 190-199 courses  
may be used to fulfill the upper-division  
units for the minor.  

See Minors under the College of Natural  
and Agricultural Sciences in the Colleges and  
Programs section of this catalog for additional  
information on minors.  

Community College Transfers  
The department provides special advisory ser- 

cices to aid community college transfer students  
in formulating their program and in remedi- 
yng any deficiencies in required course work.  
Transfer students who have followed the pre- 
scribed program at the community college  
should be able to continue with the sample  
program at the junior level.  

Graduate Program  
The Department of Physics and Astronomy  
offers the M.S. and Ph.D. degrees in Physics.  
Ongoing research in the Department of Physics  
and Astronomy includes astrophysics and  
space physics, condensed matter physics, par- 
ticle physics, heavy ion physics, surface sci- 
ence, laser physics, and environmental physics.  
Large-scale experiments are carried out at the  
major U.S. and European accelerator labora- 
tories or observatories.  

Admission  
All applicants must submit scores from the GRE  
General and Physics subject tests. Questions about requirements for admission  
should be directed to the graduate advisor at (951) 827-5332.  

Master’s Degree  
A student is recommended for the degree of  
M.A. or M.S. in Physics upon completion of the  
following requirements:  
1. Satisfactory completion of a minimum of 36  
quarter units of approved physics courses  
taken for a letter grade after admission to  
graduate study. Of these, at least 24 quarter  
units must be in the 200 series. Each  
course must be passed with a grade of “B-”  
or better. Each student must maintain an  
average for all courses of “B” or better.  
2. Either of the following two plans:  
Plan I (Thesis)  
Satisfactory completion of a  
thesis in a field of physics to be chosen in  
consultation with a faculty supervisor. This  
thesis is approved by a committee designat- 
ed by the department. In addition,  
PHYS 401 is required.  

Plan II (Comprehensive Examination)  
Satisfactory performance on the comprehen- 
sive examination.  
Under either plan all requirements for the mas- 
ter’s degree must be completed not later than  
the end of the sixth quarter.  

Normative Time to Degree  
Six quarters  

Doctoral Degree  
The Department of Physics and Astronomy  
offers the Ph.D. degree in Physics.  
It is recommended that students in the Ph.D.  
program become associated with a research  
advisor by the end of their first year.  
A student is recommended for advancement to  
candidacy for the Ph.D. degree in Physics  
upon completion of requirements (1), (2), and  
(3) below. The student is recommended for the  
Ph.D. degree upon completion of requirements  
(4) and (5) below.  

1. Course Work  
Each course must be passed  
with a grade of “B-” or better. Each student  
must maintain an average of “B” or better  
for all courses.  

1A. Core courses for students pursuing a  
program in Physics (other than  
Astronomy):  
PHYS 205 (Classical Mechanics)  
PHYS 210A, PHYS 210B  
(Electromagnetic Theory)  
PHYS 212A, PHYS 212B (Thermo-  
dynamics and Statistical Mechanics)  
PHYS 221A, PHYS 221B, PHYS 221C  
(Quantum Mechanics)  
PHYS 401 (Scientific Writing and  
Illustration)  

1B. Core courses for students pursuing a  
specialization in Astronomy:  
PHYS 205 (Classical Mechanics)  
PHYS 210A, PHYS 210B  
(Electromagnetic Theory)  
PHYS 212A (Thermodynamics and  
Statistical Mechanics, Part A)  
PHYS 213 (Astrophysics of the  
Interstellar Medium)  
PHYS 214 (Techniques of Observational  
Astrophysics)  
PHYS 218 (Fundamentals of  
Astrophysics)  
PHYS 219 (Cosmology and Galaxy  
Formation)  
PHYS 401 (Scientific Writing and  
Illustration)  
In addition, students in both programs must  
complete at least three elective graduate lec- 
ture courses. Students pursuing program 1A  
should choose electives from section “a-f”  
below. Students pursuing program 1B should  
choose electives from section “g” below. The  
program for each student must be approved  
by the graduate committee and the student's  
research advisor. Such a program may entail  
more than the minimum number of courses,  
and may also involve a mixture of courses  
from different areas in addition to those in the  
elective lists below.  
The elective courses include the following:  

a) Nuclear and Particle Physics  
PHYS 225A, PHYS 225B (Elementary  
Particles)  
PHYS 230A, PHYS 230B (Advanced  
Quantum Mechanics and Quantum  
Theory of Fields)  
b) Condensed Matter, Surface, and Optical  
Physics  
PHYS 209A, PHYS 209B (Introduction  
to Quantum Electronics)  
PHYS 234 (Physics of Nanoscale Systems)  
PHYS 235 (Spintronics and Nanoscale  
Systems)  
PHYS 236 (Advanced Imaging Techniques)  
PHYS 240A, PHYS 240B, PHYS 240C  
(Condensed Matter Physics)  
PHYS 241A, PHYS 241B, PHYS 241C  
(Advanced Statistical Matter Physics and  
Field Theory)  
PHYS 242 (Physics at Surfaces and  
Interfaces)  
c) Astrophysics  
PHYS 208 (General Relativity)  
PHYS 211A (Radiative Processes in  
Astrophysics)  
PHYS 211B (Astrophysical Fluid Dynamics)  
PHYS 214 (Techniques of Observational  
Astrophysics)  
PHYS 215 (Galactic Dynamics)  
PHYS 216 (Star Formation)  
PHYS 217 (Stellar Structure and Evolution)  
Additional astrophysics courses may be  
taken at other UC campuses through the  
Intercampus Exchange Program.  
d) Cosmology and Astroparticle Physics  
PHYS 208 (General Relativity)  
PHYS 225A, PHYS 225B (Elementary  
Particles)  
PHYS 230A (Advanced Quantum Mechanics)  
PHYS 226 (Cosmology)  
PHYS 227 (Particle Astrophysics)  
e) Environmental Physics  
Two courses chosen from track (b) and  
two courses chosen from below:  
SWSC 203 (Surface Chemistry of Soils)
2. **Written and Oral Comprehensive Examinations**

   Students must have satisfactory performance on a comprehensive examination, to be taken at the end of the student's first year. A make-up exam is offered in the winter quarter. The comprehensive examination for students pursuing the physics program consists of an exam that covers Mechanics, Statistical and Thermal Physics, Quantum Mechanics, and Electromagnetism. The comprehensive examination for students pursuing the astronomy specialization consists of an exam that covers Mechanics, Statistical and Thermal Physics, Electromagnetism, and Fundamental Astrophysics.

3. **Oral Qualifying Examination in General Area of Proposed Research**

   Satisfactory performance on an oral examination in the general area of the student's proposed research. This examination is conducted by a doctoral committee, charged with general supervision of the student's research. It is normally taken during the academic year following that in which the comprehensive examination requirement has been successfully completed. A student who fails this examination on the first attempt may, at the discretion of the committee, be permitted to take it a second time.

4. **Dissertation Examination**

   Students must complete a dissertation containing a review of existing knowledge relevant to the area of the candidate's research, and the results of the candidate's original research. This research must be of sufficiently high quality to constitute a contribution to knowledge in the subject area.

5. **Final Oral Examination**

   A final oral defense may be required.

**Normative Time to Degree**

For students pursuing program 1A: 15 quarters for theoretical physics; 18 quarters for experimental physics; 17 quarters for specialization in environmental physics (theory); 20 quarters for specialization in environmental physics (experimental). For students pursuing the astronomy program, 1B: 18 quarters.

**Lower-Division Courses**

- Only one of the following sequences, PHYS 002A, PHYS 002B, PHYS 002C, or PHYS 040A.
- PHYS 004B, PHYS 0040B, PHYS 040C may be taken for credit.

**PHYS 002A. General Physics (4)**

   Lecture, 3 hours; workshop, 2 hours. Prerequisite(s): MATH 008B with a grade of “C-” or better or MATH 009A with a grade of “C-” or better or MATH 009A with a grade of “C” or better.

**PHYS 002B. General Physics (4)**

   Lecture, 3 hours; workshop, 2 hours. Prerequisite(s): MATH 009B or MATH 090H (if taken concurrently). PHYS 002A with a grade of “C-” or better. Covers topics in mechanics, thermodynamics, and electromagnetism. Includes fluid mechanics; temperature and heat; the laws of thermodynamics; kinetic theory of gases; electric fields and potentials; current and DC circuits; capacitance and inductance; magnetism; and Faraday's law. For biological sciences students. Credit is awarded for only one of PHYS 002A or PHYS 040A.

**PHYS 002C. General Physics (4)**

   Lecture, 3 hours; workshop, 2 hours. Prerequisite(s): PHYS 002B with a grade of “C-” or better. Covers topics in waves and modern physics. Includes harmonic oscillations; mechanical and electromagnetic waves; geometrical optics; reflection, refraction, interference, diffraction, and polarization; and quantum, atomic, and nuclear physics. For biological sciences students. Credit is awarded for only one of PHYS 002C or PHYS 040C.

**PHYS 006. The Violent Universe (4)**

   Lecture, 3 hours; discussion, 1 hour. An introduction to violent phenomena that power the universe, specifically phenomena that illustrate basic astrophysical principles. Topics include impacts in our planetary system: explosions of stars, bursts of star formation, galaxy collisions, black holes, quasars, cosmic jets, and the “Big Bang.” Cross-listed with GEO 006.

**PHYS 007. Space-Time, Relativity, and Cosmology (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An nontechnical presentation of the growth of modern science covering topics from Newton and gravitation, Kepler and the motion of celestial bodies, Einstein and relativity, and Planck and Bohr up to present theories on the origin and evolution of the universe. Explores the philosophical ideas, scientific method, historical settings, and intellectual impacts. Includes demonstrations and visual illustrations.

**PHYS 008. Color and Sound: Dimensions in Communication (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Discusses the interplay between visual and aural sensory experiences and the physical principles of light and sound. Topics include visual perception and pattern recognition; the color spectrum; optical instruments; anatomy of the camera and the eye; lasers and holography; vibrations and sound waves; acoustics; reverberation; and sound production in speech, music, and high-fidelity audio devices. Includes demonstrations and illustrations.

**PHYS 010. How Things Work (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Survey of the physical basis of modern technology, with an emphasis on electronics and electrical devices. Topics include electro- and magneto-statics and dynamics (xerographic copiers, magnetic levitation, electrical power distribution), communication (radio, TV, computers, tape recorders, CD players), and imaging (cameras, DVD players, x rays, magnetic resonance imaging).

**PHYS 012. The Big Bang: Forces in the Early Universe (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Explores current understanding of the origins of the universe in a nontechnical manner using basic scientific literature. Topics include the “Scientific Process - How a Theory Comes to Be,” the fundamental forces of nature and their unification, the structure of the vacuum, and the beginning and end of the universe.

**PHYS 016. Principles of Physics (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 005 is recommended. Topics include classical laws of motion, force, energy, electricity and magnetism, properties of matter, atomic structure, waves, sound, light, heat, the Earth, and the solar system and universe. Includes demonstrations and visual illustrations. Not open to students with credit or concurrent enrollment in PHYS 002A, PHYS 002B, PHYS 002C, PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, or PHYS 040E.

**PHYS 018. Energy and the Environment (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Applies the fundamental physics of energy sources and energy balance in the environment and to models of weather and the “Greenhouse Effect.” Explores the environmental impact of solar, fossil fuel, and nuclear energy. Covers thermodynamics, energy and mass flow, and the limitations of modeling. Helps in making informed decisions about environmental issues.

**PHYS 020. Exploring the Universe: An Adventure in Astronomy (4)**

   Lecture, 3 hours; workshop, 3 hours. Prerequisite(s): none. An astronomy course for non-science students. The excitement of an evolving and sometimes violent universe of stars and galaxies is explored in a descriptive manner. Here, the union of modern and ancient observations with astrophysical laws will provide a sophisticated but by no means complete picture of the universe. Special topics such as Astrology and Extraterrestrial Life will be discussed.

**PHYS 021. Kingdom of the Sun (4)**

   Lecture, 3 hours; workshop, 3 hours. Prerequisite(s): none. An astronomy course for non-science students. The nearest star, our Sun, and its solar system of planets, moons, asteroids, and comets are presented in a descriptive manner. A historical astronomy of the solar system is traced from ancient concepts to modern space exploration. Special topics such as UFO's and colonization of space are discussed.

**PHYS 022. The Science in Science Fiction (4)**

   Lecture, 3 hours; screening, 1 hour; term paper, 1 hour; extra reading, 1 hour. Prerequisite(s): none. Covers the physics underlying various science fiction stories, books, television shows, and films. Provides a perspective for interpreting the (often misleading) information presented in the popular media, and highlights those aspects that are good science.

**PHYS 024. DNA in Your Life: The Physical Basis for Structure, Function, and Control (4)**

   Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to various medical, biological, and commercial aspects of physical DNA science.
PHYS 02LA. General Physics Laboratory (1) Laboratory, 3 hours. Prerequisite(s): PHYS 002A (may be taken concurrently). Illustrates the experimental foundations of physics presented in PHYS 002A. Covers the basic principles of classical mechanics. Laboratory is helpful, but not required, for PHYS 002A.

PHYS 02LB. General Physics Laboratory (1) Laboratory, 3 hours. Prerequisite(s): PHYS 002A with a grade of "C-" or better, PHYS 021A, PHYS 002B (PHYS 002B may be taken concurrently). Illustrates the experimental foundations of physics presented in PHYS 002B. Covers the basic principles of fluid and rotational mechanics, temperature, heat, and electromagnetism. Laboratory is helpful, but not required, for PHYS 002B.

PHYS 02LC. General Physics Laboratory (1) Laboratory, 3 hours. Prerequisite(s): PHYS 002B with a grade of "C-" or better, PHYS 021B, PHYS 002C (PHYS 002C may be taken concurrently). Illustrates the experimental foundations of physics presented in PHYS 002C. Covers the basic principles of oscillations, waves, optics, and radioactivity. Laboratory is helpful, but not required, for PHYS 002C.

PHYS 039. Adventures in Physics (2) Seminar, 1 hour; discussion, 1 hour. Prerequisite(s): none. General introduction to frontiers of physics research. Introduces the outstanding issues in physics research, along with work of UC Riverside faculty. Tours of the research labs. Graded Satisfactory (S) or No Credit (NC).

PHYS 040A. General Physics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 008B with a grade of "C-" or better or MATH 009A with a grade of "C-" or better or MATH 009B or MATH 099A (MATH 009B or MATH 099A may be taken concurrently). Designed for engineering and physical sciences students. Covers topics in classical mechanics including Newton's laws of motion in one, two, and three dimensions; friction; circular motion; work, energy, and conservation of energy; the dynamics of particle systems; collisions; rigid-body motion; torque; and angular momentum. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 002A or PHYS 040A.

PHYS 040B. General Physics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 009C or MATH 099C (may be taken concurrently); a grade of "C-" or better in PHYS 040A. Designed for engineering and physical sciences students. Covers topics in mechanics and thermodynamics including elasticity; oscillations; gravitation; fluids; mechanical waves and sound; temperature, heat, and the laws of thermodynamics; and the kinetic theory of gases. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 002B or PHYS 040B.

PHYS 040C. General Physics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 009C or MATH 099C; a grade of "C-" or better in PHYS 040B. Designed for engineering and physical sciences students. Covers topics in electricity and magnetism including electric fields and potential; Gauss' law; capacitance; magnetic fields; Ampère's law; Faraday's law and induction; electromagnetic oscillations; dc and ac current; and circuits.

Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 002C or PHYS 040C.

PHYS 040D. General Physics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): a grade of "C-" or better in PHYS 040C or consent of instructor. For engineering and physical sciences students. Topics in electromagnetic waves including Maxwell's equations; geometrical optics; optical instruments, cavities, and waveguides; interference, diffraction, and polarization; and special theory of relativity. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications.

PHYS 040E. General Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 046 (may be taken concurrently), a grade of "C-" or better in PHYS 040D. For engineering and physical sciences students. Covers topics in modern physics including the quantum theory of light and particles; quantum mechanics in one and three dimensions; tunneling phenomena; the hydrogen atom; statistical physics; lasers; molecular structure; and solid state, nuclear, and particle physics.

PHYS 097. Lower-Division Research (1-4) Individual study, 3-12 hours. Prerequisite(s): consent of instructor. Special research projects in physics performed under the supervision of a member of the staff. This course may not be used to satisfy the undergraduate unit requirements in the major. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 8 units.

Upper-Division Courses

PHYS 111. Astrophysics and Stellar Astronomy (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010B, MATH 046, or equivalents; PHYS 040C; PHYS 040D. Covers stellar interiors, radiations, and evolution, the origin of the elements; particle and electromagnetic radiation; pulsars, quasars, and other unusual objects; and galactic structure and cosmology.

PHYS 130A. Classical Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010B, MATH 046, PHYS 040A. Topics include vector calculus, single-particle motion, oscillations, Lagrangian and Hamiltonian dynamics, and central-forces motion and celestial mechanics.

PHYS 130B. Classical Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040B. PHYS 130A. Topics include dynamics of a system of particles, motion in non-inertial reference systems, dynamics of rigid bodies, coupled oscillations, and special theory of relativity.

PHYS 134. Thermal Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010B, PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E. Macroscopic properties of many-particle systems. Laws and applications of thermodynamics: entropy, thermodynamic potentials, ideal gases. Principles and applications of statistical mechanics: probability distributions; canonical, microcanonical, and grand canonical ensembles; specific heat of solids; paramagnetism; kinetic theory of gases; phase transitions; quantum statistics.

PHYS 135A. Electromagnetism (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010B, MATH 046, PHYS 040C. Topics include vector calculus, Coulomb's law and the electric field, Gauss' law, scalar potential, conductors in electrostatic fields, electrostatic energy, electric multipoles, boundary conditions, electrostatics in the presence of matter, and special methods in electrostatics.

PHYS 135B. Electromagnetism (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 135A. Topics include electric currents and circuits, Ampere's law, the magnetic field, the integral form of Ampere's law, the vector potential, Faraday's law of induction, magnetic energy, magnetic multipoles, magnetism in the presence of matter, Maxwell's equations, and plane waves.

PHYS 136. Electromagnetic Waves (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040D, PHYS 135B. Maxwell's equations; propagation of electromagnetic waves in wave guides, coaxial lines, and optical fibers; reflection, refraction, and diffraction of waves; dispersion of waves in gases and plasmas; interference and coherence and their role in holography; electromagnetic radiation from charged particles, antennas, masers, and lasers; relativistic electrodynamics.

PHYS 139L. Electronics for Scientists (5) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): PHYS 040C or consent of instructor. An introduction to basic analog and digital circuit designs emphasizing practical applications. Topics include properties of diodes and transistors; operational amplifiers for use as amplifiers, oscillators, and function generators; properties and use of logic gates, counters, and timers; data storage and synchronization; multiplexer and decoder applications; microprocessor functions and computer interfacing.

PHYS 142L. Advanced Physics Laboratory (1-4) Laboratory, 3-12 hours. Prerequisite(s): PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E; upper-division standing in Physics; consent of advisor. Consists of experiments chosen from areas in contemporary physics. Course is repeatable to a maximum of 8 units.

PHYS 145A. Biophysics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 010C or CHEM 01HC; MATH 010B; MATH 046; PHYS 040E. Covers physical modeling of the structure of proteins; protein folding; structure of nucleic acids; electrostatic potential of DNA; dynamics of biomolecules; structure of a biological cell; osmotic pressures of cells; non-equilibrium thermodynamics; and biochemical reactions.

PHYS 145B. Biophysics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 145A; BCH 110B or BCH 110B; or consent of instructor. Covers conformation of biopolymers, intermolecular forces, dynamics of biopolymers, Brownian motion, biopolymers as polyelectrolytes, electrolytic solutions, and the Debye-Hückel theory.

PHYS 145C. Biophysics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 145B or consent of instructor. Examines stochastic thermodynamics; the Fluctuation Theorems and the Jarzynski relation; protein and RNA denaturation; tests of the Jarzynski relation; chemical forces and self-assembly; enzymes and molecular machines; survey of molecular devices found in cells; and kinetics of real enzymes and machines.

PHYS 150A. Introduction to Condensed Matter Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D, PHYS 040E; or consent of instructor. Covers properties of systems composed of many atoms arranged in a periodic lattice. Topics include crystal structure, symmetry, and diffraction; crystal cohesion; lattice dynamics; thermal properties; metallic properties and the Fermi surface; band theory of metals and semiconductors; and collective excitations.
Graduate Courses

PHYS 202. Interdisciplinary Overview of Current Issues in Semiconductor Processing (3) Lecture, 3 hours. Prerequisite(s): graduate standing in Chemistry, Physics, Engineering, or a related subject or consent of instructor. An interdisciplinary overview of present-day semiconductor processing. Introduces topics such as properties of semiconductors, cleanroom environment, epitaxy, ion implantation, etching, lithography, device architecture, testing, and fault detection. May offer field trips. Cross-listed with CHEM 208.

PHYS 205. Classical Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing in Physics. Covers the Lagrangian formulation, calculus of variations, Hamilton’s principle, conservation principles and symmetry properties, the two-body central force problem, the Kepler problem, and scattering. Also examines orthogonal transformations, rigid body motion, the inertia tensor, Euler’s equations, Hamiltonian formulation, canonical transformations, and complex integration. Tsai

PHYS 208. General Relativity (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 205. Tensors, covariant derivative, the Riemann curvature tensor and Einstein’s equation. The Schwarzschild metric and applications to the solar system and black holes. Gravity waves and expanding universe.

PHYS 209A. Quantum Electronics (4) Lecture, 4.5 hours. Prerequisite(s): PHYS 133, PHYS 135A, PHYS 135B, PHYS 156A; or consent of instructor. Quantum theory of light and interaction of light with atoms. Density matrix formulation of atomic susceptibility. Propagation of light in matter and optical waveguides. Optical resonators. Theory and operation of common lasers. Letter grades are assigned to students whose research is related to atomic, molecular, or optical physics. Other students receive either a letter or Satisfactory (S) or No Credit (NC) grade.

PHYS 209B. Nonlinear Optics (4) Lecture, 4.5 hours. Prerequisite(s): PHYS 209A or consent of instructor. Wave propagation in nonlinear media. Electro-optic effect, three- and four-wave mixing, high-resolution nonlinear spectroscopies, rare atomic and molecule detection, laser manipulation of particles, high-intensity laser physics, laser-plasma interactions. Letter grades are assigned to students whose research is related to atomic, molecular, or optical physics. Other students receive either a letter or Satisfactory (S) or No Credit (NC) grade.

PHYS 210A. Electromagnetic Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing, consent of instructor. Covers electrostatics, Coulomb potential, method of images, and Laplace’s equations in Cartesian, spherical and cylindrical coordinates. Also examines magnetostatics, boundary value problems, multipole, and dielectric media.

PHYS 210B. Electromagnetic Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 210A; graduate standing, consent of instructor. Covers electrodynamics, Maxwell’s equations, electromagnetic waves, special theory of relativity, tensor analysis, radiation, and interaction of electromagnetic fields with charged particles. Also examines Lagrangian formulation, gauge transformation, and magnetic monopoles. Pryadko

PHYS 211A. Radiative Processes in Astrophysics (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 135A, PHYS 135B, PHYS 136, PHYS 156, PHYS 156A, PHYS 156B. Radiative transfer of continuum and line radiation, Einstein coefficients, photoionization equilibrium, radiation by free electrons, bremsstrahlung and synchrotron emission, Compton and inverse Compton scattering, wave propagation through magnetized plasmas, atomic and molecular structure and spectra, atomic fine structure, and molecular hyperfine lines. Letter grades are assigned to students whose research is related to astrophysics. Other students receive either a letter or Satisfactory (S) or No Credit (NC) grade.

PHYS 211B. Astrophysical Fluid Dynamics (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 211A. Covers hydrodynamics, sound waves, turbulence, supersonic turbulence, magnetohydrodynamics, Alfvén waves, extragalactic relativistic jets, supersonic jets, galactic spiral structure and density-wave theory, accretion disk theory, Balbus-Hawley instability, and stellar winds. Students whose research is related to astrophysics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 212A. Thermodynamics and Statistical Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; consent of instructor. Covers thermodynamics, statistical mechanics, ideal Bose systems, ideal Fermi systems, and bulk motion. Wudka

PHYS 212B. Thermodynamics and Statistical Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 212A; graduate standing; consent of instructor. Addresses functional integrals, approximation techniques, introduction to phase transitions, and the renormalization group.

PHYS 214. Techniques of Observational Astrophysics (4) Lecture, 2 hours; laboratory, 3 hours; written work, 3 hours. Prerequisite(s): graduate standing. An introduction to the basic tools of observational astronomy. Topics include astronomical telescopes and detectors, observing techniques, calibration, and error analysis. Students whose research is related to astronomy receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 215. Dynamics and Evolution of Galaxies (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing. Discusses the structure, stability, and dynamics of galaxies. Interprets observational data on galaxies within a coherent theoretical framework. Topics include potential theory, orbits, collisionless systems, and the structure and evolutionary history of galaxies. Students whose research is related to astronomy receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 216. Star Formation (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing. Discusses the processes involved in the formation of stars: the initial conditions in the interstellar medium that leads to star formation and the formation of planets and planetary systems around young stars. Topics include molecular cloud formation, the properties of young stars, jets and outflows, massive stars, and cosmological star formation. Students whose research is related to astronomy receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 217. Stellar Structure and Evolution (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing. Topics include physics of stellar structure and main sequence evolution, and energy production and transport; postmain sequence evolution through the giant stage and the formation of compact objects, supernovae, nucleosynthesis, pulsars, and the role of accretion within the framework of stellar evolution; and the physics of white dwarfs, neutron stars, and black holes. Students whose research is related to astronomy receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 218. Fundamentals of Astrophysics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Develops basic astrophysical concepts from fundamental physics. Topics include nucleosynthesis, stellar structure, evolution of stars of different masses, end-states of stars, and bremsstrahlung and synchrotron radiation. Also covers cross-sections, opacity, hydrogen atom transitions, forbidden lines, and molecular lines. Addresses the ongoing search of life in the Universe. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

PHYS 221A. Quantum Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; consent of instructor. Examines the fundamental concepts of quantum mechanics including wave functions and the uncertainty relations. Also covers time dependence of quantum systems, such as the simple harmonic oscillator and simple two-level systems. Desai

PHYS 221B. Quantum Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 221A; graduate standing; consent of instructor. Covers angular momentum and approximation methods, including perturbation theory.

PHYS 221C. Quantum Mechanics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 221B; graduate standing; consent of instructor. Covers symmetries in quantum mechanics, identical particles, and scattering theory. Desai

PHYS 225A. Elementary Particles (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 221A, PHYS 221B, PHYS 221C; or consent of instructor. Provides an overview of particle physics. Topics include Quantum Electrodynamics (QED), the Quark-Parton Model, and Quantum Chromodynamics (QCD). Also discusses experimental techniques for particle detection and energy measurement. Students whose research is related to high-energy physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 225B. Elementary Particles (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 225A or consent of instructor. Covers advanced topics in particle physics such as the Standard model, Charge-Parity (CP) violation and conservation laws, and mixing in the neutrino strange and bottom meson systems. Students whose research is related to high-energy physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 226. Cosmology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; PHYS 208. Discusses advanced topics in cosmology: Friedmann models and the large-scale structure of the universe, Hubble constant and deceleration parameter, and galaxy counting and the physics of the early universe. Also covers vacuum phase transitions, inflation, baryon number generation, fluctuations, topological defects and textures, primordial nucleosynthesis, density fluctuations, dark matter candidates, and the age of the universe. Students whose research is related to cosmology or astroparticle physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.
PHYS 227. Particle Astrophysics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; PHYS 226. An introduction to current research in particle astrophysics: the very early universe, the origin of matter, gravitational perturbations, the origin of structure, the nature of dark matter, vacuum energy, matter-antimatter asymmetry, neutrino astrophysics, gravitational radiation, black holes, the origin of ultrahigh energy cosmic rays, and Hawking radiation. Students whose research is related to cosmology or astrophysics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 230A. Advanced Quantum Mechanics and Quantum Theory of Fields (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 221A, PHYS 221B, or consent of instructor. Topics include quantization of fields for particles with spins 0, 1/2, and 1; path integrals; Feynman diagrams; and scattering amplitude and cross sections. Students whose research is related to quantum mechanics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 230B. Advanced Quantum Mechanics and Quantum Theory of Fields (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 230A or consent of instructor. Explores renormalization of quantum field theory, gauge invariance, spontaneous breaking of gauge symmetry, Quantum Chromodynamics, and electroweak interactions. Students whose research is related to quantum mechanics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 230C. Advanced Quantum Mechanics and Quantum Theory of Fields (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): PHYS 230B or consent of instructor. A study of current topics in quantum field theory, including solitons and instantons, supersymmetry, and the unification of all forces. Students whose research is related to quantum mechanics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 231. Methods of Theoretical Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. A study of analytic functions, Cauchy’s theorem, Taylor series, Laurent series expansions, the residue theorem, and analytic continuation.

PHYS 234. Physics of Nanoscale Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Explores the fundamental concepts and techniques of nanoscience and nanotechnology, including nanoscale fabrication and characterization techniques, electronic properties in reduced dimensions, properties of carbon nanotubes, and nanoelectromechanical systems, superconductivity in reduced dimensions, and nanophotonics. Students whose research is related to materials and nanoscale systems receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 235. Spintronics and Nanoscale Magnetism (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Provides an overview of contemporary issues in nanoscale magnetism and spin-dependent phenomena in solids, including the fundamentals of magnetism, magnetism in reduced dimensions, novel magnetic materials, spin-polarized transport, spin coherence in semiconductors, magnetization dynamics, and device applications. Students whose research is related to materials and nanoscale systems receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 236. Advanced Imaging Techniques (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Covers advanced fabrication and characterization techniques of nanoscale materials, structures, and devices, including lithographic methods (top-down approach), self-assembly growth of nanowires and nanocrystals, scanned probe microscopy, and electron microscopy. Students whose research is related to materials and nanoscale systems receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 240A. Condensed Matter Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 221C; graduate standing or consent of instructor. Topics include classical and quantum theories of the electron gas, crystal and reciprocal lattices, X-ray diffraction, crystal symmetries, electrons in a periodic potential, nearly free electrons, tight binding, semi-classical dynamics, and semiclassical transport. Students whose research is related to condensed matter physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 240B. Condensed Matter Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 240A or consent of instructor. Topics include measuring the Fermi surface, band structure, electron scattering, electron-electron interactions, surface effects, classification of solids, cohesive energy, classical and quantum harmonic crystals, and phonon dispersion relations. Students whose research is related to condensed matter physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 240C. Condensed Matter Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 240B or consent of instructor. Topics include anharmonic phonon effects, phonons in metals, dielectric properties, homogeneous and inhomogeneous semiconductors, defects, diamagnetism, paramagnetism, magnetic interactions, magnetic ordering, and superconductivity. Students whose research is related to condensed matter physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 240D. Advanced Solid State Physics (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 240C. Discusses the techniques of group theory and symmetry considerations applied to solid state physics. Uses these techniques to analyze and develop the theory and experiments of ferro and antiferromagnetism, ferroelectricity, spintronics, and correlated fermions. Students whose research is related to solid state physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 241A. Advanced Statistical Physics and Field Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; PHYS 212B or consent of instructor; PHYS 221C or consent of instructor. PHYS 240A, PHYS 240B, and PHYS 240C are recommended. Topics include elementary excitations in many-body systems, critical phenomena and the renormalization group technique, Green’s functions and Feynman diagrams, and other field-theory techniques, and advanced topics in condensed matter physics. Students whose research is related to condensed matter physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 241B. Advanced Statistical Physics and Field Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; PHYS 241A. Topics include advanced field-theory techniques applied to many-body systems, exactly soluble classical and quantum models in one and two dimensions, quantum Hall effect, and other advanced topics in condensed matter physics. Students whose research is related to condensed matter physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 241C. Advanced Statistical Physics and Field Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing; PHYS 241B. Topics include quantum superconductivity, localization, transport phenomena, mesoscopic systems, nonequilibrium phenomena, and advanced field-theory methods, such as methods for treating disorder. Students whose research is related to condensed matter physics receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 242. Physics at Surfaces and Interfaces (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Overview of surface science, electronic and geometric structure of clean surfaces, techniques for investigating structure, electron spectroscopy of surfaces, adsorption on surfaces, vibrations on surfaces, and epitaxial growth and applications of surface science. Letter grades will be assigned to students whose research is related to surface physics. Other students will receive either a letter grade or Satisfactory (S) or No Credit (NC) grade.

PHYS 246. Biological Physics (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 134 or consent of instructor. Introduces topics at the interface of physics and biology: cell physiology, probability and information, diffusion, random walks, electrostatics, elasticity of biopolymers and membranes, DNA topology, friction in fluids, and Low Reynolds numbers. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

PHYS 251. Techniques of Observational Astronomy (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Covers major areas necessary for the successful completion of an observational program, from the choice and preparation of telescope time proposals, to the actual data acquisition and reduction, to the analysis and publication of results. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Canalezo

PHYS 252. Topological Phases in Condensed Matter and Their Applications to Quantum Computing (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. A study of topological order and fractionalization emergent in the systems of strongly correlated electrons, as well as their applications, in particular those related to quantum information processing. Covers frustrated quantum magnets, fractional quantum Hall effect, and related gauge theories. Discusses use of topologically ordered states for performing fault-tolerant quantum computations. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Shtengel

PHYS 253 (E-Z). Special Topics (3) Seminar, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Additional prerequisites may be required for segments of this course; see department. Discusses subjects such as magnetohydrodynamics, astrophysics, and high-energy physics. Graded
Satisfactory (S) or No Credit (NC). Some segments of this course may be repeatable; see Department. Zych

PHYS 254. Statistical Physics in Biology (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Introduces students to the evolving field of biological physics. Topics include random walks, self-assembly, scaling laws in polymer physics, mechanical properties of biopolymers, protein-DNA, and protein-protein interactions. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Zandi

PHYS 255. Spin-Dependent Phenomena in Solids (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include spin-dependent transport and tunneling in magnetic multilayers and tunnel junctions, spin injection and detection in inorganic and organic semiconductors, spin transfer torque in nanomagnets, and their technological applications. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Le"u

PHYS 256. Advances in Nanoscale Physics (1 or 2) Seminar, 1 hour, 0-3 hours. Prerequisite(s): graduate standing. Seminars on current topics in nanoscale physics and materials science, including nanoelectronic devices, nanoelectromechanical systems, nanoscale biophysics, spintronics, nanoscale magnetism, nanophotonic systems, and advanced characterization techniques. Students who give class presentations receive credit for 2 units; other students receive credit for 1 unit. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Le"u

PHYS 258. Seminar in Surface Science (1) Seminar, 1 hour. Prerequisite(s): graduate standing in Physics or Chemistry or consent of instructor. Oral presentations by participating visiting scholars, postdoctoral researchers, students, and UCR faculty on current research topics in surface science. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Flemm

PHYS 260. Selected Topics in Theoretical High-Energy Physics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include the physics of the Standard Model and its extensions; anomalies, spontaneous symmetry breaking, and phenomenology; and cosmological effects of new particles. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with CHEM 256. Yarmoff

PHYS 261. Theory of Strongly Correlated Low-Temperature Systems (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include quantum transport with disorder and interactions, quantum effect, high-temperature superconductivity, and low-dimensional systems. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Wudka

PHYS 262. Electron Spin and Magnetism in Nanostructures (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include synthesis of new materials and hybrid nanostuctures, molecular beam epitaxy and magnetism dynamics, ultrafast optical spectroscopy, spin transport in molecular electronic devices, and sample characterization by atomic force microscopy and transmission electron microscopy. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Kawakami

PHYS 263. The Yukawa Sector Beyond the Standard Model (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Covers recent research in determining the quark masses and weak mixing angles through the properties of the Yukawa mass matrices at scales higher than the Standard Model scale. Topics include texture zeroes and their possible origin, renormalization group equations, and the role of the condensate mechanism. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Desai

PHYS 264. Strongly Correlated and Nanoscale Systems (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Discusses current topics of research, including properties of materials and nanostructures with strong electronic correlations. Covers theoretical approaches to the study of effects of interaction and disorder in quantum many-body systems and the additional effects of surfaces, interfaces, and constrained geometry in nanoscale systems. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Mill

PHYS 265. DNA Computation (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Involves elementary manipulations on DNA molecules with use of various enzymes, separation techniques, and detection methods and their applications to simple DNA molecular analog neural networks and autonomous reactions. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Ma

PHYS 266. Theoretical Aspects of Fundamental Particle Interactions (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Covers electroweak symmetry breaking and the origin of mass; conservation laws and physics beyond the Standard Model; and new theoretical ideas and their possible applications. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Ma

PHYS 267. Hadron Physics at Electron-Positron Colliders (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Covers phenomenology of electroweak and strong interactions in electron-positron collisions; experimental results; and techniques for investigating the properties and interactions of quarks, gluons, leptons, and the W and Z gauge bosons at high energy e+e- accelerators. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Gary

PHYS 268. Electroweak Physics at Electron-Positron Colliders (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. The study of the electroweak interaction at high-energy e+e- colliders. Covers properties of the Z and W bosons. Emphasis is placed on the high precision tests of the Standard Model. Includes comparisons with similar tests in other reactions. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Clare

PHYS 269. Physics and Electronics in Nanoscale Systems (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Discusses current topics of research including electrical, mechanical, and magnetic properties of nanoscale systems and possible device applications. Examples include superconducting and semiconducting nanostructures, carbon nanotubes, and molecule-based nanostructures. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Lau

PHYS 270. Magnetic Resonance Techniques in Condensed Matter Physics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Introduces research graduate students to two or three topics in the following areas: nuclear magnetic resonance, muon spin rotation (muSR), and heavy-fermion materials. Topics are selected to correspond to the experience and interests of the students. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. MacLaughlin

PHYS 271. Heavy Ion Physics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. A study of heavy ion collisions at high energies. Surveys experimental data and examines theoretical predictions for the production of the quark-gluon plasma. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Seto

PHYS 272. High Transverse Momentum Physics at Hadron Colliders (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. A review of current research in both the current and future generation of hadron colliders. Discusses experiments, with an emphasis on high transverse momentum and rare processes and the search for new particles. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Wimpenny

PHYS 274. Experimental Relativistic Nucleon-Nucleon Collisions (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Survey of experimental methods used by current relativistic nucleon-nucleon collision detectors at Brookhaven National Laboratory and CERN. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Barish

PHYS 276. Experimental Aspects of Electroweak Symmetry Breaking (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Investigation of experimental techniques and current limits on the origins of electroweak symmetry breaking. Includes examination of the Standard Model and extensions of the Standard Model. Topics include comparison of various production schemes: hadron colliders, electron-positron colliders, and muon colliders. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Hanson

PHYS 277. Special Topics in the Theory of Condensed Matter (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include quantum transport with disorder and interactions, quantum effect, high-temperature superconductivity, and low-dimensional systems. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Ma

PHYS 278. Electroweak Physics at Electron-Positron Colliders (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. The study of the electroweak interaction at high-energy e+e- colliders. Covers properties of the Z and W bosons. Emphasis is placed on the high precision tests of the Standard Model. Includes comparisons with similar tests in other reactions. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Gary

PHYS 279. Physics and Electronics in Nanoscale Systems (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Discusses current topics of research including electrical, mechanical, and magnetic properties of nanoscale systems and possible device applications. Examples include superconducting and semiconducting nanostructures, carbon nanotubes, and molecule-based nanostructures. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Lau
students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Varma

PHYS 278. Surface Sciences (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include geometrical and electronic structure at surfaces and interfaces; chemical reactions on surfaces; interactions of radiation with surfaces; mechanisms of film growth on surfaces; and development of novel surface science analytical techniques. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Yarmoff

PHYS 279. Astrophysics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include measurements of gamma rays from pulsars and other cosmic sources, measurements of gamma rays and neutrons from the sun, and laboratory magnetosphere and comet experiments. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Zych

PHYS 280. Space Physics and Astrophysics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Topics include the large-scale structure of the heliosphere, the physics of the interplanetary and interstellar medium, and particle acceleration and transport. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Zank

PHYS 281. Charge-Parity (CP) Symmetry Violation (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Provides an overview of charge-parity (CP) symmetry violation, mostly from an experimental point of view; reviews the theoretical background and discusses experimental results and their implications. Students who present a seminar or submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Long

PHYS 282. Experimental Investigations of Strongly Correlated Materials (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Examinations of thermodynamic and transport properties in strongly correlated materials which often exhibit unusual broken-symmetry ground states. Topics include measurements of specific heat, resistivity, magnetoresistivity, thermopower, and the Hall effect of existing and previously uncharacterized compounds. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Beyermann

PHYS 283. Techniques of Microscopy (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Explores current techniques of microscopy. Covers optical and electron microscopy and novel techniques of scanning microscopy such as scanning tunneling microscopy, near-field scanning optical microscopy, and atomic force microscopy. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Mohideen

PHYS 284. Optical Techniques for Measurements in Physics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Explores current topics in optical physics and the use of optical and nonlinear optical techniques to make measurements of interest in atomic, molecular, chemical, and condensed matter physics. Emphasizes advances in science enabled by advances in laser technology. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Tom

PHYS 285. Experimental Techniques in Particle Physics (2) Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Review of experimental techniques used in particle physics experiments, including tracking, calorimetry, and muon detection. Analysis of experiments at future super-colliders and their physics capabilities, focusing on the searches for the Higgs, top quark physics, and super-symmetric particles. Students who present a seminar or submit a paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Ellisson

PHYS 288. Current Research Themes in Physics (2) Seminar, 1 hour; discussion, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Introduces first-year graduate students to current issues in physics research at UCR. Involves seminars by faculty on their research and interaction with advanced students and postdoctoral researchers. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Moore

PHYS 289. Colloquium in Physics (1) Colloquium, 1 hour. Prerequisite(s): graduate standing; consent of instructor. Specialized discussions by visiting scientists, faculty, and students on current research topics in physics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Chair in charge

PHYS 290. Directed Studies (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor; consent of advisor or Department Chair. Individual study, directed by a faculty member, of specially selected topics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Chair in charge

PHYS 291. Individual Study in Coordinated Areas (1-6) Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Faculty-assisted programs of individual study for candidates who are preparing for examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable within the following limits: Up to 6 units may be taken prior to award of the Master’s degree, such units to be in addition to minimum unit requirements for the degree. Up to 12 additional units may be taken (continued) prior to advancement to candidacy for the Ph.D.

PHYS 297. Directed Research (1-4) Outside research, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor. Original research, in an area selected for the advanced degree, performed under the direction of a faculty member. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Chair in charge

PHYS 299. Research for Thesis or Dissertation (1-12) Thesis, 3-36 hours. Prerequisite(s): graduate standing; consent of instructor. Original research, in an area selected for the advanced degree, performed under the direction of a faculty member. This research is to be included as a part of the dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

PHYS 301. Teaching of Physics at the College Level (2) Lecture, 2 hours. Prerequisite(s): graduate standing in Physics or consent of instructor. Required of all Teaching Assistants in the Department. Designed to introduce effective methods for teaching physics and to evaluate and improve teaching skills. Topics covered include lecture techniques, effective visual aids, improving laboratory and recitation section learning situations. Credit not applicable toward degree course requirements. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Chair in charge

PHYS 302. Teaching Practicum (1-4) Consultation, 1 hour; laboratory, 3-12 hours; practicum, 3-12 hours. Prerequisite(s): Appointment as a departmental Teaching Assistant; graduate standing. Supervised teaching in Physics courses and regular consultation with faculty supervisor(s) regarding teaching responsibilities. Credit not applicable toward degree course requirements. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units. Chair in charge

PHYS 401. Scientific Writing and Illustration (1) Lecture, 1 hour. Prerequisite(s): consent of instructor. The research notebook. The thesis. References. The form of a technical article. Figures and slides. Patent requirements. Periodical requirements. Graded Satisfactory (S) or No Credit (NC).

Plant Pathology and Microbiology

Subject abbreviation: PLPA
College of Natural and Agricultural Sciences

Michael F. Allen, Ph.D., Chair
Department Office, 1463 Boyce Hall
(800) 735-0717 or (951) 827-4116
plantpathology.ucr.edu

Professors Emeriti
Salomon Bartnicki-Garcia, Ph.D.
J. Allan Dodds, Ph.D.
Donald E. Erwin, Ph.D.
Seymour D. Van Gundy, Ph.D. (Plant Pathology/Invertebrate Zoology)
Lewis G. Weathers, Ph.D.

Professors
James G. Borneman, Ph.D.
Michael D. Coffey, Ph.D.
Donald A. Cookey, Ph.D.
Shou-Wei Ding, Ph.D.
Howard S. Judelson, Ph.D.
A. L. N. Rao, Ph.D.
Michael E. Stanghellini, Ph.D.

Teaching Assistant; graduate standing. Supervised teaching in Physics courses and regular consultation with faculty supervisor(s) regarding teaching responsibilities. Credit not applicable toward degree course requirements. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Chair in charge

PHYS 302. Teaching Practicum (1-4) Consultation, 1 hour; laboratory, 3-12 hours; practicum, 3-12 hours. Prerequisite(s): Appointment as a departmental Teaching Assistant; graduate standing. Supervised teaching in Physics courses and regular consultation with faculty supervisor(s) regarding teaching responsibilities. Credit not applicable toward degree course requirements. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Chair in charge

PHYS 401. Scientific Writing and Illustration (1) Lecture, 1 hour. Prerequisite(s): consent of instructor. The research notebook. The thesis. References. The form of a technical article. Figures and slides. Patent requirements. Periodical requirements. Graded Satisfactory (S) or No Credit (NC).

Plant Pathology and Microbiology

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Joseph S. Semancik, Ph.D.
James J. Sims, Ph.D.
Peter H. Tsao, Ph.D.
Seymour D. Van Gundy, Ph.D. (Plant Pathology/Nematology)

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must be in the 200 series courses in Plant Pathology or Nematology. A maximum of 12 units may be in graduate research for the thesis.

**Plan II (Comprehensive Examination)** requires 36 units of upper-division and graduate courses, of which at least 18 must be in the 200-series courses in Plant Pathology or Nematology, excluding graduate research for a thesis or dissertation, and a comprehensive final examination in the major subject.

The departmental graduate advisory committee, in consultation with the student’s major professor or curriculum advisor, is responsible for prescribing the course of study, which normally includes as a minimum PLPA 200, PLPA 203, PLPA 204, PLPA 206/NEP 206, and participation in PLPA 250 for each term the student is registered.

**Doctoral Degree**

The Department of Plant Pathology and Microbiology offers the Ph.D. degree in Plant Pathology.

In accord with the student’s preparation and specific interests, the departmental graduate advisory committee, in consultation with the student’s major professor or curriculum advisor, prescribes areas where study is required. In addition to selected subjects in plant pathology, related fields in which some degree of competence may be expected is drawn normally from biochemistry, biology, chemistry, cell and molecular biology, entomology, genetics, mathematics, microbiology, nematology, plant physiology, soils, and statistics.

The departmental graduate advisory committee, in consultation with the student’s major professor or curriculum advisor, is responsible for prescribing the course of study.

**Course Work**

The course of study normally includes, as a minimum, PLPA 200, PLPA 203, PLPA 204, PLPA 206/NEP 206, and participation in PLPA 250 each term.

**Written and Oral Qualifying Examinations**

Students must demonstrate to the departmental graduate advisory committee, by written and oral examination, adequate preparation in the fields fundamental to plant pathology and in any area in which the student has placed special emphasis in their training. A written dissertation research proposal is to be prepared before the qualifying examination and defended during the oral examination. After successful completion of the qualifying examination and all other formal requirements to the satisfaction of the dean of the Graduate Division, the student is advanced to candidacy for the Ph.D. degree.

**Dissertation and Final Oral Examination**

A dissertation is required of every candidate. The dissertation must be approved by the dissertation committee before the candidate may take the final oral examination. The final oral examination deals primarily with defense of the dissertation and its relation to the field in which its subject lies.

**Normative Time to Degree**

18 quarters

**Lower-Division Courses**

PLPA 010. Microbes and Society: A Window into the Microbial World around Us (4) F, W

Lecture, 3 hours; extra reading, 3 hours. An introduction to the remarkable diversity and biology of microorganisms. Emphasizes the areas microorganisms impact human affairs, including food production, agriculture, medicine, and history. Includes cheese-, yogurt-, wine-, beer-, and bread-making; the Irish potato famine; tulipomania; antibiotics; mushrooms and mushroom lore; food preservation; microbial toxins and food poisoning; and vaccines and useful viruses. 

**Upper-Division Courses**

PLPA 120. Introduction to Plant Pathology (3) F

Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 015A, BIOL 015B, BIOL 055, BIOL 099, CHEM 091C or CHEM 091C3, MATH 099B or MATH 099B, PHYS 092C, PHYS 092LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. An introduction to the study of plant diseases. Topics include diseases and disease-causing agents, pathogen interaction during disease development, and strategies for disease management. An optional, separate laboratory is offered. Cross-listed with BIOL 120 and MCBL 120.

PLPA 120L. Introduction to Plant Pathology Laboratory (1) F

Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 015A, BIOL 015B, BIOL 055, BIOL 099, CHEM 091C or CHEM 091C3, MATH 099B or MATH 099B, PHYS 092C, PHYS 092LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. Covers fundamentals in the use of laboratory instruments and techniques for the detection, isolation, and identification of representative infectious agents that cause disease in plants. Cross-listed with BIOL 120L and MCBL 120L.

PLPA 123. Introduction to Comparative Virology (4) S

Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 015A, BIOL 015B, BIOL 055, BIOL 099, CHEM 091C or CHEM 091C3, MATH 099B or MATH 099B, PHYS 092C, PHYS 092LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. Considers viruses as infectious agents of bacteria, plants, and animals (vertebrates and invertebrates). Compares the major groups of viruses to each other with respect to their biological and biochemical properties, molecular and genetic characteristics, and modes of replication. Cross-listed with BIOL 123 and MCBL 123.

PLPA 134. Introduction to Plant Pathology Laboratory (3) F

Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 015A, BIOL 015B, BIOL 055, BIOL 099, CHEM 091C or CHEM 091C3, MATH 099B or MATH 099B, PHYS 092C, PHYS 092LC, BCH 100 or BCH 110A, one course in statistics; or consent of instructor. Introduction to the morphology, taxonomy, genetics, physiology, ecology, and economic importance of the major groups of the fungi. Cross-listed with BIOL 134.

Adaskaveg

PLPA 134L. Introduction to Mycology Laboratory (1) F

Lecture, 3 hours. Prerequisite(s): BIOL 005A, BIOL 015A, BIOL 015B, BIOL 055, BIOL 099, or equivalents; concurrent enrollment in BIOL 134 or PLPA 134; or consent of instructor. Introduces fundamentals in the use of laboratory instruments and techniques for the isolation, cultivation, and identification of representatives of the major taxa of fungi. Cross-listed with BIOL 134L. Adaskaveg

**Graduate Program**

The Department of Plant Pathology and Microbiology offers the M.S. and Ph.D. degrees in Plant Pathology.

**Admission**

In addition to meeting the requirements for admission to the Graduate Division, students typically have a baccalaureate major in a biological science or training equivalent to that given in the Plant Science curriculum of the College of Natural and Agricultural Sciences. Majors in the physical sciences are welcomed, but students must be prepared to augment their undergraduate preparation with courses in the biological sciences. All domestic applicants must provide GRE General Test scores (verbal, quantitative, analytical).

All candidates for the M.S. or the Ph.D. degree should have good basic preparation in chemistry and biology. It is common for students to have completed courses in biochemistry, organic chemistry, cell and molecular biology, elementary college mathematics, general physics, general botany, microbiology, statistics, genetics, plant physiology, mycology, and plant pathology. If these courses have been completed as an undergraduate, graduate study is facilitated. If students have not completed these courses prior to admission, they may be required to take them early in their graduate career.

**Master’s Degree**

The Department of Plant Pathology and Microbiology offers the M.S. degree in Plant Pathology.

General university requirements are given in the Graduate Studies section of this catalog. The master’s degree in Plant Pathology is offered under Plans I or II.

**Plan I (Thesis)** requires 36 units of upper-division and graduate courses, of which at least 24...
PLPA 200. Fungal Diseases of Plants (4) S, Even Years
Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): BIOL 134/PLPA 134 or consent of instructor. A study of important fungal diseases of plants, including biology of development of pathogens, host-pathate relations, and survival strategies. Emphasis will be on disease physiology, epidemiology, etiology, and control measures including breeding for resistance and chemical and biological control.

PLPA 201. Functional Diversity of Prokaryotes (3)
Lecture, 3 hours. Prerequisite(s): BCH 110A, BCH 110B, BIOL 121/MCBL 121; or equivalents; or consent of instructor. In-depth coverage of bacterial and archaeal bioenergetics, cell structure, diversity of metabolism, regulation of metabolism, growth, and biosynthesis, and cell-cell interactions between prokaryotes and eukaryotes. Project involves analysis of metabolic pathways from complete, annotated, prokaryotic genome sequences. Cross-listed with ENSC 205 and MCBL 201.

PLPA 203. Bacterial Diseases of Plants (4) W, Odd Years
Lecture, 2 hours; laboratory, 6 hours. An extensive introduction to bacterial diseases of plants, including: symptomatology, epidemiology, diagnosis, control, and the physiology and biochemistry of plant-bacterial interactions. Cooksey, Ma

PLPA 204. Viral Diseases of Plants (4) S, Even Years
Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 120/MCBL 120/PLPA 120 or consent of instructor. A study of viral diseases of plants and the agents causing them. Topics include historical developments, symptomatology, transmission, epidemiology, management, and classification of viruses pathogenic to plants. Special emphasis placed on the molecular nature of the pathogens and the processes of pathogenesis. Ding, Ng, Matthews

PLPA 205. Signal Transduction Pathways in Microbes and Plants (4) S, Even Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing in the biological sciences, BIOL 107A or BIOL 113 or BIOL 114 or CBNS 101; or consent of instructor. Advanced topics in signal transduction pathways that regulate growth and development in plants and prokaryotic and eukaryotic microbes. Areas covered include two-component regulatory systems, quorum sensing, signaling via small and heterotrimeric G proteins, mitogen-activated protein kinase cascades, cAMP signaling; photoreceptors; plant hormone signaling; responses to low-oxygen stress; calcium signaling; and plant pathogenesis. Cross-listed with BCH 205, BSCP 205, CMDB 205, GEN 205, and MCBL 205. Borkovich

PLPA 206. Phytopathogens: Nematoedes (2) S, Odd Years
Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Recognition, diagnosis, biology, and control of major nematoedes diseases of plants. Laboratory covers identification techniques, soil sampling and processing techniques, and process of pathogenesis. Cross-listed with NEM 206. Baldwin, Roberts

PLPA 215. Genetics of Fungi (3) Lecture, 3 hours. Prerequisite(s): BIOL 102 or consent of instructor.

Molecular and cellular mechanisms of fungal reproduction and genetic recombination. Classical and molecular genetic methods used in mycological research. Genetics aspects of fungal metabolism, development, pathogenesis, systematics, and evolution.

PLPA 219. Molecular Plant Virology (3) Lecture, 3 hours. Prerequisite(s): PLPA 204. Molecular biology of plant, animal, and bacterial viruses and viroids with emphasis on plant viruses; replication strategies; evolution; genetics; viruses as genetic vectors; and recombination. Rao

PLPA 220A. Morphology and Taxonomy of Fungi: Ascomycetes and Basidiomycetes (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 134/PLPA 134 or equivalent. Provides an in-depth examination of fungal taxonomy, classification, morphology and life cycles. Discusses the historical and ecological importance of certain fungi and their role in plant disease, industry, and human welfare.

PLPA 220B. Morphology and Taxonomy of Fungi: Deuteromycetes and Myxomycetes (4) W, Odd Years
Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): BIOL 134/PLPA 134 or equivalent. Provides an in-depth examination of fungal taxonomy, classification, morphology and life cycles. Discusses the historical and ecological importance of certain fungi and their role in plant disease, industry, and human welfare. Douhan

PLPA 221. Chemical Control of Plant Diseases (3) W, Even Years
Lecture, 3 hours. Prerequisite(s): consent of instructor. A study of the principles of selective toxicity as applied to the control of plant diseases; the chemistry and mechanism of action of antimicrobial agents. Wong

PLPA 226. Microbial Genetics (4) W, Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BCH 110C or BIOL 107A; BIOL 102. In-depth coverage of the genetics of microbes with emphasis on the primary data and the foundation of modern techniques using Escherichia coli and other prokaryotic systems. Includes genome organization, plasmids, restriction-modification systems, mutation, transposable elements, regulation of gene expression, viruses, recombination, repair, and responses to stress. Cross-listed with BIOL 221 and MCBL 221. Borkovich

PLPA 228. Deuteromycetes and Myxomycetes (4) W, Odd Years
Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): consent of instructor. Discussion of the myxomycete and deuteromycete fungi with emphasis on their role in plant disease, industry, and human welfare. Shpigel

PLPA 230. Molecular Plant-Microbial Interactions (3) F, Odd Years
Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BCH 100, BIOL 120/MCBL 120/PLPA 120, or equivalents. A study of the physiology of host-pathogen interactions with emphasis on the metabolism of diseased plants, nature of pathogenicity, and defense mechanisms in plants. Cross-listed with BSCP 230, CMDB 230, and GEN 230. Eulgem, Jin, Aleksichan

PLPA 235. Epidemiology of Plant Disease (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 120/MCBL 120/PLPA 120. An introduction to the study of plant disease epidemics and their management. Topics will include: temporal, spatial, and genetic aspects of disease development in plant populations; assessment and prediction of disease and crop loss; inoculum density-disease relationships; and modeling. Adasavage

PLPA 240. Field Plant Pathology (1) F field trips. Prerequisite(s): consent of instructor. This course will deal with diagnosis of plant disease in the field, collection methods, identification of pathogens, and control methods. Graded Satisfactory (S) or No Credit (NC). Adasavage

PLPA 241. Special Topics (2) Lecture, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Oral presentations and intensive small-group discussion of selected topics in each faculty member’s area of specialization. Course content emphasizes recent advances in the special topic area and varies accordingly. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with MCBL 241.

PLPA 245. Field Mycology (1) field trips. Prerequisite(s): BIOL 134/PLPA 134 or consent of instructor. This course will deal with observation, collection and identification of fungi both in the field and in the laboratory. Graded Satisfactory (S) or No Credit (NC).

PLPA 246. Diagnosis of Plant Disease (2) W, Lecture, 1 hour; laboratory, 1 hour, field, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Field trips to observe symptomology of diseases in nature, identification by laboratory and greenhouse tests, approaches to control, culture practices for major California crops, and influences of crop management on disease development. Adasavage

PLPA 250. Seminar in Plant Pathology (1) Seminar, 1 hour. Reports and discussions of selected topics in plant pathology by graduate students. Graded Satisfactory (S) or No Credit (NC).

PLPA 260. Current Research in Plant Pathology (1) Seminar, 1 hour. Prerequisite(s): graduate standing. Topics in plant pathology will be discussed by outstanding workers in the field from this and other campuses and by graduate students. Graded Satisfactory (S) or No Credit (NC).

PLPA 261. Seminar in Genetics, Genomics, and Bioinformatics (1) Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Oral reports by visiting scholars, faculty, and students on current research topics in Genetics, Genomics, and Bioinformatics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with BCH 261, BIOL 261, BSCP 261, ENTM 261, and GEN 261.

PLPA 265. A Colloquium on the Principles of Plant Pathology (3) Lecture, 3 hours. Prerequisite(s): advanced standing in the program. Faculty members will rotate as leaders in structured discussions leading to a synthesis of concepts from other courses, the heterogeneity of plant pathology as a scientific discipline, and its unifying principles. Graded Satisfactory (S) or No Credit (NC).

PLPA 290. Research or Study on Special Topics by Individual Graduate Students (1-6) Outside research, 1-6 hours. Prerequisite(s): graduate status. This course is designed to allow graduate students to study an area or areas not covered by formal course work under a professor who will direct the amount and judge the quality of the work. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PLPA 291. Individual Study in Coordinated Areas (1-6) Outside research, 1-6 hours. Prerequisite(s): graduate status. A program of study designed to advise and assist candidates who are preparing for examinations. A student may take up to 12 additional units prior to successful completion of the Ph.D. qualifying examination. Graded Satisfactory (S) or No Credit (NC).

PLPA 297. Directed Research (1-6) Graded Satisfactory (S) or No Credit (NC).

PLPA 299. Research for Thesis or Dissertation (1-12) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
Political Science

Subject abbreviation: POSC
College of Humanities, Arts, and Social Sciences

Shaun Bowler, Ph.D., Chair
Department Office, 2206 Watkins Hall
(951) 827-5312; politicalscience.ucr.edu

Professors
Shaun Bowler, Ph.D.
John C. Laursen, Ph.D.
David S. Pion-Berlin, Ph.D.

Professors Emeriti
Francis M. Carney, Ph.D.
Max Neiman, Ph.D.
Frank Way, Ph.D. (Political Science/Religious Studies)

Associate Professors
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Benjamin Bishin, Ph.D.
Kevin M. Esterling, Ph.D.
P. Martin Johnson, Ph.D.
Ronald O. Loveridge, Ph.D.
John N. Medearis, Ph.D.
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Farah Godrej, Ph.D.
Indridi Indridiason, Ph.D.
Bromwyn A. Leeawb, Ph.D.
Yuhki Tajima, Ph.D.
Antoine I. Yoshinaka, Ph.D.

Acting Assistant Professors
Jana Grittersova, Ph.D.

Majors
The Political Science Department offers undergraduate majors leading to B.A. degrees in Political Science, Political Science/Administrative Studies, Political Science/International Affairs, Political Science/Law and Society, and Political Science/Public Service. In addition, the department offers minors in Political Science and International Relations.

Counseling
Counseling on graduation and departmental requirements and on enrollment is handled in the department office by the student affairs staff.

For more information about the undergraduate programs, call or write the Department of Political Science, (951) 827-5502 or (951) 827-5312.

Political Science Major
The study of political science provides undergraduates with career opportunities in law, government service, education, journalism, and business. Because career goals may vary, the department offers two distinct majors. For students planning careers in such areas as law, journalism, or teaching, the traditional major in Political Science is appropriate. For students considering careers in government service, especially for such positions as program and budget analyst, urban planner, and executive or administrative assistant, the appropriate major is the Political Science/Public Service major.

Further information on the study of law or the legal profession may be obtained from the departmental prelaw counselor.

Political Science/Administrative Studies Major
The Political Science/Administrative Studies major combines the disciplinary interests of political science with a particular focus on administrative behavior, tools of decision making, and politics of public policy. The Administrative Studies component provides an interdisciplinary approach to training in administrative analytical skills and, more importantly, to the study of the policies, politics, and theories of public administration. The Business Administration courses provide a variety of perspectives on these objectives. In addition, they should be of particular value to those planning to either enter directly into public administration (federal, state, or local levels) or attend a professional school of administration.

Political Science/International Affairs Major
The Political Science/International Affairs major offers a challenging opportunity to observe and participate in the dynamics of global interaction. As versatile as it is valuable, a degree in international affairs prepares the student for work in many diverse careers in the private sector, government, and academia. From diplomatic missions to the United Nations to intense debate with a private “think tank,” careers in international affairs should appeal to students seeking to understand and influence the world in which we live.

Political Science/Law and Society Major
The Political Science/Law and Society major combines the breadth of a political science major with a particular focus on the theme of law and law-like relationships. The major provides a multidisciplinary approach to the study of legal and law-like institutions and relationships and focuses on relationships that have formed the core of political science: the emergence and development of law, the relationship between law and values, and the growth of the power of the state, among others. The courses provide a variety of perspectives on this theme, and the range of courses should be of particular benefit to those who plan to attend law school.

Political Science/Public Service Major
The Political Science/Public Service major introduces students to knowledge and skills associated with managerial career positions in government, without sacrifice of either a broad knowledge of politics or a liberal arts education.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The Political Science Department offers undergraduate majors leading to B.A. degrees in Political Science, Political Science/Administrative Studies, Political Science/International Affairs, Political Science/Law and Society, and Political Science/Public Service.

Political Science Major
The major requirements for the B.A. degree in Political Science are as follows:

1. Lower-division requirements (four courses [at least 16 units]):
   - POSC 005; POSC 010; POSC 015 or POSC 017; and POSC 020

2. Upper-division requirements (nine courses [at least 36 units]):
   a) One course from each of the following areas:
      - (1) U.S. Government and Politics:
        - POSC 100, POSC 101, POSC 143, POSC 145, POSC 146, POSC 148, POSC 149, POSC 166, POSC 167, POSC 168, POSC 170, POSC 171, POSC 172/URST 172, POSC 173, POSC 180, POSC 181, POSC 182, POSC 183, POSC 186
      - (2) Comparative Government and Politics:
        - POSC 151, POSC 152, POSC 153, POSC 154, POSC 155, POSC 157, POSC 158/LNST 148, POSC 159, POSC 160, POSC 162/LNST 142, POSC 164
      - (3) International Relations and Foreign Policy:
        - POSC 123, POSC 124, POSC 125, POSC 126, POSC 127, POSC 128, POSC 129, POSC 130
      - (4) Political Theory:
        - POSC 110, POSC 111, POSC 112, POSC 113, POSC 116, POSC 122
   b) Five additional courses in Political Science course work (Not more than 2 courses from the 190 series and POSC 142L and POSC 142M are allowed toward the nine-course upper-division requirement.)

A course in statistics is strongly recommended.

Political Science/Administrative Studies Major
The major requirements for the B.A. degree in Political Science/Administrative Studies are as follows. Note that the prerequisite for POSC 198-I is a GPA of 2.70 or better.

Political Science requirements
The Political Science requirements are as follows:

1. Lower-division requirements
   - Three courses from POSC 005; POSC 010; POSC 015 or POSC 017; POSC 020

2. Upper-division requirements
   - [List of specific courses]
a) Three courses from POSC 181, POSC 182, POSC 183, POSC 186
b) At least one course from each of the following:
   2. Comparative Government and Politics: POSC 120, POSC 131, POSC 151, POSC 152, POSC 153, POSC 154, POSC 155, POSC 156, POSC 157, POSC 158/LNST 148, POSC 160, POSC 161, POSC 162/LNST 142
   3. International Relations and Foreign Policy: POSC 123, POSC 124, POSC 125, POSC 126, POSC 127, POSC 128, POSC 129, POSC 130, POSC 150, POSC 153, POSC 169
   4. Political Theory: POSC 110, POSC 111, POSC 112, POSC 113, POSC 116, POSC 122
c) Four (4) units from POSC 198G or POSC 198-I (prerequisite: GPA of 2.70 or better)
d) Additional four (4) units in any upper-division Political Science course

Administrative Studies requirements (37 units)
1. Lower-division courses (17 units)
a) BUS 010, BSAD 020A
b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
c) CS 008 (may be used to satisfy breadth requirements)
2. Upper-division requirements (20 units)
a) Two courses (8 units) from the list below:
   1. ECON 102A or ECON 130 or ECON 162/BSAD 162
   2. PSYC 140 or PSYC 142
   3. SOC 150 or SOC 151 or SOC 171
   4. POSC 181 or POSC 182 or POSC 183
   5. ANTH 127 or ANTH 131
   These two courses must be outside the discipline of Political Science and cannot be courses included as part of the three course Business Administration track or their cross-listed equivalents.
b) A three-course track (12 units) in Business Administration courses from one of the following:
   1. Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
   2. Human Resources Management/Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
   3. Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186
   4. Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
   5. Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
   7. Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
   9. Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 122, BUS 127/STAT 127

Note: in filling the dual requirements of the selected major, students may not count more than two courses toward both parts of their total requirements (Political Science requirements and Administrative Studies requirements).

Political Science/International Affairs Major
The major requirements for the B.A. degree in Political Science/International Affairs are as follows:
1. Lower-division requirements (two courses [at least 8 units]): POSC 015 or POSC 017, POSC 020
2. Upper-division requirements (16 courses [at least 64 units]):
   a) International Relations (four courses) POSC 123, POSC 124, POSC 125, POSC 126, POSC 127, POSC 128, POSC 129, POSC 130, POSC 150, POSC 169
   b) Comparative Politics (four courses) POSC 120, POSC 131, POSC 151, POSC 152, POSC 153, POSC 154, POSC 155, POSC 157, POSC 158/LNST 148, POSC 159, POSC 160, POSC 162/LNST 142, POSC 164
   c) General Political Science (four other political science courses in any subfield).
   d) In addition, students must take four courses from the following: ANTH 161/LNST 161, ANTH 163, ANTH 164/LNST 164/WMST 164, ANTH 186/LNST 166 ECON 171, ECON 175, ECON 178/BUS 178, ECON 181, ECON 182, ECON 185/LNST 185 HIS 117B, HIS 164B, HIS 141, HIS 142, HIS 145, HIS 146, HIS 174, HIST 182
   e) SOC 135, SOC 137, SOC 161
Students may petition for permission to count a specific course not on this list.

Political Science/Law and Society Major
The major requirements for the B.A. degree in Political Science/Law and Society are as follows:
1. Political Science requirements (52 units)
   All major requirements for the B.A. in Political Science
2. Law and Society requirements (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWSO 100
c) One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, POSC 186, SOC 147, SOC 149, SOC 180
f) LWSO 193, Senior Seminar

Note: For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department in filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (Political Science requirements and Law and Society requirements).

Political Science/Public Service Major
The major requirements for the B.A. degree in Political Science/Public Service are as follows. Note that the prerequisite for POSC 198-I is a GPA of 2.70 or better.
1. Lower-division requirements (five courses [at least 20 units])
   a) POSC 010
   b) One course from POSC 005, POSC 015 or POSC 017, POSC 020
c) ECON 003
d) SOC 004
e) SOC 005 or STAT 040
2. Upper-division requirements (11 courses [at least 44 units])
   a) Political Science distribution: choose one course from each group
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(1) Comparative Government and Politics Group: POSC 151, POSC 152, POSC 153, POSC 154, POSC 155, POSC 157, POSC 159, POSC 160, POSC 162/LNST 142, POSC 164

(2) International Relations and Foreign Policy Group: POSC 124, POSC 125, POSC 126, POSC 128, POSC 129, POSC 130

(3) Political Theory Group: POSC 110, POSC 111, POSC 112, POSC 113, POSC 116, POSC 122

b) Public Service requirement
(1) POSC 181, POSC 183
(2) Eight (8) units from POSC 198G and POSC 198I (prerequisite: GPA of 2.70 or better)
(3) An additional four courses from POSC 118, POSC 170, POSC 171, POSC 172/URST 172, POSC 182, POSC 186

Minor
The Political Science Department offers a minor in Political Science.

1. One lower-division course (at least 4 units) in political science, selected from POSC 005; POSC 010; POSC 015 or POSC 017; POSC 020

2. Five upper-division courses (at least 20 units) to be selected as follows:
   a) One course in each of the following areas (4 courses):
      (1) American Politics: POSC 100, POSC 101, POSC 143, POSC 145, POSC 146, POSC 148, POSC 149, POSC 166, POSC 167, POSC 168, POSC 170, POSC 171, POSC 172/URST 172, POSC 182, POSC 186
      (2) Comparative Politics: POSC 151, POSC 152, POSC 153, POSC 154, POSC 155, POSC 157, POSC 158/LNST 148, POSC 159, POSC 160, POSC 162/LNST 142, POSC 164
      (3) International Relations: POSC 123, POSC 124, POSC 125, POSC 126, POSC 127, POSC 128, POSC 129, POSC 130
      (4) Political Theory: POSC 110, POSC 111, POSC 112, POSC 113, POSC 116, POSC 122
   b) One additional course selected by the student from among those listed in (1) through (4) above.

Honors Program
The Political Science undergraduate Honors Program is designed to provide qualified upper-division Political Science majors with opportunities to engage in upper-division course work in the field in an intensive seminar format and to obtain the necessary training to engage in independent research in the field.

Upon successful completion of the program, students are awarded and have posted on their transcripts, the designation Honors, Department of Political Science Undergraduate Honors Program.

Complete details and an application are available from the Political Science Student Affairs Officer.

Prerequisites for the Honors Program
1. Submission of an application during the last quarter of the sophomore or junior year
2. Junior standing (completion of a minimum of 86 units)
3. Minimum GPA requirements or consent of director
   a) Cumulative GPA of 3.50
   b) A GPA of 3.50 in upper-division major courses
4. Statistics or methods course (i.e., POSC 114) recommended

Requirements for the Honors Program
Twelve (12) units/three courses from the following:
   - POSC 175H (Introduction to the Honors Thesis)
   - POSC 176H (Seminar on Writing the Honors Thesis)
   - POSC 177H (Honors Thesis)
   - POSC 199 (Senior Research[Thesis Optional])

Model United Nations (MUN)
The Model United Nations (MUN) program is a campuswide activity that combines academic and social aspects. The academic preparation takes place within the Political Science Department, with one course, POSC 142L. The simulation preparation takes place within the UCRMUN organization, for participation in external conferences. Each year, the UCRMUN organization hosts a two-day MUN conference, which attracts over a thousand high school students. In recent years, the UCRMUN High School MUN has been the third largest in the nation. Planning and running this conference is entirely in the hands of UCR students participating in the UCRMUN program. The program provides training in administration and diplomacy. In the spring, a UCRMUN delegation attends either a local conference or the National Model United Nations Conference in New York City.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program
The Department of Political Science offers the M.A. and Ph.D. degrees in Political Science.

The requirements for graduate degrees in the Department of Political Science for students entering a program effective Fall 2001 may not be fully reflected below. Consult the department Graduate Secretary for current requirements.

Admission Admission to both the M.A. and Ph.D. degrees is based on the quality and character of previous academic work, scores on the GRE, and letters of evaluation from previous instructors. Applications are accepted for the Fall quarter only.

Master’s Degree
The Department of Political Science offers the M.A. degree in Political Science.

Usually, the department operates under Plan II.

Plan II (Comprehensive Examination) Students must complete 36 units, of which at least 28 units must be in 200-level Political Science courses, including POSC 201 and POSC 202A. In addition, students must complete at least one course from at least three of the five fields offered by the department (see listing below). Up to 8 units of academic work in related fields may be approved by the graduate advisor as part of the 36 units.

The examination must be passed in one of the following fields:
1. Comparative Politics Students must complete the core course POSC 217 and at least one additional course in the field.
2. International Relations Students must complete the core course POSC 216 and at least one additional course in the field.
3. American Politics Students must complete the core course POSC 249 at least one additional course in the field.
4. Mass Political Behavior Students must complete a core course, either POSC 255 or POSC 256, and at least one additional course in the field.
5. Political Theory Students must complete the core course POSC 212 and at least one additional course in the field.
Permission to complete the M.A. program under Plan I (Thesis) is restricted to students who can demonstrate a readiness to undertake advanced independent research and who can identify a faculty member willing to supervise preparation of the thesis.

**Doctoral Degree**

The Department of Political Science offers the Ph.D. degree in Political Science. The doctoral program is organized into three stages. The first stage focuses on intensive course work and preparation for the Ph.D. examination. Normally taking two years, this period is dedicated to the following:

1. **Obtaining substantive background in the discipline through completion of three graduate courses per quarter**
2. **Selecting two major fields and one minor field of concentration**
3. **Satisfying course requirements for the major fields**

The major fields may be chosen from among American Politics, Mass Political Behavior, Comparative Politics, International Relations, and Political Theory; the minor field, consisting of three courses, may be chosen from those above or, at the discretion of the graduate committee, a cognate field.

**Course Work** During the first stage, students are also expected to satisfy three required courses: POSC 201, POSC 202A and POSC 202B.

1. **Comparative Politics** Students must complete the core course POSC 217 and at least three additional courses in the field.
2. **International Relations** Students must complete the core course POSC 216 and at least three additional courses in the field.
3. **American Politics** Students must complete the core course POSC 249 and at least three additional courses in the field.
4. **Mass Political Behavior** Students must complete a core course, either POSC 255 or POSC 256, and at least three additional courses in the field.
5. **Political Theory** Students must complete the core course POSC 212 and at least three additional courses in the field.

Minors selected from the fields listed above must include the core course plus two additional seminars in the field.

Specific course work in a cognate minor field varies depending on the course list preapproved by the graduate committee. POSC 290 courses may be accepted in lieu of seminars. However, prior to passing the Ph.D. examinations, no more than two POSC 290 courses are allowed, with no more than one in each field of examination. The limit can be exceeded if course staffing or scheduling problems require it. All POSC 290 courses must have prior approval of the graduate advisor. A POSC 290 course should only be taken if the material to be covered is not available in a scheduled course.

**Written Qualifying Examination** The second stage of the program is normally one year (Year 3). In the fall quarter, the student enrols in POSC 291 (Individual Coordinated Study) and prepares for the comprehensive examination. Written examinations in the two major fields are normally taken in the fall quarter of the third year. Postponements to this schedule are allowed in exceptional circumstances; all delays in taking comprehensive examinations must be approved by the Graduate Committee.

**Professional Paper and Oral Defense** The winter and spring quarters are devoted in part to the preparation of the Professional Paper (POSC 285), which is required of all students, and Directed Research (POSC 297) to prepare a dissertation prospectus under the direction of the principal advisor. The purpose of the Professional Paper is the writing of a manuscript that demonstrates the capacity of the student to identify, implement, and report on a manageable research topic. Students also complete at least one additional course in both the winter and spring quarters. These courses are determined by the faculty and major advisor in consultation with the student and should be applicable either to completion of work in the minor field or to the dissertation project. In the spring quarter, students are advanced to candidacy upon successful completion of the oral defense of their dissertation prospectus.

Years 4 and 5 comprise the third stage of the program. Students are normally expected to complete their degree within this period. Additional time is provided if circumstances warrant it. Whether circumstances justify additional time is to be determined by the Graduate Committee, in cooperation with the thesis advisor.

Students who do not complete their degree requirements during this two-year period are closely reviewed on a biannual basis. These reviews are provided by the graduate advisor, after consultation with the dissertation advisor. Until completion of the Ph.D. requirements, each review includes targeted amounts of required progress, to be completed prior to the next review. Students who fail to complete their scheduled work are reviewed by the Graduate Program Committee for a recommendation of termination from the Political Science graduate program.

**Normative Time to Degree** 15 quarters.

General regulations applying to the dissertation and qualifying examinations are found in the Graduate Studies section of this catalog and in other Graduate Division and department publications.

For further information, contact the graduate advisor, Department of Political Science.

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### Lower-Division Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Prerequisites</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSC 005</td>
<td>Political Ideologies (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>Introductory study of the ideologies of the modern era; May explore selected thinkers and texts representative of liberalism, conservatism, socialism, fascism, nationalism, nonviolence, and feminism, as well as various non-Western ideologies. Credit is awarded for only one of POSC 005, POSC 005H, or POSC 007.</td>
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<tr>
<td>POSC 005H</td>
<td>Honors Political Ideologies (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to POSC 005. An introductory study of the ideologies of the modern era. May explore selected thinkers and texts representative of liberalism, conservatism, socialism, fascism, nationalism, nonviolence, and feminism, as well as various non-Western ideologies. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of POSC 005, POSC 005H, or POSC 007.</td>
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<tr>
<td>POSC 007</td>
<td>Introduction to Political Theory</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>An introductory exploration of political theory from the ancient world to the present. May explore Western theorists, from Aristotle to Rawls, or non-Western theorists, from Confucius to Gandhi. Themes highlighted can include citizenship, community, political change, and human flourishing. Credit is awarded for only one of POSC 005, POSC 005H, or POSC 007.</td>
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<tr>
<td>POSC 010</td>
<td>American Politics (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>An introduction to the principles and practices of government, with special attention to the policy process and selected political issues in the United States. Credit is awarded for only one of POSC 010 or POSC 010H.</td>
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<tr>
<td>POSC 010H</td>
<td>Honors American Politics (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to POSC 010. An introduction to the principles and practices of government, with special attention to the policy process and selected political issues in the United States. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of POSC 010 or POSC 010H.</td>
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<tr>
<td>POSC 015</td>
<td>Comparative Politics (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>A comparative analysis of contemporary political systems, practices, and institutions. Credit is awarded for only one of POSC 015 or POSC 017.</td>
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<tr>
<td>POSC 017</td>
<td>Politics of the Underdeveloped World (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>An introduction to the political processes and problems confronting third-world states. Topics include poverty, violence, dictatorship, civil-military relations, regime transitions, and democracy. Credit is awarded for only one of POSC 015 or POSC 017.</td>
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<tr>
<td>POSC 020</td>
<td>World Politics (5)</td>
<td>Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours</td>
<td>Explores approaches to and models of international relations: theories, the causes of war, international organizations, cooperation and conflict, international political economy, regional economic agreements, and international social issues such as human rights and the environment. Credit is awarded for only one of POSC 020 or POSC 020H.</td>
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Upper-Division Courses

POSC 100. Presidential Politics (4) Lecture, 3 hours; outside research, 1 hour; individual study, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Analyzes modern presidential leadership and power. Topics include the institutional presidency, presidential selection, and the presidency’s relationships with the bureaucracy, Congress, interest groups, the press, and the public. Consider what makes presidents popular and what determines the effectiveness of presidential leadership.

POSC 107. Non-Western Political Thought (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. Exposes students to some of the key political thinkers and ideas outside the Western canon. Familiarizes students with both the cultural-religious legacies and the political thought endemic to non-Western societies. Follows an overview of key non-Western civilizations and addresses crucial problems in comparative political theory. Provides a more detailed analysis of some regions - from the political thought of Islam to the traditions of India to the Far Eastern political theory.

POSC 108. Politics of Race, Immigration, and Ethnicity in the United States (5) Lecture, 3 hours; discussion, 1 hour; term paper, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. POSC 010 or POSC 010H. Examines the politics of race, immigration, and ethnicity in the United States, including comparisons between African Americans and Latino, Asian, and European immigrants. Emphasizes the role of institutions in shaping the importance of race to politics in the United States.

POSC 109. Political Religions and Religious Politics (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigation of major themes and issues in the intersection of religion and politics, such as the sacralization of politics, religious nationalism, sacral kingship, revolutionary asceticism, “throne and altar,” civil religion, militarism, political myth and ritual, integralism, and the conformity of the polity to religious values. Cross-listed with RLST 173.

POSC 110. The Origins of Political Ideas (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the major schools of political thought of ancient times. Discusses political thinkers such as Plato, Aristotle, Confucius, and Ashoka.

POSC 111. Democracy and the Social Contract (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the major political philosophers of the social contract and their criticisms on issues such as individualism versus community, the roles of religion and of markets in politics, and the adequacy of contract theory for women and minorities.

POSC 112. Modern Political Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Critically explores selected works of political theory from the eighteenth century to the present, with attention to issues such as freedom, utility, justice, nature, citizenship, tolerance, equality and inequality, autonomy, democracy, power, rights, and identity.

POSC 113. American Political Thought (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of developments in American political thought from the seventeenth century to the present.

POSC 114. Theory and Methodology of Political Science (4) Lecture, 3 hours, extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers the development and scope of political science as a discipline. Addresses selected theoretical and methodological issues in contemporary political and social science. Credit is awarded for only one of POSC 114, POSC 114H, or POSC 114S.

POSC 114H. Honors Theory and Methodology of Political Science (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers the development and scope of political science as a discipline. Addresses selected theoretical and methodological issues in contemporary political and social science. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of POSC 114, POSC 114H, or POSC 114S.

POSC 115S. Utopia and Dystopia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. Examines the political thought of utopian literature from ancient Greece to the present, with analyses of utopian and dystopian elements in each work. Typical authors include Plato, Thomas More, James Harrington, Ernest Callenbach, and Katherine Forrest.

POSC 116. Capitalism, Socialism, and Political Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines debates about economic life, focusing on issues such as markets and marketization, labor, globalization, freedom, class, corporations, democracy, the welfare state, and power.

POSC 117. Contemporary Democratic Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A critical survey of the principal approaches to thinking about democracy since the World War II. May cover elite, pluralist, deliberative and participatory theories may be explored, along with questions about inclusiveness, and the optimal character and scope of democracy.

POSC 118. Ethics in Government (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or POSC 010 or POSC 010H or consent of instructor. An examination of ethical issues in government, with emphasis on problems of representation in elected and administrative office, questions of political responsibility, and controversies regarding the role and nature of the public interest in government policy making.

POSC 119. Political Thinkers in Depth (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing. Intensive reading of one or more great political thinkers from around the world, with special attention to contested readings of each figure. Examples might include Plato, Confucius, Machiavelli, Marx and Engels, John Stuart Mill, or Gandhi.

POSC 120. The Politics of India and Pakistan (4) Lecture, 3 hours; extra reading and term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the domestic and international politics of India and Pakistan, with attention to other South Asian countries. Explores nationalist movements, struggles for development, contrasting experiences with democracy and dictatorship, and internal and external conflicts.

POSC 121. Monarchy (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural survey of the institution of monarchy in the ancient world and its role in political, social, economic, and religious life. Cross-listed with CLA 121 and CPAC 121.

POSC 122. Skepticism and Liberalism (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; one term paper. Prerequisite(s): upper-division standing. Explores the origins of the modern way of thinking about politics (i.e., liberalism, in a sense that includes both conservatives and liberals) in the ancient skeptics and in early modern skepticism such as Montaigne, Spinoza, Hume, and Kant.

POSC 123. Conflict Resolution (4) Lecture, 3 hours; extra reading, 1 hour; term paper, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of conflict resolution in international relations and domestic conflict. Topics covered include theories of conflict and conflict resolution, negotiation, the role of external powers, mediation, and peacekeeping.

POSC 124. International Relations (4) Lecture, 3 hours; term paper, 1 hour; extra reading, 2 hours. Prerequisite(s): POSC 020. An in-depth consideration of the major theories of contemporary international relations. Focuses on core issues in international security affairs, such as the causes of war and peace, cooperation and conflict, alliances, perception and misperception, ethnic conflict, and the link between democracy and war. Credit is awarded for only one of POSC 124 or POSC 124S.

POSC 125S. International Relations (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): POSC 020; upper-division standing or consent of instructor. An in-depth consideration of the major theories of contemporary international relations. Focuses on core issues in inter-
national security affairs, such as the causes of war and peace, cooperation and conflict, alliances, perception and misperception, ethnic conflict, and the link between democracy and war. Credit is awarded for only one of POSC 124 or POSC 124G.

POSC 125. United States Foreign Policy Since World War II (4) Lecture; outside research, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A survey and evaluation of the major developments in U.S. foreign policy from 1945 to the present. Focuses on relations with the Soviet Union, its successor states, and the Third World, within which the uses of force and diplomacy are emphasized.

POSC 126. The Politics of International Trade, Finance, and Development (4) Lecture; 3 hours; individual study, 3 hours. Prerequisite(s): POSC 020 or POSC 020H. A study of the interaction between international economics and world politics. Focuses on the post-World War II period and covers the evolution of the institutions governing world trade; the role of multinational corporations; Third World debt and development; the North Atlantic Treaty Organization and the European Union; economic reform in postcommunist societies; and the relationship between trade and the environment.

POSC 127. International Environmental Politics (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; written work, 1 hour. Prerequisite(s): POSC 020 or POSC 020H. Introduces the study and practice of international environmental politics. Familiarizes students with major developments in the evolution of international environmental law and policy. Topics covered include ozone depletion, acid rain, marine pollution and whaling, tropical deforestation, overpopulation, and the impact of environmental degradation on the politics of sub-Saharan Africa.

POSC 128. Comparative Foreign Policy (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; one term paper. Prerequisite(s): upper-division standing. Compares foreign policies of the United States and the Soviet Union with special attention to the influence of historical, political, ideological, and systemic factors on their international behavior. Close attention paid to their use of military and economic instruments in their relationship with various actors.

POSC 129. The Proliferation of Weapons of Mass Destruction (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing. Introduces students to the politics of weapons of mass destruction, including nuclear, chemical, and biological weapons. Topics covered include why states develop such weapons and whether possession of them increases or decreases the likelihood of war. Also covered are international efforts to stop weapons proliferation, and specific cases of proliferation such as those in India, and Pakistan, North Korea, Iraq, and Iran.

POSC 130. Politics and Economics of the Pacific Rim (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Provides students with a broad understanding of the politics and economics of countries that border the Pacific Rim, including Japan, South Korea, Singapore, Taiwan, and China, and of their relationship to the United States. The major issues addressed include economic growth, sociopolitical development, trade, and interdependence.

POSC 131. Modern Japanese Politics (4) Lecture, 3 hours; writing and extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the politics of postwar Japan. Topics include Who rules contemporary Japan? How do we explain long-term conservative rule and economic success? and What are the sources of recent political instability and economic hard times and is the situation likely to continue?

POSC 133. Politics of Central Asia in Comparative Perspective (4) Lecture, 3 hours; extra reading, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Studies the current political and economic issues and problems, and international relations of the former Soviet republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Includes a historical background of the region.

POSC 135. Ethics and International Politics (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores the ethical dimensions of contemporary debates in international politics. Topics include international justice, humanitarian aid, military intervention, and just war theory. Credit is awarded for only one of POSC 135 or POSC 267.

POSC 140. Militarist Hegemony in the Ancient World (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative study of ancient warfare and hegemony in two of the major regions of the ancient world. Perspectives may include social and political contexts, gender and war, acquisition of empire, religious wars, and weapons, strategies and tactics in theory and practice. Study of primary source material in texts and visual arts. Cross-listed with AST 145, CHN 141, CLA 141, and CPAC 141.

POSC 142. E-2). Simulation Laboratory (2-4) Participation in and analysis of laboratory models of complex political systems.

POSC 142L. The United Nations (2) Lecture, 2 hours. Examination of the structure and functioning of the United Nations with major emphasis on the principal organs (Security Council, General Assembly). ECOSOC, the Trusteeship Council and the leading committees. The course will examine theories on the pacific settlement of disputes, collective security and functionalism. The focus will be on the United Nations as a living, contemporary political institution.

POSC 142M. Model U.N.-Country Studies (Simulation) (2) simulation, 2 hours. Prerequisite(s): POSC 142L. An intensive study of the foreign policies of two selected countries, normally one developed and one undeveloped country, conducted through lectures, discussion, and simulations of their foreign policies being projected in the arena of the United Nations. Can be repeated twice for a total of 6 units.

POSC 143. Elections and Political Participation (4) Lecture, 3 hours; consultation, 1 hour. An examination of political behavior in the United States with emphasis on political participation and voting behavior.

POSC 145. Money in American Politics (4) Lecture, 3 hours; term paper, 1 hour; extra reading, 2 hours. Prerequisite(s): POSC 142 or POSC 010H or consent of instructor. Analyzes the role of money in federal elections and in the formulation of public policy. Examines the contemporary role of parties in raising and spending campaign money, the explosion of “soft money” in congressional and presidential elections, and the effect of campaign spending on electoral outcomes. Explores how campaign contributions influence public policy.

POSC 146. Mass Media and Public Opinion (4) Lecture, 3 hours; term paper and reading, 1 hour. Analysis of public opinion—character, sources, and functions—and especially its relationship to mass media. Particular attention will be devoted to the role and importance of television in American politics.

POSC 147. Political Theory of Globalization (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing. PHIL 001 or PHIL 001H or POSC 005 or POSC 005H. Examines how the phenomenon of globalization has been theorized within the discipline of political philosophy. Covers how the effects of globalization have been addressed by leading political theorists, with attention to concepts such as cosmopolitanism, nation-states and citizenship, cultural diversity, moral universalism, and international distributive justice.

POSC 148. Politics of Congressional Elections (4) Lecture, 3 hours; term paper, 2 hours; individual study, 1 hour. Prerequisite(s): upper-division standing, POSC 010 or POSC 010H; or consent of instructor. An introduction to the politics of congressional elections. Topics include campaigning for Congress, strategic behavior in the decision to run for election, incumbency, and money in congressional elections. Credit is awarded for only one of POSC 148, POSC 148H, or POSC 148S.

POSC 148H. Honors Politics of Congressional Elections (5) Lecture, 3 hours; discussion, 1 hour; term paper, 2 hours; extra reading, 1 hour. Prerequisite(s): admission to the University Honors Program, upper-division standing, POSC 010 or POSC 010H; or consent of instructor. Honors course corresponding to POSC 148 and POSC 148S. An introduction to the politics of Congressional elections. Topics include campaigning for congress, strategic behavior in the decision to run for election, incumbency, and money in congressional elections. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of POSC 148, POSC 148H, or POSC 148S.

POSC 148S. Politics of Congressional Elections (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): upper-division standing, POSC 010 or POSC 010H; or consent of instructor. An introduction to the politics of congressional elections. Topics include campaigning for Congress, strategic behavior in the decision to run for election, incumbency, and money in congressional elections. Credit is awarded for only one of POSC 148, POSC 148H, or POSC 148S.

POSC 149. Presidential Elections (4) Lecture, 3 hours; laboratory, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing. Investigation of presidential elections using computer simulation of presidential popularity, public opinion polling, presidential primaries, and the presidential general election. In addition, students use National Election Study data to explore individual-level voter decision making.

POSC 150. Human Rights in Theory, Law, and Politics (4) Lecture, 3 hours; extra reading, essays, and research paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the theory, politics, and law of human rights. Examines the emergence of human rights institutions since World War II and ongoing dilemmas in the field. Topics include cultural relativism, criminal tribunals, truth commissions, and refugees.

POSC 151. British Government and Politics (4) Lecture, 3 hours. A study of constitutional principles and of contemporary government and politics, primarily in the United Kingdom but with some attention to overseas diffusion of the Westminster model of government.
POSC 152. Politics of the Middle East (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. The domestic policies and international relations of the contemporary states of the Middle East. Includes analysis of the politics of various transnational forces and the policies of external powers as they impinge on the area.

POSC 153. Russian Foreign Policy in Transition (4) Lecture, 3 hours; extra reading and term paper, 3 hours. Prerequisite(s): POSC 020 or POSC 020H; upper-division standing or consent of instructor. Surveys postwar Russian foreign policy with an emphasis on recent developments in the relations between the United States and Eastern Europe and the independent states that formerly comprised the USSR. Utilizes various international relations theories and concepts to help students understand these significant changes.

POSC 154. The Government and Politics of the European Community (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the formation of the European Community, its institutional structure, its policy-making processes, and its new role in Europe. Explores its success in the face of Western Europe’s persistent nationalism.

POSC 155. Government and Politics in Western Europe (4) Lecture, 3 hours. The comparative study of contemporary government and politics in Western Europe with special attention to the influence of economic, cultural, and other factors upon their formation. Comparative analysis of parties, bureaucracy, legislatures, and executives and of the way in which they reflect and contribute to the political life of the European peoples.

POSC 156. Political Systems across Muslim Societies (5) Lecture, 3 hours; discussion, 1 hour; term paper, 1 hour; extra reading, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A survey of the different political systems and institutional arrangements regulating the relationship between religion and the state across the Muslim world. Includes the history and main tenets of Islam and case studies such as Iran, Indonesia, Jordan, Pakistan, Nigeria, and the United States.

POSC 157. Modern Dictatorships (4) Lecture, 3 hours; individual study, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Considers how dictatorships from such countries as Germany, Cambodia, Chile, Argentina, and Iraq came to power; how they abused that power; what contributed to their successes; and why some met with defeat.

POSC 158. Politics of Mexico (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A survey of contemporary Mexican politics. Emphasis is on recent economic and social changes and their impact on Mexico’s political system. Topics include relations with the United States, the rise of drug trafficking in Mexico, and the recent emergence of opposition politics. Cross-listed with LNST 148.

POSC 159. The Armed Forces and Politics (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the origins, nature, and behavior of the military within political systems. Focuses on the political interaction between the armed forces and civilians. Topics include military intervention, democracy, human rights, missions, defense organizations, and civilian control. Explores case studies of the United States, Russia, and countries from Latin America and Asia.

POSC 160. Globalization and Underdevelopment (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Critical evaluation of issues and theories about underdevelopment and the prospects for development within the context of globalization. Examines areas of continuity and change, resistance and conflict, and crises and solutions emerging in a post-World War II developing world increasingly connected to a single global economy.

POSC 162. Latin America: The Quest for Development and Democracy (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour, term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A comparative examination of central issues in and components of Latin American political life, including economic development, regimes and alliances, guerrilla wars, the armed forces, human rights, and democratic consolidation. Countries studied include Argentina, Brazil, Chile, El Salvador, and Cuba. Cross-listed with LNST 142.

POSC 164. The Nation State and Capitalism (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers the comparative political economy of advanced industrial countries. Examines forms of capitalism after World War II. Studies political foundations and institutional features and their relation to economic growth, investment, innovation, international trade, employment, and economic quality. Analyzes the impact of globalization on labor relations, social welfare, financial market regulation, and corporate governance. Credit is awarded for only one of POSC 164 or POSC 164S.

POSC 164S. The Nation State and Capitalism (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Covers the comparative political economy of advanced industrial countries. Examines forms of capitalism after World War II. Studies political foundations and institutional features and their relation to economic growth, investment, innovation, international trade, employment, and economic quality. Analyzes the impact of globalization on labor relations, social welfare, financial market regulation, and corporate governance. Credit is awarded for only one of POSC 164 or POSC 164S.

POSC 166. Judicial Politics and Policy Making (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An examination of the characteristics of judicial bodies, emphasizing their interaction with other policy-makers and social and political problems. Investigates the policy roles of local, state, and lower federal courts and the U.S. Supreme Court.

POSC 167. Constitutional Law: Fundamental Freedoms (5) Lecture, 3 hours; discussion, 1 hour; outside research, 1 hour; individual study, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A study of the legal and political context in the U.S. of freedom of expression, the press, and religion; separation of church and state; equal rights for women and minorities; voting rights; and citizenship.

POSC 168. Constitutional Law: Criminal Justice (5) Lecture, 3 hours; discussion, 1 hour, extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An examination of the rights of criminal defendants; the role of lawyers, police, prosecutors, and judges in the criminal process in the United States; and the function of criminal law.

POSC 169. Terrorism and Political Violence (4) Lecture, 3 hours; extra reading and term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the nature and origin of political violence as a political pathology and as an instrument of supporters and opponents of regimes. Examines types of political violence: terrorism, ethnic and communal conflict, rebellion, and revolutionary and counter-revolutionary violence.

POSC 170. Local Leadership in California (4) Lecture, 3 hours; consultation, 1 hour. A survey of the local leadership structure official and unofficial in California. An analysis of who decides and influences local policy decisions.

POSC 171. American State Politics (4) Lecture, 3 hours. A critical examination of the activities, structure, and function of the states in the American political system. Concern is with the politics and major policy issues of the 50 states, with a special interest in California.

POSC 172. Urban Politics and Policies (4) Lecture, 3 hours; term paper and extra reading, 3 hours. Prerequisite(s): upper-division standing; POSC 010 or POSC 010H. An analysis of urban politics in the United States. Topics include theories of urban politics, structure of political competition, leading political roles, and major policy problems. Cross-listed with URST 172.

POSC 173. Government and Politics of California (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the political process of California. Focuses on both the electoral and legislative politics and the contribution they make to democratic governance under conditions of social diversity. Credit is awarded for only one of POSC 173 or POSC 173S.

POSC 173S. Government and Politics of California (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 1 hour; individual study, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the political process of California. Focuses on both the electoral and legislative politics and the contribution they make to democratic governance under conditions of social diversity. Credit is awarded for only one of POSC 173 or POSC 173S.

POSC 175H. Introduction to the Honors Thesis (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Familiarizes students with the procedures and techniques, from theory construction to data collection and analysis, needed to design and conduct original research for an honors thesis. Satisfaction (S) or No Credit (NC) grading is not available.

POSC 176H. Seminar on Writing the Honors Thesis (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): POSC 175H; upper-division standing or consent of instructor. Provides guidance for students writing an honors thesis in political science. Topics include bibliographic research, fieldwork, statistics, case study analysis, professional writing, and standards of academic scholarship. Satisfaction (S) or No Credit (NC) grading is not available.

POSC 177H. Honors Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): POSC 175H; POSC 176H; upper-division standing or consent of instructor. Independent
research and preparation of an honors thesis completed under the supervision of a faculty member. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 12 units.

**POSC 180. The Politics of Public Health (4)** Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on the social, environmental, and political factors that shape population health. Utilizes public health topics to illustrate the fundamental problems of the politics of regulation and social policy. Credit is awarded for only one of POSC 180 or POSC 180S.

**POSC 181. Public Policy: Values, Conflict, and Politics (4)** Lecture, 3 hours; outside research, 1 hour; individual study, 1 hour; term paper, 1 hour. Prerequisite(s): upper-division standing; POSC 010 or POSC 010H. Introduces methods and approaches used to describe, explain, and evaluate public policies. Examples include group theories, system approaches, program planning, and budgeting systems.

**POSC 182. Politics and Economic Policy (5)** Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the political and administrative processes of economic policy formation, the rationale of government programs, and the mixture of facts, values, and social forces that determine policy. Emphasizes issues of government-economy interaction emerging under the impact of modern technology.

**POSC 183. Administrative Politics and Theory (4)** Lecture, 3 hours; outside research, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): POSC 010 or POSC 010H; upper-division standing or consent of instructor. An introduction to the politics and theory of public administration. Topics include decision-making processes, leadership, formal and informal organization, and the interrelationships among values, structures, and behavior patterns.

**POSC 186. Regulation: A Political Perspective (5)** Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines government regulation from a political perspective, covering both traditional areas of business regulation and the newer social regulation in areas of environment, health and safety, and areas of business regulation and the newer social regulation. Credit is awarded for only one of POSC 180 or POSC 180S.

**POSC 196. Moot Court: Legal Research, Writing, and Advocacy (4)** Seminar, 4 hours. Prerequisite(s): senior standing; 3.40 GPA; POSC 167 or POSC 168. Introduction to the judicial process and legal argument. Explores how attorneys devise and make legal arguments, oral presentations, and argument skills, and the basics of legal analysis.

**POSC 197. Research for Undergraduates (1-4)** Outside research, 1-4 hours. Offers opportunity for directed individual research, to result in a substantial paper, when a student wishes to do a deeper study of a topic than is possible in the normal term paper.

**POSC 198. Field Work in Political Science (4)** Tutorial, hours to be announced; assignments, 8 hours. Direct evaluation of the local political process through participant observation, combining academic instruction and supervised field work. Students will examine firsthand political behavior and the policy process in one location in local political systems. May be repeatable once for credit.

**POSC 198L. Individual Internship in Political Science (1-12)** Internship, 2-24 hours; reading and writing, 1-12 hours. Prerequisite(s): a GPA of 2.70 or better; upper-division standing; consent of instructor. Intern assignments in major political offices. Students participate in and observe substantive theoretical analyses of political behavior and policy processes. Course is repeatable to a maximum of 16 units.

**POSC 199. Senior Research (1-4)** Outside research, 3-12 hours. Prerequisite(s): upper-division standing and consent of instructor. Independent work under the direction of members of the staff. The project may be undertaken as a one-, two-, or three-quarter sequence. In the case of a two- or three-quarter sequence, the final grade may be deferred until completion of the last quarter. Course is repeatable to a maximum of 12 units.

### Graduate Courses

**POSC 201. Introduction to Political Inquiry (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to the logic of political inquiry. Problems of theory-building, research design, case selection, and measurement are covered in the context of quantitative and qualitative political research.

**POSC 202A. Survey of Quantitative Methods (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): POSC 201 or approval of department graduate committee. Introduction to statistical analysis. Topics include descriptive statistics, probability, sampling distributions, parameter estimation, hypothesis testing, correlation, and bivariate regression analysis.

**POSC 202B. Introduction to the use of advanced techniques in political science applications. Topics include Statistical Package for the Social Sciences (SPSSX), regression analysis, causal modeling, factor analysis, and cluster analysis in research design context.**

**POSC 2023. Social Science, History, and Qualitative Methodology (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to the basic epistemology of qualitative social science. Provides students with a working knowledge of the strengths and weaknesses of the historical and comparative case study approaches to social science.

**POSC 204. Mathematical Modeling in Political Science (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Survey of basic mathematical tools relevant to research in political science and other disciplines of the social sciences, with an emphasis on concepts and applications. Topics include sets, matrix algebra, comparative-static analysis, optimization problems, exponential and logarithmic functions, equality constraints in optimization, and integration.

**POSC 205. Advanced Regression Analysis (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): POSC 202B. Introduction to the use of advanced techniques in regression analysis. Topics include model specification, measures of goodness of fit, two-stage least squares, and models with binary dependent variables.

**POSC 206. Environmental Policy and Law (4)** Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing, POSC 010 or POSC 010H, POSC 020 or POSC 020H; or consent of instructor. An introduction to the process and politics of environmental regulation in the United States and the negotiation and implementation of international environmental accords. Uses social scientific methods of analysis to investigate specific issues such as air quality, energy, and biodiversity. Cross-listed with ENSC 206.

**POSC 207. Advanced Quantitative Analysis (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): MATH 005, POSC 202B; or consent of instructor. Introduction to the use of advanced techniques in quantitative analysis. Topics include maximum likelihood, sample selection bias, simultaneous equations.

**POSC 208. Seminar in Representation (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines representation in America. Topics include what it means to represent; the different means of representation; to what degree the elected behave consistently with constituents’ preferences; and the accountability of elected officials. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

**POSC 212. Political Theory (4)** Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Survey of general issues in political theory. Figures covered may include Plato, Montesquieu, Weber, Arendt, Rawls, Foucault, and others. Debates may include hermeneutics and normativity vs. science; power vs. truth; democracy vs. liberalism.

**POSC 213. Rhetoric and Argument in Ancient China and Greece (4)** Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A study of important ancient Chinese and Greek (texts dating from the fifth to the third centuries B.C.), as well as some of their implications for contemporary theory and practice. Students who submit a seminar paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. This course may also be taken on a Satisfactory (S) or No Credit (NC) basis by students advanced to candidacy for the Ph.D.

**POSC 216. International Relations (4)** Lecture, 3 hours. Prerequisite(s): consent of instructor. Historical development and present range of political thought on relations among nations, origins and implications of the idea of sovereignty, the theory of an international community, theories of imperialism. The analysis of selected contemporary problems—bipolarity, emerging nations, alliance systems in the light of recent contributions to international relations theory.

**POSC 217. Comparative Politics (4)** Lecture, 3 hours. Survey and introduction to comparative politics with emphasis on major ideas, trends, and issues in the field. Critical assessment of the literature on systems, political culture, development and underdevelopment, and elites.
POSC 220. Politics of Race, Immigration, and Ethnicity (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the politics of race, immigration, and ethnicity in the United States, including comparisons to ethnic politics in other regions of the world. Emphasizes the role of political institutions and processes in making race, immigration, and ethnicity more or less salient in elections, legislation, social movements, and interpersonal and intergroup relations. Course is repeatable as content changes to a maximum of 8 units.

POSC 230. Proseminar on Research in Political Science in U.S. Government and Politics (1) Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Presentations by students, departmental faculty, and visiting scholars describing current research in political science in the U.S. government and the political arena. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

POSC 231. Proseminar on Research in Political Science in International Relations and Foreign Policy (1) Seminar, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Presentations by students, departmental faculty, and visiting scholars describing current research in political science in the areas of international relations and foreign policy. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

POSC 249. American Politics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys major theoretical approaches to the study of American politics and enduring research questions in the field. Topics vary and could include the politics of race and ethnicity, the historical development of government institutions, political parties, voting behavior, federalism, and the policy-making process in the United States. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes to a maximum of 8 units.

POSC 250. Seminar in Politics and the Legal Order (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive reading and research on selected topics in politics and the legal order, such as law and social change, compliance with judicial decision making, and important areas of constitutional law.

POSC 251. Seminar in Urban Analysis and Issues (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An examination of selected topics bearing on urban phenomena. Topics include theoretical approaches to urban politics, reform issues, specific social change, and enduring research questions in the field. Topics include the role of politics and policy-making in urban settings.

POSC 252. Public Policy (4) Seminar, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys major approaches to public policy analysis, emphasizing interaction between substance and process in policy development. Covers both theories and concrete case studies; special attention given to the administrative stage of policy development.

POSC 253. Constitutional Law (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Designed to acquaint students with the issues and questions that structure debate in the constitutional arena. Students read and analyze court opinions dealing with such topics as doctrines of access to the courts, intergovernmental relations, and civil rights and liberties.

POSC 254. Seminar on the U.S. Congress (4) Seminar, 3 hours. An examination of major research on the U.S. Congress. Emphasis will be placed upon substantive questions requiring further research and upon methodological techniques appropriate to such research.

POSC 255. Seminar in American Electoral Behavior (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the literature on electoral behavior in the United States. Focuses on the major models of voting behavior developed since 1945. In addition, issues such as voter turnout, economic voting, and presidential primaries are covered.

POSC 256. Seminar in Public Opinion and Mass Media (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores the literature on public opinion and mass media. Topics in public opinion include political socialization, attitude constraint, and theories of attitude change. Topics in mass media include agenda setting and framing effects.

POSC 257. Comparative Political Behavior and Elections (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines issues in the theoretical literature on voting studies by using examples mainly from outside the U.S.

POSC 258. Congressional Elections (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Congressional elections is a growing field of inquiry in American electoral politics. Much scholarly debate has been generated over a variety of phenomena in this area. This seminar provides an overview of a number of these controversies and offers students the conceptual framework to critically analyze a rather large body of literature.

POSC 259. Women and the American Political Process (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An examination of the role of women in the American political process. Topics include the women’s movement as a social movement and as an interest group, women as voters, candidates and office holders, and women’s issues and the public policy process.

POSC 260. Economics and Elections (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the impact of issues and economic conditions on voting behavior in elections, with primary focus on United States presidential elections. The roles of campaigns and information are also covered.

POSC 261. American Political Institutions (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys the principal theoretical and empirical issues involved in the study of American political institutions. Covers the major U.S. national political institutions, including Congress, the presidency, the judiciary, the bureaucracy, interest groups, and political parties.

POSC 262. War Termination and Conflict Resolution (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Considers competing explanations of why and when conflicts come to an end. Focuses on international and civil wars. Addresses questions such as the following: Why do civil wars last longer than international ones? Why are civil wars difficult to settle through negotiation? What impact does domestic politics have on international war termination?

POSC 263. Seminar on Conflict and Peace (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Considers some of the principal problems, issues, and findings in the study of the causes and consequences of war. Focuses on a number of key variables and their links to war under certain conditions and introduces students to standard data sources.

POSC 264. Seminar in International Political Economy (4) Seminar, 3 hours; consultation, 1 hour. Examination of major economic institutions, development, and forces in world politics, with emphasis on the international political economy. Topics include political institutions, social development, economic growth, and democratization.

POSC 265. A Seminar on International Relations (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): Graduate standing or consent of instructor. Explores the literature on international relations and the impact of globalization, domestic, and international institutions. Course is repeatable as content changes to a maximum of 8 units.

POSC 267. Ethics and International Politics (4) Seminar, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): graduate standing or consent of instructor. Examines ethical debates in the field of international politics. Topics include just war theory, humanitarian aid, military intervention, international justice and human rights, aggression, peacekeeping, and global inequality. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Credit is awarded for only one of POSC 135 or POSC 267.

POSC 268. Human Rights (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the principal theoretical and empirical issues in the study of human rights. Explores major themes and contemporary topics, including, but not limited to, cultural relativism, the evolution of the human rights regime, and the impact of globalization, domestic, and international institutions. Course is repeatable as content changes to a maximum of 8 units.

POSC 271. Comparative Political Economics (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Past attempts to address such questions as "What part does government play in the economy?" have been made within the disciplinary boundaries of political science or economics. Such questions, however, cut across the domains of economics and political science, and the new political economy attempts to integrate theories and insights from both disciplines. This course will examine this literature to see how successful it has been in explaining important aspects of the interrelationship between politicians and the economy.

POSC 272. Parties and Party Systems in Western Europe (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines some of the literature on parties and party systems in Western Europe, with special attention to the role of such systems in modern representative democracies and to debates in the literature on this topic.
POSC 273. Rational Choice in Comparative Politics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. The rational choice approach has begun to gain favor among a number of comparatists working on a variety of questions. This seminar critically reviews and discusses the contribution the rational choice perspective has made as well as the debates it has sparked.

POSC 274. The Armed Forces and Politics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the role of the armed forces in political society, covering western-democratic, communist, postcommunist, and third world systems. Comparisons of civil-military relations across regions are made, with an emphasis on military political intervention and civilian control strategies.

POSC 276. Democracy and Democratization (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Addresses topics and readings on democracy and democratization within the field of comparative politics. Covers arguments between democracy and democratization across regions and time. Explores the relative impact of economic, social, and political factors in the emergence of democracy and conditions sustained therein.

NO.

POSC 278. Seminar in Latin American Politics (4) Seminar, 3 hours. Critical examination of fundamental issues of Latin American politics with attention to varying interpretations and approaches to the study of elites and masses, power and class conflict, development and underdevelopment.

POSC 279. Asian Political Economy in Comparative Perspective (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on the political economy of late development, particularly in East Asia, including rival forms of institutional analysis, case studies versus comparative analysis, and the particular data and methodological challenges of fieldwork-based analysis.

POSC 280. Seminar in Political Theory (4) Seminar, 2-3 hours. Prerequisite(s): consent of instructor. A detailed study at an advanced level of political theories and concepts, and the writings of the major theorists, confined to some selected era or limited to some selected major theme.

POSC 281. Seminar in the History of Political Thought (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced study of the methodology and practice of research in the history of political thought.

POSC 282. Political Theory and Policy Analysis (4) Seminar, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): graduate standing or consent of instructor. Provides an overview of the literature focusing on the analysis of individual behavior within various types of institutional arrangements. Introduces a diversity of work oriented in rational choice theory, broadly defined. Emphasis is placed on applying institutional analysis to legislative, bureaucratic, and so-called informal institutions.

POSC 283. Political Thinkers in Depth (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Intensive reading of one or more great political thinkers from around the world, with special attention to methodologies of research and interpretation. Examples might include Plato, Confucius, Machiavelli, Marx and Engels, John Stuart Mill, or Gandhi. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes to a maximum of 8 units.

POSC 285. Professional Research Paper (4) Outside research, 12 hours. Prerequisite(s): graduate standing or consent of instructor. An independent study course focusing on writing a substantial research paper, emphasizing research design problems. Must be completed within two quarters following doctoral qualifying examinations. If completed in one quarter, a grade will be assigned for 4 units. If two quarters are necessary, course will be graded In Progress (IP) until both terms are completed when the final grade will be assigned for 8 units. Course is repeatable to a maximum of 8 units.

POSC 290. Directed Studies (1-6) Prerequisite(s): consent of instructor. Advanced work in a topic or topics appropriate to the student’s special interests and needs. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

POSC 291. Individual Study in Coordinated Areas (1-12) Prerequisite(s): consent of instructor. A program of study designed to advise and assist candidates who are preparing for doctoral examinations. Does not count toward the unit requirement for the master’s degree. Graded Satisfactory (S) or No Credit (NC). May be repeated up to a total of 16 units.

POSC 292. Concurrent Analytical Studies in Political Science (2-4) Outside research, 8-16 hours. Prerequisite(s): consent of instructor. Each 292 course is taken concurrently with a 100-series course but on an individual basis. Students complete a graduate-level paper based on research or criticism related to the 100-series course. Faculty guidance and evaluation is provided throughout the quarter. POSC 114, POSC 114H, POSC 114S, POSC 142 (EZ), POSC 186, POSC 190, POSC 196, POSC 197, POSC 198G, POSC 198L, and POSC 199 may not be used for this course arrangement. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

POSC 293. Research Topics in Political Science (1) Lecture, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Lectures and discussions by invited scholars and faculty on selected research topics in political science. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

POSC 297. Directed Research (1-6) Outside research, 3-18 hours. Individual research performed under the direction of a faculty advisor. Designed for students preparing their dissertation prospectuses. Students meet in groups by appointment with a faculty advisor to discuss issues of dissertation writing. Emphasis is placed on the development of research design. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 18 units.

POSC 299. Research for Thesis or Dissertation (1-12) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

POSC 301. Teaching of Political Science at the College Level (2) Seminar, 1 hour; practicum, 3 hours. Prerequisite(s): graduate standing in Political Science. A program of weekly meetings and individual formative evaluation required of new Political Science Teaching Assistants. Covers instructional methods and classroom/section activities most suitable for teaching Political Science. Conducted by departmental faculty or the Teaching Assistant Development Program. Graded Satisfactory (S) or No Credit (NC).

POSC 302. College Teaching Practicum (1-4) Practicum, 2-8 hours; consultation, 1-4 hours. Prerequisite(s): graduate standing and consent of instructor. Required of all teaching assistants in the department. Credit not applicable to graduate unit requirements. Supervised teaching in college level classes under the supervision of the course instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.
Assistant Professors
Dale J. Barr, Ph.D.
Michael A. Erickson, Ph.D.
Kelly Huffman, Ph.D.
Edward Korzus, Ph.D.
Khaleel Razak, Ph.D.
Rebekah Richert, Ph.D.
Aaron Seitz, Ph.D.
Kate Sweeney, Ph.D.
Thomas Sy, Ph.D.
Tuppet M. Yates, Ph.D.

Cooperating Faculty
Robert C. Calfee, Ph.D. Graduate School of Education

Majors and Career Opportunities
The major in Psychology is designed to give students a broad, general exposure to knowledge in the various areas of psychology and to the methods psychologists use to conduct research. The B.A. degree in Psychology is useful to those students seeking careers in probation and parole, corrections, personnel, industrial relations, mental health work, social work, or positions as trainees in a variety of executive training programs. The degree also prepares students for graduate school in psychology in either M.A. or Ph.D. programs. Such graduate programs prepare students for a variety of career possibilities. Careers include teaching and research positions in community and private colleges and state and other universities as well as career positions such as research psychologist, clinical psychologist, counseling psychologist, and industrial psychologist.
For more information, see psych.ucr.edu.
The department offers a minor in Psychology and a major in Psychology/Law and Society.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.
The lower-division biological, physical sciences, and mathematics requirements for the Psychology major also count toward the college's Natural Sciences and Mathematics breadth requirement. Consult with a departmental advisor.

Major Requirements
Psychology Major
The Psychology major requires early, satisfactory completion of certain lower-division requirements. The lower-division requirements listed below must be completed by the end of the sophomore year, with an average grade of “C” or better, with no grade below a “C-”, and before upper-division Psychology courses are taken. All courses must be taken for a letter grade. Transfer students and others entering the major after achieving sophomore standing must complete the requirements within one year by enrolling in applicable courses every quarter until the requirement is met. Students who do not complete the lower-division requirements in this timely fashion and with at least the minimum required grade average will not be permitted to continue in the Psychology major. Students must check course descriptions for prerequisite requirements.
The major requirements for the B.A. degree in Psychology are as follows:
1. Lower-division requirements (39 units)
   a) One course in Mathematics, Statistics, or Computer Science
   b) One course in biological sciences chosen from BIOL 002 or both BIOL 005A and BIOL 05LA, BIOL 003 or BIOL 005B, BIOL 005C, BIOL 034
   c) One course in physical science chosen from
      (1) CHEM 001A, CHEM 001B, CHEM 001C (and CHEM 01LA, CHEM 01LB, CHEM 01LC), CHEM 003
      (2) PHYS 002A, PHYS 002B, PHYS 002C, PHYS 007, PHYS 008, PHYS 020, PHYS 021, PHYS 040A, PHYS 040B, PHYS 040C
      (3) Any Geosciences courses except for cultural geography courses
   d) Two additional courses from a), b), or c) above
   e) PSYC 001, PSYC 002, PSYC 011, PSYC 012
2. Upper-division requirements (36 units)
   a) PSYC 110 or CBNS 106
   b) PSYC 140, PSYC 150
   c) PSYC 132 or PSYC 134
   d) PSYC 160
   e) Four additional 4-unit, upper-division Psychology courses. Only EDUC 106/PSYC 106, one 4- to 5-unit quarter of PSYC 198G, or one 4- to 8-unit quarter of PSYC 198I may be included. No 190-series courses other than PSYC 198G or PSYC 198I may be used.
   Students planning for graduate school should take into consideration any specific graduate school requirements when choosing these elective Psychology courses.

Note
Students who have taken general or introductory Psychology courses other than PSYC 001 and PSYC 002 must consult with a departmental advisor.

Sample Program
This sample program provides a curriculum for the Psychology student who does not need remedial English or remedial math, and does need four quarters of a foreign language.

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Psychology/Law and Society Major
1. All requirements for the B.A. in Psychology (39 lower-division units, which includes 16 units that are also used for college breadth requirements; 36 upper-division units)
2. Requirements for Law and Society (36 units)
   a) PHIL 007 or PHIL 007H
   b) LWISO 100
   c) One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
   d) Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159
   e) Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISA 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, POSC 186, SOC 147, SOC 149, SOC 180
   f) LWISO 193, Senior Seminar

Note
For sections 2.d) and 2.e) combined, not more than two courses may be taken from the same department. In fulfilling requirements of two or more majors, students may not count more than two courses toward both parts of their total requirements. For this major, PSYC 012 fulfills a requirement in both Psychology and Law and Society.
Minor
Prerequisites for the minor in Psychology are PSYC 001, PSYC 002, PSYC 011, and PSYC 012, with an average grade of "C" or better, with no grade below a "C-".

Requirements for the Psychology minor are as follows (21 units):

1. Twenty-one (21) upper-division Psychology units
   a) PSYC 110 or CBNS 106
   b) PSYC 132 or PSYC 134
   c) PSYC 140 and PSYC 150
   d) PSYC 160

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Psychology Undergraduate Honors Program
The Psychology Undergraduate Honors Program has been discontinued. For more information please contact the Undergraduate Advising Office, 1331 Olmstead, (951) 827-5386.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR's International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program
The Department of Psychology offers the M.A. and Ph.D. degrees in Psychology; however, applications are not accepted from students wishing to work towards the master's degree only.

Graduate training in Psychology is offered in four major areas: Cognitive, Social/Personality, Developmental, and Systems Neuroscience.

Admission
Students are normally expected to have completed the equivalent of an undergraduate major in Psychology at the UC, with background preparation in basic science and mathematics. Applicants for graduate status must provide scores for the GRE General Test (verbal and quantitative) prior to admission. The Ph.D. degree is a research degree. Students must demonstrate the ability to complete rigorous empirical research and must be active in research throughout their graduate career. The course requirements in the Ph.D. program are directed toward establishing a foundation for critical evaluation of research literature and designing conceptually important empirical research.

Doctoral Degree
Course Work
The courses normally required during the first two years include the following:

1. PSYC 211, PSYC 212, PSYC 213 (Systems Neuroscience students take two of the three, as directed by the student's advisor.)

2. The appropriate area core:
   Cognitive: PSYC 203A, PSYC 203B, PSYC 203C, PSYC 233
   Developmental: PSYC 207A, PSYC 207B, PSYC 207C, PSYC 208
   Social/Personality: PSYC 225, PSYC 226, PSYC 227
   Neuroscience: NRSC 200A/PSYC 200A, NRSC 200B/PSYC 200B, NRSC 200C/PSYC 200C

3. Four additional courses or seminars outside the student's area of specialization to acquire breadth. The breadth requirement is flexible in order to provide a choice of courses suitable for students in the different specialization areas within the department. Courses can be in the Department of Psychology or in another department. They must be regular 3- or 4-unit courses or seminars, and at least one of the four courses must be a departmental core course (listed in 2, above) outside the student's area of specialization. Psychology courses in the student's area of specialization offered by other departments will typically not be approved.

For a course to satisfy the breadth requirement, approval prior to enrollment must be obtained from all the faculty in the student's area of specialization or from a three-member advisory committee in the student's area. Exceptions to the "prior approval" rule are granted to students who have completed graduate-level course work prior to entering the UCR program. Students may request that specific courses be accepted toward satisfaction of the breadth requirement. This request is reviewed by the student's area faculty, who use procedures and standards typically applied to the preapproval of breadth courses.

4. PSYC 301: Required of all graduate students prior to or concurrent with the first teaching assistant appointment unless waived by petition due to previous experience

The Psychology Department requires that each student earn a “B” average in the PSYC 211, PSYC 212, and PSYC 213 sequence and in the student's area core courses, with no grade lower than a “B-.”

In addition, students must be enrolled in the appropriate area of Proseminar every quarter until advancement to candidacy:

  Cognitive: PSYC 283
  Developmental: PSYC 284
  Social/Personality: PSYC 285

Progress in the program is formally evaluated in June of each year and informally on a continuing basis by noting participation in class and in research.

All students in the graduate program are held to these requirements whether or not they have taken graduate work at, or hold an M.A. from, another institution. The only exception may be for previously-taken graduate-level course work which is thought to be equivalent to one or more of PSYC 211, PSYC 212, or PSYC 213. If a grade of “B” or better was received, and with the approval of the advisor, the student may be tested by a departmental instructor of the course(s) in question. On the basis of the results of the test, the instructor decides if the course can be waived.

Master's Degree
Although there is not a separate terminal master’s program, students may apply for the master's degree at the beginning of the quarter in which they expect to complete the statistical sequence, the appropriate area core, two of the four breadth courses, PSYC 301 (see 1, 2, 3, and 4 above), and a minimum of 36 units in graduate status (of which at least 18 must be in graduate course work) and pass an oral comprehensive examination administered by the Psychology Department.

Teaching Experience
Each student must gain experience in a teaching capacity for the equivalent of at least three full quarters. Teaching assistants assist a faculty member in an undergraduate course by preparing and grading examinations, reading papers, lecturing, and conducting discussion and laboratory sections.

Written and Oral Qualifying Examinations
The qualifying examination should be taken during the third year of full-time graduate study. It consists of a written component and an oral examination, and focuses on the subject matter in the student's chosen area of concentration. A qualifying committee should be nominated early in the third year, and all core and breadth requirements must be completed no later than the quarter in which the qualifying examination is taken.

On the basis of this examination (and completion of the core and breadth requirements), the student may pass and be advanced to candidacy for the Ph.D.; fail, and be permitted one retake; be awarded the M.A. (if not previously awarded) but not be advanced to candidacy for the Ph.D.; or not be awarded the M.A. and not be advanced to candidacy for the Ph.D.

Upon successful completion of 1, 2, 3, and 4, passing the qualifying examination, and nomi-
nation of the dissertation committee, the Graduate Division sends the student an application for advancement to candidacy.

**Dissertation and Final Oral Examination**
Students must complete a dissertation on a subject chosen by the candidate, bearing on the principal area of concentration and showing the student’s ability in independent investigation. The dissertation committee guides the student in preparing the dissertation and examines the student during the defense of the dissertation.

Each of the four major areas may have additional requirements. Occasionally, a change in courses used to satisfy specific requirements may be justifiable. For a complete description of the program, visit psych.ucr.edu.

**Normative Time to Degree**
15 quarters

**Minor in Quantitative Psychology**
In addition to pursuing a doctoral degree in one of the core areas of psychology, graduate students may qualify, under the direction of the committee in charge of the quantitative minor, for a minor in Quantitative Psychology by completing the following:

1. PSYC 211, PSYC 212, and PSYC 213, with a grade of “A” or better in each course, or passing an examination covering the three courses

2. Three advanced quantitative courses: PSYC 259 (with different subtitles) or other courses specifically approved by the committee in charge

3. Three quarters of PSYC 270

4. Successful completion of an oral qualifying examination based upon a paper written by the student on a quantitative topic.

A three-person faculty qualifying committee, approved by the chair of the committee in charge, must grant prior approval of the topic of the paper and conduct the oral examination. The candidate and the committee determine the format of the oral exam; a presentation in PSYC 270 based on the paper satisfies the oral examination requirement.

**Opportunities for Graduate Study in Neuroscience**
Faculty from the Department of Psychology participate in a unique graduate specialization in Neuroscience which draws on the strengths of distinguished scientists from several units. For further information concerning work in this area, see Neuroscience Graduate Program in the Programs and Courses section of this catalog.

**Lower-Division Courses**

**PSYC 001. Introductory Psychology (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none; enrollment priority is given to Psychology majors and Social Relations majors. An introduction to psychology as an experimental science. Emphasizes topics in cognitive (including learning, memory, sensation, perception), comparative, and physiological psychology.

**PSYC 002. Introductory Psychology (4)** Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none; enrollment priority is given to Psychology majors and Social Relations majors. Emphasizes topics in developmental psychology, tests and measurements, social psychology, personality, and abnormal behavior.

**PSYC 011. Psychological Methods: Statistical Procedures (5)**
Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): MATH 004 or MATH 005 or MATH 008A with a grade of “C-“ or better; PSYC 001 and PSYC 002 with grades of “C-“ or better; enrollment priority is given to Psychology majors. Covers descriptive and inferential statistics, measures of central tendency, variability, and correlation. Introduces sampling distributions, statistical inference, and hypothesis testing.

**PSYC 012. Psychological Methods: Research Procedures (6)**
Lecture, 3 hours; laboratory, 3 hours; outside research, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011 with grades of “C-“ or better; ENGL 001C or equivalent with a grade of “C-“ or better; consent of instructor is required for students repeating the course; enrollment priority is given to Psychology majors. A systematic survey of research methodologies in psychology. Laboratory assignments include evaluating and testing psychological theories, assessing methodologies and research designs, designing and implementing research, collecting data and analyzing statistics, writing research reports, and discussing ethical issues in science.

**PSYC 013. Skepticism and Pseudoscience in Psychology (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): a grade of “C-“ or better in ENGL 001A or consent of instructor. Studies topics at the borderland of psychology (e.g., extra-sensory perception, repressed memory, pseudoscientific beliefs, parapsychology, psychic phenomena, faith healing, mass hysteria). Explores the relationship among skepticism, cynicism, and “gullibility” and the rhetoric of extraordinary claims. Stresses the development of scientific literacy, critical thinking skills, hypothesis testing, and understanding psychology as an empirical science.

**PSYC 049. Topics in Psychology (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Explores a topic of general interest in psychology. Debate and dialogue are the distinguishing features of this course. Topics are announced in the Schedule of Classes. Course is repeatable as topics change to a maximum of 16 units.

**PSYC 096. Research for Lower-Division Students (1-2)**
Scheduled research, 3-6 hours. Prerequisite(s): freshman or sophomore standing and consent of instructor. An introduction to research in psychology. Emphasis upon aspects of library and laboratory research within the content of ongoing faculty research programs. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.

**Upper-Division Courses**

**PSYC 106. Practicum in Child Development (4)**
Lecture, 3 hours; practicum, 3 hours. Prerequisite(s): upper-division standing. Introduction to sociocultural perspectives of child development. Topics include sociocultural theories of development, motivational aspects of learning, technology in education, and school-home linkages. Application of child development theories and research related to them takes place during fieldwork assignments in after-school, computer-based programs for elementary and middle school students. Cross-listed with EDUC 106.

**PSYC 109. Advanced Research Methods (4)**
Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, each with a grade of “B-“ or better; or equivalent; or consent of instructor. Advanced theory and practice of planning, conducting, reporting, and evaluating research in the social and behavioral sciences. Students conduct original research that, if desired, can lead to (and become part of) a senior honors thesis or other senior-level research project. Satisfactory (S) or No Credit (NC) grading is not available.

**PSYC 110. The Brain and Behavior (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 002 or BIOL 003 or BIOL 005A or BIOL 034 with a grade of “C-“ or better, or equivalents, or consent of instructor. Explores the principles of neuroanatomy and neurophysiology and their relationship to brain function. Topics include sensory and perceptual processes, biological aspects of learning and memory, motivation, emotion, language, and abnormal behavior. Credit is awarded for only one of CBNS 120/PSYC 120 or PSYC 110.

**PSYC 112. Neural Mechanisms of Animal Behavior (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 with a grade of “C-“ or better or PSYC 110 with a grade of “C-“ or better or consent of instructor. Studies how the nervous systems of vertebrates and invertebrates contribute to and control their behavior. Focuses on aspects of sensory physiology with a brief orientation to the structure and function of nervous systems. Emphasizes a top-down approach to neurobiology, with specific behaviors providing guidelines for an examination of neural mechanisms.

**PSYC 115. Drugs and Behavior (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 with a grade of “C-“ or better or PSYC 110 with a grade of “C-“ or better or consent of instructor. Describes both legal and illegal drugs. Analyzes drug-nervous system interactions and how the use of various drugs (particularly drugs of abuse) affects behavior and psychological well-being.

**PSYC 117. Cognitive Neuroscience of Memory and Consciousness (4)** Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): CBNS 106 with a grade of “C-“ or better or PSYC 110 with a grade of “C-“ or better or consent of instructor. Surveys the neural basis of mental processes, focusing on memory and consciousness and their behavioral manifestations. Emphasizes current research literature.

**PSYC 120. Cellular Neuroscience: Membrane and Synaptic Phenomena (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. An examination of cellular and molecular mechanisms of nervous system function using concepts drawn from the study of vertebrates and invertebrates with emphasis on mammalian systems. Cross-listed with CBNS 120.

**PSYC 120L. Neuroscience Laboratory (2)** Lecture, 1 hour; laboratory, 3 hours. Prerequisite(s): CBNS 120/PSYC 120 or concurrent enrollment. Laboratory experiments using anatomical, chemical, and physiological research methods fundamental to understanding neurons and neural systems. Cross-listed with CBNS 120L.

**PSYC 121. Developmental Neuroscience (4)**
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or consent of instructor. A study of the development of nervous systems. Examines the cellular and molecular mechanisms of neural development and the determinants of cell birth and death, axonal pathfinding, neuronal connections, and development of neural systems underlying behavior. Cross-listed with CBNS 121.
PSYC 124. Systems Neuroscience (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or PSYC 110 or consent of instructor. Study of the structure and function of motor and sensory systems in vertebrate and invertebrate nervous systems. Cross-listed with CBNS 124.

PSYC 125. Neuropsychology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 120/PSYC 120; previous or concurrent enrollment in CBNS 120/PSYC 120L and CBNS 124/PSYC 124 recommended. Examines synaptic neurotransmitter systems, mechanisms, and pharmacological agents and effects, which are fundamental to neural information processing. Cross-listed with CBNS 125.

PSYC 126. Neuroscience of Learning and Memory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 106 or PSYC 110 or consent of instructor. Covers mechanisms of learning and memory across levels of analysis, including genetic, neuronal, systems and theory. Topics include the multiple memory systems, memory consolidation, working memory, emotional memory, recognition memory, spatial memory, and human amnesia. Cross-listed with CBNS 126.

PSYC 127. Behavioral Control Systems (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CBNS 120/PSYC 120, CBNS 124/PSYC 124 strongly recommended. An analysis of the principles of nervous systems operation from the processing of sensory inputs for object recognition and localization to the organization of central patterns of generation of sequenced motor output. Cross-listed with CBNS 127.

PSYC 129. Human Neuropsychology (4) Lecture, 3 hours; discussion, 1.5 hours. Prerequisite(s): a grade of "C-" or better in one of the following courses or consent of instructor: CBNS 106, PSYC 110, PSYC 132, PSYC 134, PSYC 135. Surveys how high psychological functions (e.g., perception, memory, language) are organized in the human brain. Special emphasis is on behavioral and cognitive impairments due to brain injury and how they may inform our view of normal cognitive functions.

PSYC 130. Fundamentals of Learning and Conditioning (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 101/PSYC 102, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. A survey course that includes both historical and current models of human learning, conditioning, and memory. Provides a good foundation for research or future study in learning and memory by covering fundamental theories established by Pavlov and Skinner while incorporating new theories of human behavioral control.

PSYC 131. Computational and Mathematical Models in Cognitive Science (4) Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): a grade of "C-" or better in PSYC 001, PSYC 002, PSYC 011, PSYC 012 or consent of instructor. Introduces students to the technical and theoretical issues involved in using models to understand behavior. Involves analysis of model predictions and simulation of behavioral data. Course is repeatable to a maximum of 12 units if taken with different instructors.

PSYC 132. Perception (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. An analysis of the role played by sensory mechanisms, experiences, expectations, and needs in recognizing objects in the environment.

PSYC 133. Human Factors (4) Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): a grade of "C-" or better in one of the following courses or consent of instructor: PSYC 132 or PSYC 134. Provides an overview of human capabilities and limitations considered in the design of person-machine systems. Evaluates factors critical to performance in person-machine systems, including attention, decision making, motor performance, and memory. Andersen

PSYC 134. Cognitive Processes (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. Empirical and theoretical research in several subareas within contemporary cognitive psychology. These subareas include attention, mental representation, information organization and retrieval from memory, psycholinguistics, problem solving, decision making, thinking, and artificial intelligence and computer simulation of cognitive processes.

PSYC 135. Psycholinguistics (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): a grade of "C-" or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012. Introduction to psycholinguistics emphasizing the psychological implications of linguistic theory, including the effect of syntactic structure on the comprehension, production, and retention of speech; the course of language acquisition; and models of the adult language user.

PSYC 136. Topics in Cognitive Neuroscience (4) Seminar, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): a grade of "C-" or better in one of the following courses or consent of instructor: CBNS 106, PSYC 110, PSYC 129, PSYC 132, PSYC 134, PSYC 135. Intensive study of select topics in cognitive neuroscience. Stresses the methodology and interpretation of current research topics. Course is repeatable as topics change to a maximum of 12 units.

PSYC 138. Sensory Exotica: The Secret Perceptual Skills of Animals and Humans. (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 and grades of "C-" or better. Surveys lesser-known sensory mechanisms and perceptual abilities of animals and humans. Topics include echolocation abilities of bats and porpoises; biomimicry in birds; electroreception in fish; pheromones in insects; and echolocation, lipreading, and pheromone sensitivity in humans. Emphasis is on cognitive, neurophysiological, and philosophical implications.

PSYC 139. Topics in Cognitive Psychology (4) Seminar, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): a grade of "C-" or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012, and grades of "C-" or better. Surveys lesser-known sensory mechanisms and perceptual abilities of animals and humans. Topics include echolocation abilities of bats and porpoises; biomimicry in birds; electroreception in fish; pheromones in insects; and echolocation, lipreading, and pheromone sensitivity in humans. Emphasis is on cognitive, neurophysiological, and philosophical implications.

PSYC 150. Personality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. A survey of the principal theories of personality with attention to the experimental methods and findings on which they are based.

PSYC 152. Abnormal Psychology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of "C-" or better; or equivalents; or consent of instructor. An introduction to the research and theories regarding the major types of abnormal behavior, including the neuroses, schizoidia, psychosomatic disorders, sexual disorders, drug and stress induced states, and organ-ic disorders.

PSYC 153. Introduction to Clinical Psychology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): a grade of "C-" or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012, PSYC 150, PSYC 152. Introduction to the field of clinical psychology with an emphasis on the application and evaluation of techniques of individual and group counseling and therapy and the application and evaluation of psychological tests in the assessment of psychological problems.

PSYC 155. Personality Assessment (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): a grade of "C-" or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012, PSYC 150. Covers the assessment of personality through self-report tests, projective tests, and systematic observations. Also entails descriptions of the psychometric testing of systems as it applies to the problems in studying personality.

PSYC 158. Person Perception (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): a grade of "C-" or better in the following courses or consent of instructor: PSYC 001, PSYC 002, PSYC 011, PSYC 012, PSYC 140 or PSYC 150 (preferably both). Explores "person perception" from the viewpoints of both personality psychology and social psychology. Examines how individuals perceive and judge their own personalities and those of others. Focuses on the processes used in daily life to judge personality and the ways such judgments are erroneous and accurate.
PSYC 160. Life Span Development (5) Lecture, 3 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of “C-” or better; or equivalents; or consent of instructor. Introduces the biological, social, and cognitive processes that influence development from the prenatal period through late adulthood. Topics include development in physical, motor, perceptual, cognitive, emotional, and social areas. Includes discussion of issues related to interlaced functioning, personality, social roles and relationships, coping and adjustment, and aging.

PSYC 161. Socioemotional and Personality Development (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of “C-” or better; or equivalents; or consent of instructor. Study of the development of human personality from birth through late adolescence. Emphasis is on the impact of interpersonal relationships on the acquisition of human traits, emotional reactions, and patterns of adjustment.

PSYC 162. Biological Issues in Development (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, and PSYC 160 with grades of “C-” or better; or equivalents; or consent of instructor. Examines biological processes that influence behavior and development across the life span. Discusses contemporary theoretical approaches to the study of biological, genetic, and environmental influences on development. Topics include behavioral genetics, developmental neuro-science, and the impact of early environments and stress on adaptation and resilience.

PSYC 163. Cognitive Development (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, and PSYC 160 with grades of “C-” or better; or equivalents; or consent of instructor. An analysis of intellectual development from birth through maturity and into stages of aging. Discusses historical and contemporary theoretical and experimental approaches to studying the mechanisms of intellectual growth and development.

PSYC 164. Emotional and Behavioral Disorders of Childhood (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, PSYC 152, and PSYC 160 with grades of “C-” or better; or equivalents; or consent of instructor. Provides an overview of behavioral and emotional disorders affecting adolescents within a developmental context. Examines disorders affecting youth in terms of prevalence, developmental course, and theories. Topics include theoretical models of child psychopathology; diagnostic, assessment, and treatment practices; and the descriptive psychopathology of major childhood disorders.

PSYC 165A. The Cultural Bases of Human Development (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, and PSYC 160 with grades of “C-” or better; or equivalents; or consent of instructor. Examines the social, emotional, and intellectual aspects of human development from a cultural perspective. Covers theory, research, and methods of studying the cultural bases of psychological growth. Topics include socialization processes, religion, social relations, language and cognition, schooling and academic achievement, acculturation, and ethnicity.

PSYC 165B. The Development of Immigrant and Ethnic Minority Youth (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, and PSYC 160 with grades of “C-” or better; or equivalents; or consent of instructor. Covers current theory and research on the development of immigrant and ethnic minority youth in the United States. Focuses on the social, cultural, and psychological processes influencing the biological, cognitive, and social development of youth from immigrant and ethnic minority families.

PSYC 166. Adolescence and Emerging Adulthood (4) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012, and PSYC 160 with grades of “C-” or better; or equivalents; or consent of instructor. Covers current theory and research on the periods of development referred to as adolescence and the transition to adulthood. Topics include the sociocultural, psychologi-cal, and historical changes that have defined these periods, and key features of these periods including pubertal changes and changes in cognitive and social development.

PSYC 167. Psychological Development of Black Children (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 002. This course will analyze both the traditional theoretical approaches to the study of Black children and innovative approaches that are currently being developed by Black psychologists. The course will cover topics in the areas of cognitive, social, and personality development. Cross-listed with ETST 167.

PSYC 168. Psychological Aspects of the Black Experience (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 002. This course examines the interdependence between personal characteristics, Afro-American culture, and the social conditions which foster the Black experience. Group memberships, life styles, role factors, and situational settings as social norms will be explored in order to understand the uniqueness of the Black experience. Cross-listed with ETST 168.

PSYC 169. Topics in Developmental Psychology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, PSYC 012 with grades of “C-” or better, PSYC 160; or equivalents; or consent of instructor. Intensive study in developmental psychology. Stresses literature, methodology, and experimental design and analysis. Specific course content varies. Course is repeatable to a maximum of 16 units.

PSYC 175. Psychology and Law (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): LWSO 100 with a grade of “C-” or better or PSYC 001 and PSYC 002 with grades of “C-” or better. A study of psychological theory and empirical research as it relates to the law. Topics include jury decision making, eyewitness memory, child custody, criminal responsibility and intent, competence, rehabilitation and punishment, ethics and legal responsibilities in therapy, and psychological research.

PSYC 178. Health Psychology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): HNPG 042K or PSYC 002 or SOC 001 or SOC 001H. An examination of the importance of interpersonal relationships to physical health and effective medical care. Applies social psychological perspectives to such topics as stress-related diseases, placebo effects, doctor-patient interactions, dying, and the hospital environment.

PSYC 179. Health and Behavior Change (4) Lecture, 3 hours; discussion, 1 hour; term paper, 1 hour. Prerequisite(s): a grade of “C-” or better in one of the following courses: HNPG 042K, PSYC 002, PSYC 178. Examines psychological constructs in health behavior change. Covers theories and research on preventive health behavior; adherence to medical treatment; health lifestyles; substance use and abuse; and anxiety and depression in medical illness. Also examines cognitive and behavioral techniques; helping skills; placebo effect; social support; effective therapeutic communication; medical care delivery; and ethical issues.

PSYC 180. Laboratory in Perception (4) Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, and PSYC 012 with grades of “C-” or better; or consent of instructor. Provides hands-on computer experience testing phenomena of sensory and perceptual psychology. Students perform experiments in vision, hearing, touch, taste, or smell, using computer software. Students also design, perform, and analyze a novel experiment of their choosing. Discusses the theoretical and practical relevance of all experiments.

PSYC 181. Laboratory in Cognitive Psychology (4) Lecture, 3 hours; outside research, 1.5 hours; extra reading, 1.5 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, and PSYC 134 with grades of “C-” or better. Integrates the conceptual and theoretical foundations of cognitive psychology with the mechanics of conducting research. Students develop and design research studies and collect, analyze, and interpret data.

PSYC 190. Special Studies (1-5) Prerequisite(s): upper-division standing with consent of instructor. Individual study under the direction of a faculty member. Course is repeatable to a maximum of 16 units.

PSYC 191A. Seminar in Developmental Psychology Research (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Discussion of selected topics of research in developmental psychology. Some combination of readings, short written assignments, and oral presentation is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

PSYC 191B. Seminar in Neuroscience Research (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Discussion of selected topics of research in neuroscience. Some combination of readings, short written assignments, and oral presentation is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

PSYC 191C. Seminar in Personality Psychology Research (2) Seminar, 2 hours. Prerequisite(s): consent of instructor. Discussion of selected topics of research in personality psychology. Some combination of readings, short written assignments, and oral presentation is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

PSYC 191D. Seminar in Social Psychology Research (2) Seminar, 2 hours. Prerequisite(s): concurrent enrollment in or completion of PSYC 132 with a grade of “C-” or better. Provides students with the opportunity to conduct research in social psychology. Some combination of readings, short written assignments, and oral presentation is required. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.
and admission to the Psychology Department Undergraduate Honors Program. Presentations by individual faculty members of their research programs; discussions of readings provided by faculty members; discussion of research conceptualization, design, methodology, and statistics; discussion of the-sis-writing procedures; peer exchanges. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 6 units.

PSYC 193H. Senior Honors Seminar (2) Seminar, 2 hours. Prerequisite(s): senior standing in Psychology; admission to the Psychology Department Undergraduate Honors Program. Presentations by individual faculty members of their research programs; discussions of readings provided by faculty members; discussion of research conceptualization, design, methodology, and statistics; discussion of the-sis-writing procedures; peer exchanges. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 6 units.

PSYC 194. Independent Reading (1-4) Prerequisite(s): upper-division standing with consent of instructor. Individual reading under faculty direction. Course is repeatable to a maximum of 4 units.

PSYC 195. Senior Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): senior standing in Psychology; consent of instructor. The student works with a faculty member to prepare a thesis based on independent research. Course is repeatable to a maximum of 12 units.

PSYC 195H. Senior Honors Thesis (2) Term paper, 6 hours. Prerequisite(s): senior standing in Psychology and admission to the Psychology Department Undergraduate Honors Program. The student will work independently with a faculty member preparing a thesis as a final phase of participation in the program. Satisfactory (S) or No Credit (NC) grading is not available.

PSYC 197. Research for Undergraduates (1-4) individual research, 3-12 hours. Prerequisite(s): upper-division standing with consent of instructor. Directed original research. Graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned special projects. Course is repeatable.

PSYC 198. Group Internship in Psychology (2-5) Lecture, 1 hour; internship, 4-10 hours; written assignments, 2-4 hours. Prerequisite(s): PSYC 002 or consent of instructor. Supervised clinical experience in community settings such as mental health clinics, hospitals, and group homes. A written assignment such as a short research paper or a weekly journal is required. Enrollment is for 4 units; a rare exception may be made, in writing, by the instructor for 2, 3, or 5 units. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

PSYC 198H. Junior Honors Research (2) Outside research, 6 hours. Prerequisite(s): junior standing in Psychology and admission to the Psychology Department Undergraduate Honors Program. Original research undertaken under the direction of individual faculty members. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 4 units.

PSYC 198I. Individual Internship in Psychology (2-8) Internship, 4-16 hours; consultation, 1 hour; written work, 1-4 hours; seminar, 0-4 hours. Prerequisite(s): PSYC 001, PSYC 002, PSYC 011, and PSYC 012 with grades of “C-” or better; upper-division standing; consent of instructor. Individual internship in nonclinical psychology fieldwork. The student spends three hours per week in a prescribed combination of academic activities and internship for each unit of credit. Students keep a weekly log and write a summary of the internship experience. Students who complete additional assigned reading and submit a substantive term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 16 units.

PSYC 198T. Counseling Skills (1) Lecture, 1 hour. Prerequisite(s): PSYC 002 or consent of instructor. Focuses on helping skills as applied to the fields of clinical and counseling psychology. Designed for students involved in campus peer counselor settings and future residence hall advisors. Graded Satisfactory (S) or No Credit (NC).

PSYC 199. Senior Honors Research (1-5) Outside research, 3-15 hours. Prerequisite(s): open to senior Psychology majors by invitation. Original research undertaken, by invitation of faculty, under the direction of individual faculty members. Psychology Department Undergraduate Honors Program participants must enroll for 2 units each quarter of their senior year except for the thesis-writing quarter. Satisfactory (S) or No Credit (NC) grading is not available for Honors Program participants; other students may choose Satisfactory (S) or No Credit (NC) grading. Course is repeatable to a maximum of 16 units.

Graduate Courses

PSYC 200A. Fundamentals of Neuroscience (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. The fundamentals of neuroscience in molecular and cellular mechanisms, neural and hormonal systems, and neural control of behavior. Cross-listed with NRSC 200A.

PSYC 200B. Fundamentals of Neuroscience (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor; NRSC 200A/PSYC 200A. The fundamentals of neuroscience in molecular and cellular mechanisms, neural and hormonal systems, and neural control of behavior. Cross-listed with NRSC 200B.

PSYC 200C. Fundamentals of Neuroscience (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor; NRSC 200B/PSYC 200B. The fundamentals of neuroscience in molecular and cellular mechanisms, neural and hormonal systems, and neural control of behavior. Cross-listed with NRSC 200C.

PSYC 203A. Experimental Psychology (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on the history and philosophy of cognitive science. Covers the theories and models and gives an empirical overview of perception.

PSYC 203B. Experimental Psychology (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers the theories and models and gives an empirical overview of attention and memory.

PSYC 203C. Experimental Psychology (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers the theories and models and gives an empirical overview of higher level language and memory processes.

PSYC 207A. Theories in Developmental Psychology (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. A consideration of major issues and theories in the area of developmental psychology. Theories to be covered include social learning theory, structural theories, sociobiology, and theories of personality development. Topics include life span models and plasticity of human behavior.

PSYC 207B. Social Development (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. Theoretical and empirical consideration of various topics in social development, including attachment, aggression, dependency, cooperation, and competition. Students will also consider methodological issues appropriate to investigations of these phenomena.

PSYC 207C. Processes of Cognitive Development (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. Examines the cognitive changes in humans throughout the life cycle. Topics include Piagetian theory and memory, information processing, attention, and intelligence with a focus on the changes that occur in these skills.

PSYC 208. Research Methods in Development (3) Lecture, 3 hours. Prerequisite(s): PSYC 211; PSYC 212 or consent of instructor. Develops students’ skills in evaluating current research methodologies to answer developmental questions and in critically evaluating a variety of research methodologies currently in use. Topics include measurement of developmental dimensions and methods for assessing interrelations among developmental dimensions.

PSYC 210. Preparing Research Proposals in Psychology (3) Seminar, 3 hours; written work, 2 hours. Prerequisite(s): second-year standing or above in the Psychology graduate program or consent of instructor. Designed for advanced graduate psychology students planning a research career. Focuses on funding opportunities for predoctoral research support. Topics include sources of grant support, mechanisms of grant support, and essentials of grant writing. Graded Satisfactory (S) or No Credit (NC).

PSYC 211. Statistical Inference (4) Lecture, 3 hours; discussion, 1 hour; laboratory, 2 hours. Prerequisite(s): graduate standing in Psychology or consent of instructor. Examines basic issues related to the application of statistical inference, effect size estimation, and significance tests to various research paradigms in psychology. Discusses aspects of psychological measurement and the appropriateness of particular statistical techniques to different types of psychological data.

PSYC 212. Multiple Regression and Correlation Analysis (4) Lecture, 3 hours; discussion, 1 hour; laboratory, 1 hour. Prerequisite(s): graduate standing in Psychology or consent of instructor. Multiple regression, the general linear model, their relationship to analysis of variance, and extensions to multivariate analysis. The use of assorted computer statistical packages.

PSYC 213. Experimental Design and Analysis of Variance (4) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): graduate standing in Psychology, PSYC 211; or consent of instructor. Experimental design and analysis of variance including repeated measures and mixed designs, with special attention to exploratory data analysis, nested designs, interactions, and contrasts.

PSYC 225. Theories and Concepts of Social Psychology (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. Advanced theories and concepts of social psychology. Special attention is given to the history and development of the major concepts of the field. Required of all social-personality graduate students.

PSYC 226. Theories and Concepts of Personality Psychology (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. Advanced critical review of the theories, assessment techniques, and empirical literature in personality psychology. Special attention is given to the interactionist perspective. Required of all social-personality graduate students.
PSYC 227. Research Methods in Social Psychology (3) Lecture, 3 hours. Prerequisite(s): consent of instructor. Laboratory and field research methods with special attention to subject and experimenter artifacts and effects. Special issues include social research and publication and research ethics.

PSYC 228. Research Methods in Personality (3) Lecture, 2 hours. Prerequisite(s): graduate standing or consent of instructor. Methods of personality research with an emphasis upon the methods psychologists can use to assess personality. Attention to data analytic methods and theoretical content is included.

PSYC 231. Mathematical and Computational Models in Cognitive Science (3) Lecture, 3 hours; extra reading, 1.5 hours; written work, 1.5 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces the technical and theoretical issues involved in using models to understand behavior. Emphasis is on hands-on analysis of model predictions and simulation of behavioral data. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 9 units if taken with different instructors.

PSYC 233. Research Methods in Cognitive Science (3) Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Develops skills in research methodologies cognizant of cognitive scientists such as eye-tracking, computational modeling, signal detection, neuroimaging, and event-related potential techniques. Emphasis is on critically examining assumptions of methods and current research utilizing each method, and on how each is being utilized to address theoretical and empirical questions. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable to a maximum of 9 units if taken with different instructors.

PSYC 234. Data Analysis in Cognitive Sciences (3) Lecture, 3 hours. Prerequisite(s): graduate standing in Psychology or consent of instructor. Focuses on the analysis of cognitive psychological data obtained using specialized methodologies particularly relevant to cognitive psychology research including computer simulation, online experimentation, and eye tracking. Topics include real-time data analysis, signal detecting theory, Fourier analysis, and reaction time data. Course is repeatable to a maximum of 9 units if taken with different instructors.

PSYC 243. Multivariate Statistics (3) Lecture, 3 hours; laboratory, 1 hour. Prerequisite(s): PSYC 211, PSYC 212, PSYC 213. Introduces students to multivariate statistical methods, including multivariate analysis of variance, analysis of covariance, repeated measures analysis of variance, cluster analysis, discriminant function analysis, multivariate regression, principal components analysis, exploratory factor analysis, and confirmatory factor analysis. Focuses on the theoretical and practical applications of each method. Graded Satisfactory (S) or No Credit (NC).

PSYC 251. Seminar in Cognitive Neuroscience (3) Seminar, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Consists of seminars, oral reports, and discussions by students, faculty, and visiting scholars on current trends in cognitive neuroscience. Focuses on a memory phenomenon. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PSYC 255. Seminar in Social Psychology (3) Seminar, 3 hours. Prerequisite(s): consent of instructor. Selected advanced topics in social psychology. The contents of these courses will vary. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PSYC 256. Seminar in Perception (3) Seminar, 3 hours. Prerequisite(s): consent of instructor. Study and discussion of experimental papers in relation to the theory of perceptual processes. Graded Satisfactory (S) or No Credit (NC). May be repeated.

PSYC 257. Seminar in Personality Psychology (3) Seminar, 3 hours. Prerequisite(s): consent of instructor. Selected advanced topics in personality with an emphasis on experimental findings and theoretical interpretations. Graded Satisfactory (S) or No Credit (NC). May be repeated.

PSYC 258. Seminar in Developmental Psychology (3) Seminar, 3 hours. Prerequisite(s): consent of instructor. Selected advanced topics in developmental psychology. Graded Satisfactory (S) or No Credit (NC). May be repeated.

PSYC 259. Topics in Quantitative Methods (3) Lecture, 3 hours. Prerequisite(s): standing in Psychology or consent of instructor. A study of selected advanced topics in quantitative methods specifically for behavioral research, especially multivariate analysis. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as topics change.

PSYC 262. Developmental Biospsychology (3) Lecture, 3 hours. Prerequisite(s): standing in Psychology or consent of instructor. Covers basic processes of brain development and plasticity from conception to adulthood. Emphasis is on relationships between biological and psychological phenomena such as sensation, perception, and learning. Students who submit a term paper receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade.

PSYC 263. Seminar in Physiological Psychology (3) Seminar, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Readings, oral reports, and discussions by students, faculty, and visiting scholars of selected areas in physiological psychology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 36 units.

PSYC 270. Current Research in Quantitative Psychology (2) Seminar, 2 hours. Prerequisite(s): standing or consent of instructor. Discussion of selected research topics in quantitative psychology. Emphasis on contemporary research design and quantitative problems relevant to the ongoing research areas of graduate students and faculty. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

PSYC 271. Current Issues in Cognition (3) Seminar, 3 hours. Prerequisite(s): consent of instructor. Current issues in memory, learning, and psycholinguistics. Emphasis is on recent and important experimental findings and on theoretical development. Graded Satisfactory (S) or No Credit (NC). May be repeated.

PSYC 283. Proseminar on Current Research in Cognitive Psychology (1) Seminar, 1 hour; written work, 4 hours per quarter; extra reading, 1-3 hours. Prerequisite(s): graduate standing or consent of instructor. Presentations by students, departmental faculty, or visiting scholars describing current research in cognitive psychology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

PSYC 284. Proseminar on Current Research in Developmental Psychology (1) Seminar, 1 hour; written work, 4 hours per quarter; extra reading, 1-3 hours. Prerequisite(s): graduate standing or consent of instructor. Presentations by students, departmental faculty, and visiting scholars describing current research in developmental psychology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

PSYC 285. Proseminar on Current Research in Social/Personality Psychology (1) Seminar, 1 hour; written work, 4 hours per quarter; extra reading, 1-3 hours. Prerequisite(s): graduate standing or consent of instructor. Presentations by students, departmental faculty, and visiting scholars describing current research in social/personality psychology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 15 units.

PSYC 287. Colloquium in Neuroscience (1) Colloquium, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Involves oral presentations on current research topics in neuroscience by visiting scholars, faculty, and students. Graded Satisfactory (S) or No Credit (NC). Course is repeatable. Cross-listed with NRSC 287.

PSYC 289. Special Topics in Neuroscience (2) Seminar, 2 hours. Prerequisite(s): graduate standing or consent of instructor. An interdisciplinary seminar consisting of student presentations and discussion of selected topics in neuroscience. Content and instructor(s) vary each time course is offered. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable. Cross-listed with BCH 289, BIOL 289, CHEM 289, ENTM 289, and NRSC 289.

PSYC 290. Directed Studies (1-6) Prerequisite(s): consent of instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PSYC 291. Individual Study in Coordinated Areas (1-6) Outside research, 3-18 hours. Prerequisite(s): graduate standing or consent of instructor. A program of study designed to advise and assist candidates who are preparing for doctoral examinations. Graded Satisfactory (S) or No Credit (NC). May be repeated to a total of 18 units; units do not count toward the Master's Degree.

PSYC 292. Concurrent Analytical Studies (1-4) Outside research, 2-8 hours. Prerequisite(s): consent of instructor. Each 292 course will be taken concurrently with some 100-series course, but on an individual basis. It will be devoted to specific additional projects related to the 100-series course. Faculty guidance and evaluation will be provided through the quarter. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

PSYC 296. Research Tutorial (3) scheduled research, 3 hours; outside research, 3 hours; reading (extra), 3 hours; extra writing, 3 hours. Prerequisite(s): graduate standing in Psychology or consent of instructor. Research performed under the supervision of a faculty advisor. Course is repeatable to a maximum of 18 units.

PSYC 297. Directed Research (1-6) Prerequisite(s): consent of instructor. Minor research studies or exploratory work toward the development of the dissertation problem. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

PSYC 299. Research for Thesis or Dissertation (1-12) Prerequisite(s): consent of instructor. Presentation of a thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

PSYC 301. Teaching Psychology at the College Level (2) Seminar, 1 hour; practicum, 3 hours. Prerequisite(s): admission to graduate standing in Psychology. Teaching Assistant Development Program offered by the Teaching Assistant Development Office of the Graduate Division. Required prior to or concur-
Public Policy

Subject abbreviation: PBPL
College of Humanities, Arts, and Social Sciences

Anil Deolalikar, Ph.D., Chair
Program Office, 2417 Humanities and Social Sciences
(951) 827-2743

Committee in Charge
Amalia Cabez, Ph.D. (Women’s Studies)
Christopher Chase-Dunn, Ph.D. (Sociology)
John Cioffi, Ph.D. (Political Science)
Scott Coltrane, Ph.D. (Sociology)
Keith C. Knapp, Ph.D. (Environmental Sciences)
Mindy Marks, Ph.D. (Economics)
Toby Miller, Ph.D. (English/Sociology/
Women’s Studies)
Kathleen Montgomery, Ph.D. (Management and Marketing)
Kathick Ramakrishnan, Ph.D. (Political Science)
Robert K. Ream, Ph.D. (Education)
Ellen Reese, Ph.D. (Sociology)
Dylan Rodriguez, Ph.D. (Ethnic Studies)
David Warren, Ph.D. (Emeritus) (Psychology)
Georgia Warnke, Ph.D. (Philosophy)
Christopher Chase-Dunn, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

Major
Public policy analysis is the use of decision-making theory and evidence-based methods to the study of substantive public policy problems. The objective of public policy analysis is to improve the quality of public policy-making by critically examining the design and relevance of public policies, their implementation and execution, and their impact on households, communities, and the society at large. By its very nature, policy analysis is multidisciplinary. For instance, policies to address health problems in society must draw on developments in philosophy, economics, political science, medicine, and ethics (among other disciplines).

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements
The program offers the B.A. degree in Public Policy.

1. Lower-division requirements (six courses
(at least 24 units))
   a) PBPL 001
   b) POSC 010 or POSC 015
   c) ECON 003
   d) PHIL 002 or PHIL 003
   e) HIST 017B or HIST 020
   f) One course chosen from ECON 005, PSYC 011, SOC 005, STAT 040

2. Upper-division requirements (10 courses chosen from two tracks, with no more than seven courses from one track.

Track 1: Health and Population Policy
   ANTH 147/WMST 140, ANTH 160, ECON 129, ECON 156, ECON 183, ENSC 141/WSWC 141/SCIB 141, ETST 116/HISA 147, POSC 180, PSYC 178, PSYC 179, SOC 137, WMST 140/ANTH 147

Track 2: Social, Cultural, and Family Policy

Track 3: Economic Policy

Track 4: Urban/Environmental Policy
   ECON 121F, ECON 143A/ENSC 143A, ECON 143B/ENSC 143B, ECON 146/ URST 146, ENSC 101, ENSC 141, ENSC 143/ECON 143C, LWSO 175J, PHIL 117, POSC 127, POSC 172/ URST 172, SOC 182/URST 182, SOC 184

Track 5: Policy Institutions and Processes
   ECON 116, ECON 119, ANTH 104, HIST 111, HISA 120B, LWSO 100, LWSO 193, PHIL 165, POSC 101, POSC 146, POSC 150, POSC 167, POSC 168, POSC 170, POSC 173, POSC 186, PSYC 175, RLST 174, RLST 175, SOC 150, SOC 151, SOC 159

Track 6: International and Foreign Policy
   ECON 187/LNST 187, POSC 120, POSC 125, POSC 126, POSC 127, POSC 129, POSC 154, POSC 158/ LNST 148, POSC 159, POSC 160, POSC 162/LNST 142, POSC 169, RLST 173/POSC 109, SOC 135, SOC 181

3. Public Policy Seminar/Colloquia
   During the junior and senior years, students must enroll in PBPL 191 (Seminar in Public Policy), which includes attendance at public lectures to the campus community given by outside speakers — typically policy makers, administrators and researchers — on timely and important policy issues facing the Inland Empire, the state, the nation, and the world.

4. Domestic or International Policy Practicum
   In the third or fourth year of the program (or during the summer between the third and fourth years), students must undertake a policy practicum (PBPL 198-I), which consists of an internship (paid or voluntary) on a policy issue or problem with a local, state or federal government agency, nonprofit or for-profit organization, a trade association, a labor/trade union, or a public-affairs firm. The Public Policy Program Committee helps students locate internship opportunities. The summer internship provides students with an opportunity to gain real-world experience and apply the analytical skills learned in the classroom. Students enrolled in the UC Riverside Washington Academic Program, the UC Center at Sacramento program or the Education Abroad Program can apply that experience toward the policy practicum requirement, and do not need to undertake a separate internship.

5. Senior Thesis (for Honors candidates only)
   Students who have an outstanding academic record in their course work during the first three years of the program can become candidates for Honors in Public Policy during the spring quarter of their junior year. All honors candidates must enroll in a two-quarter senior thesis seminar (PBPL 195H) that will culminate in a written thesis covering a real policy problem of the student’s choice. The thesis project could grow out of the practicum experience.

Minor
1. Lower-division requirements (four courses (at least 16 units))
   a) PBPL 001
   b) One course from ECON 005, PSYC 011, SOC 005, STAT 040, HIST 017B, HIST 020
   c) One course from ECON 003, PHIL 002, POSC 010, POSC 015

2. Upper-division requirements (six courses (at least 24 units) chosen from two tracks:

Track 1: Health and Population Policy
   ANTH 147/WMST 140, ANTH 160, ECON 129, ECON 156, ECON 183,
ENSC 141/SWSC 141/MCBL 141, ETST 116/HISA 147, POSC 180, PSYC 178, PSYC 179, SOC 137, WMST 140/ANTH 147

Track 2: Social, Cultural, and Family Policy

Track 3: Economic Policy

Track 4: Urban/Environmental Policy
ECON 121F, ECON 143A/ENSC 143A, ECON 143B/ENSC 143B, ECON 146/URST 146, ENSC 101, ENSC 141, ENSC 143/C/ENCON 143C, LWSO 175J, PHIL 117, POSC 127, POSC 172/URST 172, SOC 184

Track 5: Policy Institutions and Processes
ECON 116, ECON 119, ANTH 104, HIST 111, HISA 120B, LWSO 100, LWSO 193, PHIL 165, POSC 101, POSC 146, POSC 150, POSC 166, POSC 167, POSC 168, POSC 170, POSC 173, POSC 186, PSYC 175, RLST 174, RLST 175, SOC 150, SOC 151, SOC 159

Track 6: International and Foreign Policy
ECON 187/LNST 187, POSC 120, POSC 125, POSC 126, POSC 127, POSC 129, POSC 154, POSC 155, POSC 158/LNST 148, POSC 159, POSC 160, POSC 169, RLST 173/POSC 109, SOC 135, SOC 181

3. Public Policy Seminar/Colloquia
During the junior and senior years, students must enroll in PBPL 191 (Seminar in Public Policy), which includes attendance at public lectures to the campus community by outside speakers — typically policy makers, administrators and researchers — on timely and important policy issues facing the Inland Empire, the state, the nation, and the world.

PBPL 001. Introduction to Public Policy Analysis (4)
Lecture, 3 hours; discussion, 1 hour. Introduces the basic concepts and processes underlying policy analysis, including application of these concepts to economic and budgetary policy, health care policy, welfare and social security policy, education policy, and environmental and energy policy.

PBPL 090. Special Studies (1-3) Individual study, 3-9 hours. Prerequisite(s): consent of program chair. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable to a maximum of 8 units.

Upper-Division Courses

PBPL 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): consent of program chair. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable to a maximum of 15 units.

PBPL 191. Seminar in Public Policy (2) Seminar, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Seminars by faculty, invited policy scholars, and policy makers on timely policy issues facing the region, state, nation, and the world, such as economic and budgetary policy, health care policy, welfare and social security policy, education policy, environmental and energy policy. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

PBPL 195H. Senior Honors Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): senior standing in Public Policy; admission to the University Honors Program or consent of instructor. Students complete research in public policy and write a senior honors thesis under the guidance of a faculty member. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 12 units.

PBPL 198-I. Individual Internship in Public Policy (1-12) Written work, 1-12 hours; internship, 2-24 hours. Prerequisite(s): junior standing in Public Policy; consent of instructor. Internship in a public or quasi-public agency or business concern in matters relating to public policy. Requires a summary paper. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.

Religious Studies

Subject abbreviation: RLST

College of Humanities, Arts, and Social Sciences

June O’Connor, Ph.D., Chair
Department Office, 3033 CHASS
Interdisciplinary North
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Professors
June E. O’Connor, Ph.D.
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Ivan A. Strenski, Ph.D.
Holstein Family and Community Chair in Religious Studies

Professors Emeriti
Douglas M. Parrott, Ph.D.
Brian K. Smith, Ph.D.

Associate Professors
Michael Alexander, Ph.D.
Andrew Jacobs, Ph.D.
Vivian-Lee Nyitray, Ph.D.

Assistant Professors
Muhamed Ali, Ph.D.
Jennifer S. Hughes, Ph.D.
Sherri Johnson, Ph.D.
Justin McDaniel, Ph.D.
Jonathan L. Walton, Ph.D.

Major

The Department of Religious Studies provides an opportunity for students to gain a broad, cross-cultural perspective by studying the diverse religious traditions of the world. Students examine the texts, symbols, myths, rituals, ideas, values, and ethical systems of many religious traditions, such as Judaism, Christianity, Islam, Hinduism, Buddhism, Chinese, African, and Native American religions.

Majoring in Religious Studies can be an excellent preparation for living in a multicultural society and for a variety of careers, such as teaching, counseling, business, law, writing, the arts, and professional religious leadership. Religious Studies at UCR develops in students a number of valuable and transferable skills such as disciplined attention to the facts (texts, ideas, history, behavior); critical reflection and analysis about claims of meaning and value and about assumptions and methods used in the study of religion; and descriptive and analytical writing about religious history, ideas, motivations, practices, and ethical concerns. A minor in Religious Studies is also available.

Students are encouraged to consult with the department chair and other faculty about their questions and interests.

The Holstein Family Chair in Religious Studies

The Holstein Family and Community Chair in Religious Studies is an endowed faculty chair, the result of a generous contribution given by the Robert and Loretta Holstein family and by friends of the Holstein family and the university. Dr. Ivan Strenski, the chair, is a distinguished scholar and teacher whose work engages thought on the interactions of religions and cultures as these are manifested in cultural, social, ethical, and historical debates.

The Rupert Costo Chair in American Indian Affairs

The Rupert Costo Chair in American Indian Affairs is an endowed faculty chair, made possible by the generosity of Rupert Costo and Jeannette Henry Costo.

University Requirements
See Undergraduate Studies section.

College Requirements
See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.
Major Requirements
The major requirements for the B.A. degree in Religious Studies are as follows:
1. Lower-division requirements (12 units)
   a) RLST 005
   b) RLST 012/ETST 012
   c) One additional 4-unit course in Religious Studies or equivalent
2. Upper-division requirements (40 units)
   a) At least two courses from each of the following areas:
      (1) Eastern religions
      (2) Western religions
      (3) Themes in religions
   b) RLST 100 or RLST 102
   c) RLST 193 (Senior Seminar)
   d) Eight (8) additional units from Religious Studies courses (closely related courses from other programs or departments may be substituted upon approval)

The programs of all majors should be developed in consultation with their advisors.

Art History/Religious Studies Major
The Art History/Religious Studies Major combines the disciplinary interest in the history of the visual arts with its related religious content and background. Three concentrations are offered. Students must select one family of religions, either Asian or Western, and combine it with the study of the history of the visual arts in the corresponding area of artistic endeavor. Or, students wishing to combine Asian and Western materials to serve a comparative purpose are invited to design their own major in consultation with faculty representatives from both departments. Students are strongly encouraged to participate in the Education Abroad Program and in internships abroad. Students in this major will be well prepared for graduate studies in either art history or religious studies.

Major Requirements
The major requirements for the B.A. degree in Art History/Religious Studies are as follows:

Asian Concentration (52 units)
1. Lower-division requirements (12 units)
   a) Art History (4 units): AHS 015
   b) Asian Studies (4 units): AST 030/CHN 030
   c) Religious Studies (4 units): RLST 005
2. Upper-division requirements (40 units)
   a) Art History (16 units): AHS 140, AHS 141, AHS 143, CPLT 141
   b) Religious Studies (24 units) choose from: RLST 101, RLST 103, RLST 105, RLST 106, RLST 142/AST 142/CHN 142, RLST 144/CPLT 144
   c) One additional 4-unit course in Religious Studies
   d) Eight (8) additional units from Religious Studies courses (closely related courses from other programs or departments may be substituted upon approval)
3. Optional 190 level work in either Art History or Religious Studies

Western Concentration
1. Lower-division requirements (16 units)
   a) Art History (12 units): AHS 017A, AHS 017B, AHS 017C
   b) Religious Studies (4 units) choose from: RLST 007, RLST 010
2. Upper-division requirements (36 units)
   a) Art History (16 units) choose from: AHS 145, AHS 156, AHS 157, AHS 159, AHS 161, AHS 162, AHS 164, AHS 171, AHS 172
   b) Religious Studies (20 units) choose from: RLST 100, RLST 111, RLST 121, RLST 128 (E-Z), RLST 130, RLST 133, RLST 135/CHN 135, RLST 136, RLST 142/CPLT 142
3. Optional 190 level work in either Art History or Religious Studies

Minor
Requirements for a minor in Religious Studies are as follows:
1. Lower-division requirements (12 units)
   a) RLST 005
   b) RLST 012/ETST 012
2. Upper-division requirements (16 units)
   a) Twelve (12) units consisting of one course from each of the following three areas:
      (1) Eastern religions
      (2) Western religions
      (3) Themes in religions
   b) Four (4) upper-division units from those courses approved for the Religious Studies major

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR's International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program
The Department of Religious Studies offers the M.A. and Ph.D. degrees in Religious Studies. The graduate program in Religious Studies is for students interested in the critical academic study of religions. The Ph.D. program prepares students to enter into academia as researchers and university instructors in a specific field of expertise.

Admission All applicants must submit GRE General Test scores and transcripts from all previous institutions, along with three letters of academic reference and a Statement of Goals and Qualifications. Applicants whose first language is not English must also take the TOEFL exam.

Master's Degree
The Department of Religious Studies offers the M.A. in Religious Studies. The M.A. program allows students to explore the academic study of religions broadly and is for students who wish to expand their study of religions in an academic environment but may not yet wish to pursue a career in academia.

Admission Although an undergraduate major in religious studies is not required for admission into the graduate program, applicants should demonstrate significant interest in and background in the academic study of religions and the appropriate scholarly approaches to religious studies. Applicants to the master's program must demonstrate scholarly acuity, as well as interest in the critical questions of the discipline of religious studies. Given the broader scope of the master's program, applicants to this degree program do not need to specify a particular field of study they wish to pursue in the program.

Course work Candidates must complete a mini-
mum of 36 units for the degree; 18 of the 36 units must be 200-level courses. Twelve units comprise the three core courses required of all graduate students (RLST 200A, RLST 200B, RLST 200C), preferably completed in the first year of study. The remaining units should be from among the religious studies graduate offerings; additional course work in related areas (e.g., history, anthropology, philosophy, comparative literature) are encouraged as time and workload permit. Some entering students may also be encouraged to take graduate-level survey courses in Asian or Western or Native American religious traditions.

**Comprehensive Examinations** In the final quarter of their program, master’s students complete a series of comprehensive written examinations that are designed by the department and administered by a master’s examination committee. These examinations test the student’s knowledge of specific fields of study as well as the areas of critical inquiry that serve as the methodological focus of the program.

**Foreign Language Requirement** Students must demonstrate reading proficiency in either French or German, the languages in which much modern secondary scholarship in the discipline has been written. Students may petition to substitute either another modern language of secondary scholarship or a language or primary research if it is deemed more immediately relevant to their studies. This requirement can be fulfilled through a departmental course (FREN 009A, FREN 009B, GER 002R), or by alternative certification (such as a diploma from a foreign language institute).

**Normative Time to Degree** 6 quarters.

**Doctoral Degree**

The Department of Religious Studies offers the Ph.D. in Religious Studies.

The Ph.D. program prepares students to enter into academia as researchers and university instructors in a specific field of expertise.

**Admission** Although an undergraduate major in religious studies is not required for admission into the graduate program, applicants should demonstrate significant interest in and background in the academic study of religions and the appropriate scholarly approaches to religious studies. In addition, applicants are held to a high standard of undergraduate preparation for their graduate work: both basic and advanced courses in religious studies (in methods and in their chosen field of study), beginning work in foreign languages (particularly if this will be an integral component of their particular course of study), and a demonstrated ability to work across methods, traditions, and disciplines. A master’s degree is not required for admission to the doctoral program.

**Course work** Candidates must complete the series of core courses (RLST 200A, RLST 200B, RLST 200C), preferably in their first year of course work. In addition, students must complete at least 24 units in a major area of geographic study (either Asian Religions or Religions in the West). At least 12 additional units should be taken in a minor area of geographic study (some other aspect of Asian Religions or Religions in the West).

**Written and Oral Qualifying Examinations** Students must complete a round of qualifying written examinations, followed by an oral defense of those examinations, in the quarter following their completion of course work. (Students may defer their examinations for one quarter in consultation with the graduate advisor and faculty.) Students complete the three written examinations over a two- to three-week period in the following areas:

- Major field studies
- Comparative studies
- Critical studies

The Major Field Studies examination evaluates the student’s mastery of the chosen field of study (some specific tradition within Asian religions or within Religions in the West), with particular attention to subdivisions of these fields of study on which the student has decided to focus (e.g., Buddhist monasticism or Christian ethics).

The Comparative Studies examination draws on the minor field of study the student has focused on in course work; the student must demonstrate the ability to elucidate aspects of the academic study of religions through the juxtaposition of traditions (e.g., Judaism and Islam).

The Critical Studies examination will have two components: a method section, focusing on some methodological approach to the study of religion (e.g., ethnography or literary studies) and a theory section, focusing on some conceptual approach to religion (e.g., Weber or Durkheim).

The three examinations give students the opportunity to demonstrate an overall mastery of subjects and approaches and prepare them for the more focused, rigorous research work they will pursue in their dissertations.

After completing the written examinations, students undergo an oral examination by committee. The content of the oral examinations is based on the written examination questions and answers.

Both the written and oral examinations are composed, administered, and evaluated by a qualifying committee, nominated by the graduate advisor in consultation with the student and is appointed by the graduate dean.

Upon the successful completion of the written and oral qualifying examinations, the student is recommended to the graduate dean for advancement to candidacy.

**Foreign Language Requirement** Students must demonstrate reading proficiency in either French or German, the languages in which much modern secondary scholarship in the discipline has been written. Students may petition to substitute either another modern language of secondary scholarship or a language of primary research if it is deemed more immediately relevant to their studies. This requirement can be fulfilled through a departmental examination, by passing a designated language course (FREN 009A, FREN 009B, GER 002R), or by alternative certification (such as a diploma from a foreign language institute).

In addition, students must demonstrate proficiency in any language or languages deemed critical for examination of primary texts in their declared field of study (e.g., Japanese, Latin, Arabic, Tagalog, Indonesian). It is strongly suggested that doctoral students begin studying relevant languages for research before beginning their course work at UCR. Adequate language training is becoming increasingly vital in the scholarly and professional training of academics in the fields of religious studies. Many research languages are offered at UCR; if necessary, the faculty will work with students to help place them in needed language courses at other institutions.

**Dissertation and Final Oral Examination** Students prepare a dissertation presented as prescribed by the Graduate Division under the direction of the candidate’s dissertation committee. After completion of the dissertation, the candidate is examined by the dissertation committee. This examination normally takes the form of a public presentation by the candidate followed by questions from the committee.

**Normative Time to Degree** 18 quarters.

**Lower-Division Courses**

**RLST 002. Introduction to Comparative Scripture (4)**

Lecture, 3 hours; discussion, 1 hour. Examines sacred texts of several religious traditions in comparative perspective. Contextualizes readings in primary texts from traditions including Zoroastrism, Judaism, Christianity, Islam, Hinduism, Buddhism, Taoism, classical Confucianism, and a number of modern new religious movements.

**RLST 005. Introduction to Asian Religions (4)**

Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. A survey of the major Asian religions such as Hinduism, Buddhism, Confucianism, Taoism, and Shinto, with particular emphasis on thought structures, practices, and ethics. Readings in the basic texts of the traditions. Credit is awarded for only one of RLST 005 or RLST 005H.

**RLST 005H. Honors Introduction to Asian Religions (4)**

Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to RLST 005. A survey of the major Asian religious traditions such as Hinduism, Buddhism, Confucianism, Taoism, and Shinto, with particular emphasis on thought structures, practices, and ethics. Readings in basic texts of the traditions. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of RLST 005 or RLST 005H.
RLST 007. Introduction to Western Religions (5)
Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. An introductory survey of Judaism, Christianity, and Islam. Emphasis is placed on distinguishing characteristics, major beliefs, texts, and historical interactions.

RLST 008. Christian Heresies (4) Lecture, 3 hours; discussion, 1 hour. An introduction to religious controversies from the early Church through the Reformation. Explores the historical context as well as the political, social and cultural impact of diverse religious philosophies and movements within the Christian tradition.

RLST 009. Introduction to Latin American Religions (4) Lecture, 3 hours; discussion, 1 hour. An introduction to religious practices, beliefs, and movements in Latin America from conquest to present. Topics include indigenous religious traditions, the impact of missionization, evangelization, conversion, Virgin of Guadalupe devotion, Afro-Latin traditions in Cuba and Brazil, the growth of Pentecostal churches, and transnational religion.

RLST 010. Introduction to the Bible (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): none. A preparation for informed study of the Bible. Examines contemporary interpretive stances, history, methods, and major themes through the study of significant portions of the Bible.

RLST 011. Modern Christianities and World Cultures (4) Lecture, 3 hours; discussion, 1 hour. Examines the many expressions of Christianity in diverse cultural locations: New England, the South (among African Americans), California in the American period, New Spain (Mexico and the Americas), California in the modern period, and contemporary culture and politics. Cross-listed with HIST 034.

RLST 012. Religious Myths and Rituals (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introduction to the meanings, origins, and functions of religion; the roles of myths, rituals, and symbols; and images of transcendence. Religious beliefs and expressions are examined from diverse cultural perspectives. Source materials are drawn from indigenous Native (North and South) American, African American, and/or Asian American religions. Cross-listed with ETST 012. Credit is awarded for only one of ETST 012/RLST 012 or ETST 012H/RLST 012H.

RLST 012H. Honors Religious Myths and Rituals (4) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor. An introduction to the meanings, origins, and functions of religion; the roles of myths, rituals, and symbols; and images of transcendence. Religious beliefs and expressions are examined from diverse cultural perspectives. Source materials are drawn from indigenous Native (North and South) American, African American, and/or Asian American religions. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded for only one of ETST 012/RLST 012 or ETST 012H/RLST 012H.

RLST 013. World Religions in California (5) Lecture, 3 hours; discussion, 1 hour; field, 3 hours. Prerequisite(s): none. Explores the religious landscape of California, providing basic background to texts, beliefs, and practices. Topics include local expressions of Buddhism, Christianity, Hinduism, and Native American religious traditions, as well as spiritual movements specific to the state such as Scientology, Heaven’s Gate, Muri’s nature mysticism, and Jim Jones’s Peoples’ Temple.

RLST 014. Religion and Science (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Covers major themes in the relation of science and religion. Primary focus is on issues between science and Western religion, Judaism, Christianity, and Islam. Arguments and claims about afterlife; public policy issues that involve ethical, legal, and medical concerns regarding euthanasia, physician-assisted suicide, and hospice care. Prerequisite(s): none. A study of developments in the Hindu religious tradition during the nineteenth century. Topics include ethics, law, and medicine in India with special emphasis on Hinduism and Buddhism.

RLST 100. The Problem of Religion (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): one Religious Studies course or upper-division standing or consent of instructor. Survey of problems of religion who debate meanings and functions of religions in light of modern challenges. Topics include religious pluralism due to cross-cultural encounters in Africa, Asia, and the Americas; wars among religions; theories of evolution; discovery of the unconscious; rise of behavioral and social sciences.

RLST 101. Religions of India (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): one lower-division course in Religious Studies or consent of instructor. An examination of the major religious traditions in India with special emphasis on Hinduism and Buddhism.

RLST 102. Contemporary Themes in Religion and Theory (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of contemporary cultural issues which pose challenges to the nature of religion and the way it is studied in the pulpit and university. Topics discussed include race, gender, power, colonialism, and religious commitment.

RLST 103. Confucian Traditions (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AST 030/CHN 030 or RLST 005 or RLST 005H or upper-division standing or consent of instructor. A study of Confucian thought and practice. Special attention is given to the classical cultivation of virtue and ritual practice, the historical spread of the tradition beyond China, and contemporary issues such as gender and human rights.

RLST 104. Sikhism (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the social and religious evolution of Sikhism over the past five centuries, tracing its formation in North India to traditions beyond the Indian subcontinent; examines the teachings of Guru Nanak and major doctrinal developments under subsequent Gurus.

RLST 105. Religions of Japan (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to the major religious traditions in Japan with special emphasis on Shinto and Japanese Buddhism.

RLST 106. Buddhism (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Aspects of the history and development of Buddhism in its major forms (Theravada, Mahayana, and Vajrayana). Studies of principal sutras, biographies, ethical treatises, birth narratives, and poetry.

RLST 107. Taoist Traditions (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): one upper-division course in Religious Studies or consent of instructor. A survey of the major religious traditions in China with special emphasis on Shinto and Japanese Buddhism.

RLST 108. Modern Hinduism (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of developments in the Hindu religious tradition during the nine-
teenth and twentieth centuries, inside and outside of India. Topics covered include the impact of colonialism and nationalism on Hinduism, the rise of neo-Hindu movements, modern Hindu “fundamentalism,” and Hinduism in the modern Western world.

RLST 109. New Religious Movements (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes the contexts in which new religions emerge, their relations with dominant religious traditions or normative cultures, and the religious content of such movements. Examines the “cult” versus “religion” debate, apocalyptic, eschatological, and millennial views of the world; the nature of charismatic leadership, regional patterns; and transnational trends.

RLST 111. Islam (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of Islam from the time of Muhammad (d. 632 A.D.) to the present. Attention is given to its distinctive beliefs and practices, its influence upon societies in which it became dominant, and its interaction with other traditions.

RLST 113. Topics in Modern Islam (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines key issues facing Islam in the modern world such as Islam’s engagement with and reaction to nationalism, feminism, the status of sacred texts in the face of critical historical and philological studies, science, and technology.

RLST 114. Tabu and Sacred in Time and Space (4) Lecture, 3 hours; field, 8 hours per quarter; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural inquiry into ideas of tabu and the sacred in traditional and contemporary religions, such as ancient Hawaiian religion, Puritanism, Krishna devotionism, and Roman Catholicism. Readings are from Durkheim, Eliade, and Otto. Applies theory to field observation and discusses the sacred in everyday life in music, cinema, literature of transgression, and politics.

RLST 116. Religion and Violence (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural inquiry into ideas of tabu and violence in traditional and contemporary religions, such as ancient Hawaiian religion, Puritanism, Krishna devotionism, and Roman Catholicism. Readings are from Durkheim, Eliade, and Otto. Applies theory to field observation and discusses the sacred in everyday life in music, cinema, literature of transgression, and politics.

RLST 119. Gift and Sacrifice (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analysis and survey of major theories of sacrifice in relation to the idea of sacrifice as a species of gift. Draws materials from major religious traditions with both ancient and modern applications.

RLST 121. The Hebrew Bible/Old Testament (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the collection of books usually called the Old Testament by Christians and the Bible by Jews (the acronym T’NA’CH is often used by Jews as well). The books are examined in their historical, cultural, and religious context, with attention to the methods of modern literary criticism.

RLST 124 (E-Z). Studies in Judaism from 70 C.E. to Modern Period (4) For hours and prerequisites, see segment descriptions. Exploration of developments in Judaism during this period, such as the collection of the Mishna, the development of the Talmud, Jewish Gnosticism, the medieval philosophers, Hasidism, the Reform, Orthodox and Conservative movements.

RLST 124F. Jewish Theology and Mysticism, Seventh to Seventeenth Centuries (4) Lecture, 3 hours. Prerequisite(s): none. An introduction to the major themes of Jewish thought and the impact of its mysticism and the phenomenon of underground religion upon the development of Judaism and Western civilization.

RLST 124G. Modern Jewish Thought: Classical Sources and Modern Influences (4) Lecture, 3 hours; consultation, 1 hour. Prerequisite(s): none. Major modern thinkers including Buber, Rosenzweig, Kaplan, and Heschel among others will be studied in light of their inspirations from the Talmudic, philosophic, and mystical literatures of the Jewish past and in response to the impact of Christian and secular thought of the present.

RLST 124H. Prayer, Mysticism, and Magic (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An examination of the interaction of normative and marginal Judaism in the post-biblical period as disclosed through an examination of Jewish prayer books, the great works of the Jewish mystical tradition, and magical texts.

RLST 124-I. Varieties of Ancient Judaism (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the forms of postbiblical Judaism, giving an analysis of the religious-cultural, socioeconomic and political conditions in Palestine and in the Diaspora from 330 BCE to 500 CE.

RLST 124J. The Essentials of Judaism (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of the literature and history of the early Christian movement. Attention is given to New Testament materials and apocryphal writings.

RLST 130. The Bible: New Testament (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of the literature and history of the early Christian movement. Attention is given to New Testament materials and apocryphal writings.

RLST 131. Jesus (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A quest for the historical Jesus, using the methods of modern scholarship, and including a review of those who have dealt with the topic from Reimarus (eighteenth century) to the present.

RLST 132. Black Exodus: The Great Migration and Religious Imagination (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces the history of the Great Migration (approximately 1910-1950) and the spiritual, occupational, and cultural diversification that ensued. Explores the impact of dislocation and urbanization on black religious and artistic production. Topics include the religious marketplace; Exodus theme, Stranger and Home; impact of commercial culture on identity; and class and culture intersections among migrants.

RLST 133. Christian Origins (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the social, religious, and cultural development of Christianity in its first six centuries. Particular attention paid to issues of hereyorthodoxy, material piety, and the rise of ecclesiastical institutions.

RLST 134. Christian Martyrs, Monastics, and Mystics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the social, religious, and cultural development of Christianity in its first six centuries. Particular attention paid to issues of hereyorthodoxy, material piety, and the rise of ecclesiastical institutions.
RLST 137A. Religious Cultures in Early America (4)
Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; HIST 017A is recommended. An introduction to religious beliefs and practices during the seventeenth and eighteenth centuries in the colonies that became the United States. Cross-listed with HISA 122A.

RLST 137B. Religious Cultures in Modern America (4)
Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; HIST 017B is recommended. An introduction to a variety of religious traditions, movements, and cultures from 1800 to the present in the United States. Cross-listed with HISA 122B.

RLST 138. Colonialism and Religions in Mexico (4)
Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers the survival, revival, and invention of religious traditions in ancient and contemporary Mesoamerica. Examines indigenous and immigrant religions through themes such as myths and rituals of pre-Columbian peoples; sexuality and eroticism in religion, Indian theology and theogony; Counter Reformation Catholicism; and growing religious syncretisms. Cross-listed with LNST 138.

RLST 139. African American Religions (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the history of African American religions, including religions developed in the Caribbean and Brazil; African religion in North America under slavery; African American churches and sects; the civil rights movement; and the relationship of religion to African American music and literature.

RLST 140. Martin, Malcolm, and Masculinity (4)
Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the ways in which Martin Luther King, Jr. and Malcolm X have influenced our understanding of masculinity. Focuses on readings from biographies, speeches, personal letters, and interviews. Prerequisite(s): upper-division standing or consent of instructor.

RLST 142. Chuang-tzu (4)
Lecture, 1 hour; discussion, 2 hours; outside research, 1 hour; extra reading, 1 hour; term paper, 1 hour. Prerequisite(s): RLST 005 or RLST 005H or AST 107/CHN 107/RLST 107 or consent of instructor. An examination of Chinese Taoist texts, the Chuang-tzu. Discussion of the structure and style of this literary masterpiece. Students with knowledge of classical Chinese may arrange additional work through special studies. Cross-listed with AST 142 and CHN 142.

RLST 144. Buddhist Literature (4)
Lecture, 2 hours; discussion, 1 hour; term paper, 3 hours. Prerequisite(s): RLST 005 or RLST 005H or RLST 101 or RLST 105 or RLST 106 or consent of instructor. Readings in canonical Buddhist narratives and examination of the themes of emptiness and impermanence in Buddhist-inspired literature. Examples are drawn from classical and modern Asian prose and poetry as well as from the work of contemporary American authors. Cross-listed with CPLT 144.

RLST 145. Buddhism in Southeast Asia (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): RLST 106 or consent of instructor. Examines various texts, magical practices, forms of meditation, rituals, and beliefs of ancient and modern Buddhism, focusing on the ways in which they are transformed by media technologies among evangelicals. Addresses the interconnections between religious productions of meaning, proselytizing, and politics. Explores the ways the critical interface of religion and media both shaped and is shaped by the ways people and texts understand themselves as racial, gendered and classed subjects.

RLST 167. Religion and Film (4)
Lecture, 3 hours; scheduled screening, 2 hours; outside screening, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the intersections of film, religious meaning, and contemporary society.

RLST 168. Religion and Art: Image, Icon, Idol (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the use of sacred images in spiritual practice in diverse religious traditions and explores the visual representation of the divine in different cultural contexts. Places special emphasis on Christian and Hindu traditions but also seeks to understand why some religions reject the use of images altogether.

RLST 170. Current Issues in Religious Ethics (4)
Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): one lower-division course in Religious Studies or consent of instructor. Consideration of the ethical dimension in contemporary religious and social issues (for example, war, sexuality, sexism, racism, hunger, ecology, medical ethics). Historical and contemporary religious thought will provide resources for critical reflection on these areas of decision-making.

RLST 173. Political Religions and Religious Politics (4)
Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Investigates of major themes and issues in the intersection of religion and politics, such as the secularization of politics, religious nationalism, sacerdotal kingship, revolutionary asceticism, "throne and altar," civil religion, millennium, political myth and ritual, integralism, and the conformity of the polity to religious values. Cross-listed with POSC 109.

RLST 174. The Power of Nonviolence (4)
Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural exploration of modern traditions of nonviolence change as fundamental worldviews and lifestyles, as strategic alternatives to war and socioeconomic oppression, and as practical forms of interpersonal and social conflict resolution.

RLST 175. Religion and Human Rights (4)
Lecture, 3 hours; independent research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An examination of selected human rights struggles with particular attention given to the role of religion. Case examples are taken from North and Latin America, Europe, South Africa, South Asia, or China, among others.

RLST 176. Peace and War (4)
Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of peace and war from diverse religious and ethical perspectives. Addresses nuclear and conventional war and revolutionary wars of liberation as ethical issues requiring social policy and personal decision. Topics include "just war," "holy war," nonviolence, and pacifism.

RLST 178. Religious Biography (4)
Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the construction and continuing appropriation of biographical images (textual and visual narratives) in selected religious traditions. Special attention is given to
problems of intertextuality and the medium of presentation in the communication of "religious" meaning. Cross-listed with CPLT 17B.

RLST 179. Pilgrimage (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of pilgrimage in religious traditions (Judaism, Christianity, Islam, Buddhism, Hinduism) from sociological, anthropological, and ritual perspectives, considering constructions of time, space, community, and ethnicity. Attention is paid to the concept of colonialism and the formation of an "American" religious identity through sacred space and travel.

RLST 180. Saints and Gurus (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores how religious virtuosos have shaped religious practice and the teaching of Hinduism, Buddhism, Jainism, Sikhism, and Islam in South Asia. Examines history, myth, poetry, meditation, yoga, and ritual, with a focus on how the ascetic ideal has shaped global imagination about South Asia.

RLST 184. Contemporary Christian Theologies (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of contemporary Christian theologies and schools of thought in the context of history and society. In addition to selected thinkers, the following movements are studied: orthodoxy, neoorthodoxy, Christian existentialism; evangelical, ecumenical, secular, process, liberation, and feminist theologies.

RLST 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): consent of instructor and department chair. To be taken to meet special curricular problems. Course is repeatable to a maximum of 16 units.

RLST 193. Senior Seminar (4) Seminar, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analysis of major religious documents from world religions. Choice of texts, traditions, and key unifying themes vary each year but typically focus on fundamental religious issues such as worldliness or otherworldliness, belief or unbelief, observance or nonobservance, commitment and disaffiliation, attachment or non-attachment, and conversion or rejection.

RLST 195. Senior Thesis (1-4) Enrollment by request of student with the approval of the Program faculty, which must be granted no later than the quarter before the course is to be taken. May be taken for four units only in the first or second quarter of the senior year; two more units may be taken in a subsequent quarter. Total credit may not exceed 6 units.

RLST 197. Research for Undergraduates (1-2) individual research, 3-6 hours. Prerequisite(s): upper-division standing or consent of instructor. Directed individual research. Notably graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination. Course is repeatable to a maximum of 4 units.

RLST 198-I. Individual Internship (1-6) Internship, 2-12 hours; reading and writing, 1-6 hours. Prerequisite(s): upper-division standing or consent of instructor; consent of department chair. An individually designed, academically grounded internship that provides an opportunity for advanced majors to apply their knowledge of religion to businesses and organizations outside the university. Prior approval of the instructor and supervisor is required for units, fieldwork, and academic content. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 6 units.

Graduate Courses

RLST 200A. Religion, Politics, and Public Discourse (4) Seminar, 3 hours; outside reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor; consent of graduate advisor is required for students repeating the course. Critical examination of the intersections of religious identities and public politics. Topics vary by instructor but might include human rights, "church-state" debates, Islamism, civil religion, and post-colonial religions. Course is repeatable to a maximum of 8 units if taken with different instructors.

RLST 200B. Representations, Interpretations, and Critical Histories (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor; consent of graduate advisor is required for students repeating the course. A critical examination of how religious identity and religious studies have shaped and been shaped by modes of representation, interpretation, and historical narratives. Specific topics of analysis vary according to instructor but might include biographies, art, and mass media, and scriptural interpretation. Course is repeatable to a maximum of 8 units if taken with different instructors.

RLST 200C. Religions in Contact (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor; consent of graduate advisor is required for students repeating the course. A critical examination of how religions confront each other historically, politically, and metaphorically. Specific topics vary according to instructor but might include syncretism, mission and colonization, religious wars, ecumenism, and "world religion" movements. Course is repeatable to a maximum of 8 units if taken with different instructors.

RLST 210. Understanding Theories of Religion (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers the technique and theory of interpreting theoretical texts of the study of religion within historical contexts. Special attention is paid to Charles Taylor's theory of interpretation in the human sciences and Quentin Skinner's theory of understanding theoretical ideas. Models are drawn from the literature of the theory of myth, religion, and sacrifice. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 212. The Durkheimian Tradition in the Study of Religion (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers major figures and themes in Durkheimian development of major religious themes: gift, magic, religion, sacred time and space, and sacrifice. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 220. Advanced Topics in Method and Theory in the Study of Religion (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. An inquiry into the major conceptual issues of theories employed in the study of religion. Topic varies from quarter to quarter. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 222. Human Rights as a Moral Discourse (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Inquiry into the moral and ethical dimensions of philosophical, religious, legal, and historical traditions of "rights-talk." Attention paid to conceptual, historical, cross-cultural, and case-study source materials. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 224. Comparative Religious Ethics (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Inquiry into a variety of debates about ethics: religious and philosophical, theoretical and applied. Topics may include policy debates about bioethics, moral inquiries into virtue, ethics and minority discourse, violence and nonviolence as means of social change, or fundamental moral problems generated by suffering. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 228. Lived Religions and Local Faiths: Cultural Approaches to the Study of Religion (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers ethno-anthropological, and other cultural approaches to the study of religion. Traces emergence of the cultural study of religion from colonial encounters to current-day ethnographies of religion. Evaluates risks and promises of ethnography for the study of religion. Includes ethnographic project. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 229. Material Culture of Religion (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines how material objects complicate oral and textual statements about religious belief and practice. Considers the material dimensions of scripture, ritual objects, and everyday artifacts associated with religion; the agency of objects; and religion and consumer culture. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 230. Theory and Writing on Native American Religious Traditions (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Theoretical study of Native American religious history, including its research, interpretation, and writing, in relation to colonialism and tribal sovereignty. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 235. Christian Hagiography (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Study of the writing of Christian saints' lives from a cultural perspective. Explores the role of holy men and women in premodern Christianity, with special focus on sanctity, materiality, social formations, and the relation between text and reality. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 237. Asceticism (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Provides an analysis of the theories and practices associated with bodily renunciation, focused especially on the first Christian centuries. Explores issues such as fasting, sexual abstinence, and social withdrawal from a variety of critical perspectives, with special attention paid to gender, status, and the body in religion. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 239. Ethics and Politics in African American Religious Life (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the competing ethical and political orientations of representative religious tradi-
tions in the African American community. Uses tools of social/critical theory to dissect various religious formations and movements in terms of social formations, ruling ideas, and economic forces of the dominant culture. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 241. From Text to Scripture: Canon, Performance, Reception (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focusing on the Sikh sacred text as a primary example, investigates the intellectual and emotional factors underlying the composition, copying, canonization, and transmission of sacred texts, with attention to issues of production and reception in historical communities. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 245. Via Mystica (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines religious virtuosi in Islam, Christianity, Hinduism and Buddhism, including Puu Mi Bun, sufis, swamis, saints, and martyrs. Uncovers the close connection between these religious texts in terms of ritual technology, soteriological goals, meditative practices, and eschatological articulations. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 246. Religious Reading Cultures (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines textual communities and interpretive virtuosity in different religious cultures. Explores the means by which religious scripture is composed, transmitted, translated, illuminated, performed, and preserved in Christianity, Judaism, Buddhism, Hinduism, and Islam. Introduces students to the methodologies and approaches of textual anthropology, intertextuality, homiletics, liturgical studies, performance theory, and philology. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 249. Public Religious Discourses in Modern Islam (4) Seminar, 3 hours; research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces the complexities of contemporary Islam as lived by Muslims in local and global contexts by examining the content and dynamics of modern discussions of religious and social issues in Muslim “public spheres.” Involves primary and secondary sources of information. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 252. Southeast Asian Islam (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to contextualized readings in translated primary source texts in the fourteenth through the twenty-first centuries from Muslim Southeast Asia. Explores the richness of Islamicate culture in the region through discussions of broader issues of Islam, Muslim societies, and the academic study of religion. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 261. Problems in the Study of Buddhism (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines controversies in the field of Buddhist studies. Topics include the rise of asceticism in India, the composition of the earliest Buddhist texts, the process of transmission of texts and translation problems, the rise of sectarian debate, and women’s role in Buddhist ecclesia. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 263. Historiography of Sikh Hermeneutics (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the historiography of Sikh hermeneutics, focusing on the historical contexts of various schools of interpretations of the Adi Granth in premodern, modern, and postmodern periods. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

RLST 290. Directed Studies (1-5) Outside research, 3-15 hours. Prerequisite(s): consent of instructor and graduate advisor. Advanced work in a topic or topics appropriate to the student’s special interests and needs. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

RLST 291. Individual Study in Coordinated Areas (1-12) Individual study, 3-36 hours. Prerequisite(s): consent of instructor; doctoral standing. Program of study designed to advise and assist candidates who are preparing for qualifying examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

RLST 292. Concurrent Studies in Religious Studies (1-4) Outside research, 3-12 hours. Prerequisite(s): consent of instructor; concurrent enrollment in a RLST-100 level course. Taken concurrently with a 100-level RLST course, but on an individual basis. Devoted to completion of a graduate paper based on research related to the 100-level course. Faculty guidance and evaluation is provided throughout the quarter. RLST 190, RLST 193, RLST 195, RLST 197, and RLST 198-I may not be used for this course arrangement. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

RLST 297. Directed Research (1-6) Outside research, 3-18 hours. Prerequisite(s): consent of instructor; graduate standing. Individualized research under the sponsorship of specific faculty members. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

RLST 299. Research for the Dissertation (1-12) Outside research, 3-36 hours. Prerequisite(s): satisfactory completion of the Ph.D. qualifying examination. Research, under the direction of a faculty member, for preparation of the thesis or dissertation. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

RLST 302. Teaching Practicum (1-4) Practicum, 3-12 hours. Prerequisite(s): appointment as a Teaching Assistant; graduate standing. Supervised teaching in lower- and upper-division Religious Studies courses. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Related Courses

ANTH 124. Ritual and Religion. (4) Description under Anthropology.

AHS 155. Cultures in Conflict: Art at the Fall of the Roman Empire. (4) Description under Art History.

AHS 156. Memory of Empire: the Art of Early Medieval Europe. (4) Description under Art History.

CLA 165. Greco-Roman Cults and Credence. (4) Description under Classics.

ENGL 100E. Scriptures, Myths, Interpretation. (4) Description under English.

HISE 132. The Reformation. (4) Description under History.

PHIL 159. Philosophy of Religion. (4) Description under Philosophy.

SOC 158. The Sociology of Religion. (4) Description under Sociology.

Sociology

Subject abbreviation: SOC

College of Humanities, Arts, and Social Sciences

Adalberto Aguirre, Jr., Ph.D., Chair

Department Office, 1206 Watkins Hall
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Professors

Adalberto Aguirre, Jr., Ph.D.
Steven G. Brint, Ph.D.
Peter J. Burke, Ph.D.
Christopher Chase-Dunn, Ph.D.
Robert A. Hanneman, Ph.D.
Augustine J. Kposowa, Ph.D.
Alexandra Maryanski, Ph.D.
Alfredo M. Mirandé, Ph.D.
(Sociology/Ethnic Studies)
Robert Nash Parker, Ph.D.
Raymond L. Russell, III, Ph.D.
Jan E. Stets, Ph.D.
David A. Swanson, Ph.D.
Austin T. Turk, Ph.D.
Jonathan H. Turner, Ph.D.
Kirk R. Williams, Ph.D.

Professors Emeriti

Edna M. Bonacich, Ph.D. (Ethnic Studies/Sociology)
Edgar W. Butler, Ph.D.
Jane R. Mercer, Ph.D.
Linda Brewer Stearns, Ph.D.

Associate Professors

Karen D. Pyke, Ph.D.
Ellen Reese, Ph.D.

Assistant Professor

Scott N. Brooks, Ph.D.
Vanessa Estrada, Ph.D.
Kalja Guenther, Ph.D.
Matthew Mahutga, Ph.D.
Tanya Nieri, Ph.D.

Majors

Sociology is the scientific study of human behavior, interaction, and organization. It provides a historical and comparative perspective on human societies and offers a framework for understanding society and the complex social world.

Students majoring in sociology can choose between a B.A. or B.S. degree. The department also offers majors in Sociology/Administrative Studies, and Sociology/Law and Society; as well as a minor in sociology. All students must meet quarterly prior to course enrollment with the student affairs officer or the undergraduate advisor to develop a program of studies.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.
Major Requirements

Sociology Major
The major requirements for the B.A. and B.S. degrees in Sociology are as follows:

For the Bachelor of Arts
Sociology Department requirements (14 courses [at least 56 units])

Students will not be admitted into the major until lower-division requirements are satisfied. All courses in the major must be taken for a letter grade.

1. Lower-division requirements (5 courses [at least 20 units])
   a) SOC 001, with a grade of “C” or better
   b) SOC 004, SOC 005 with a grade of “C” or better in each
   c) Two additional lower-division Sociology courses, with a grade of “C” or better in each

2. Upper-division requirements (11 courses [at least 44 units])
   a) SOC 110, SOC 168, SOC 169
   b) A minimum of one course each selected from four of the following seven areas of emphasis:
      (1) Social Organizations: SOC 150, SOC 151, SOC 171, SOC 176/ BUS 176
      (2) Social Psychology: SOC 173, SOC 174, SOC 175, SOC 177G, SOC 178
      (3) Social Inequality: SOC 129, SOC 130, SOC 133, SOC 135
      (4) Urban Sociology: SOC 137, SOC 143/URST 143, SOC 182/URST 182, SOC 184
      (5) Criminology and Deviance: SOC 144, SOC 147, SOC 149, SOC 159, SOC 180
      (6) Social Institutions and Change: SOC 120, SOC 122, SOC 123, SOC 139/MCS 139, SOC 158, SOC 160, SOC 181, SOC 183G
      (7) Family and Gender: SOC 140, SOC 141, SOC 142, SOC 152/WMST 152, SOC 153
   c) An additional 12 elective units in Sociology (No more than 4 units may be in any combination of SOC 190, SOC 197, SOC 198-I.)

Administrative Studies Requirements (37 units)

1. Lower-division courses (17 units)
   a) BUS 010, BSAD 020A
   b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
   c) CS 008 (may be used to satisfy breadth requirements)

2. Upper-division requirements (20 units)
   a) Two courses (8 units) from the list below:
      (1) ECON 102A or ECON 130 or ECON 162/BSAD 162
      (2) PSYC 140 or PSYC 142
      (3) SOC 150 or SOC 151 or SOC 171
      (4) POSC 181 or POSC 182 or POSC 183
      (5) ANTH 127 or ANTH 131
   b) A three-course track (12 units) in Business Administration courses from one of the following:
      (1) Organizations (General): BUS 176/ SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
      (2) Human Resources Management/ Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
      (3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186

Sociology/Administrative Studies Major
The major requirements for the B.A. and B.S. degree in Sociology/Administrative Studies are as follows:

For the Bachelor of Arts
Sociology Department requirements (52 units)

Students will not be admitted into the major until lower-division requirements are satisfied. All courses in the major must be taken for a letter grade.

1. Lower-division requirements (20 units)
   a) SOC 001, with a grade of “C” or better
   b) SOC 004, SOC 005 with a grade of “C” or better in each
   c) Two additional lower-division Sociology courses, with a grade of “C” or better in each

2. Upper-division requirements (32 units)
   a) SOC 168 or SOC 169
   b) A minimum of one course each selected from four of the following seven areas of emphasis:
      (1) Social Organizations: SOC 150, SOC 151, SOC 171, SOC 176/ BUS 176
      (2) Social Psychology: SOC 173, SOC 174, SOC 175, SOC 177G, SOC 178
      (3) Social Inequality: SOC 129, SOC 130, SOC 133, SOC 135
      (4) Urban Sociology: SOC 137, SOC 143/URST 143, SOC 182/URST 182, SOC 184
      (5) Criminology and Deviance: SOC 144, SOC 147, SOC 149, SOC 159, SOC 180
      (6) Social Institutions and Change: SOC 120, SOC 122, SOC 123, SOC 139/MCS 139, SOC 158, SOC 160, SOC 181, SOC 183G
      (7) Family and Gender: SOC 140, SOC 141, SOC 142, SOC 152/WMST 152, SOC 153
   c) An additional 12 elective units in Sociology (No more than 4 units may be in any combination of SOC 190, SOC 197, SOC 198-I.)
2. Upper-division requirements (44 units)

1. Lower-division requirements (20 units)

   a) SOC 001, with a grade of “C” or better
   b) SOC 004, SOC 005 with a grade of “C” or better in each
   c) Two additional lower-division Sociology courses, with a grade of “C” or better in each

2. Upper-division requirements (44 units)

   a) SOC 110, SOC 168, SOC 169
   b) A minimum of one course each selected from four of the following seven areas of emphasis:
      (1) Social Organizations: SOC 150, SOC 151, SOC 171, SOC 176/BUS 176
      (2) Social Psychology: SOC 173, SOC 174, SOC 175, SOC 177G, SOC 178
      (3) Social Inequality: SOC 129, SOC 130, SOC 133, SOC 135
      (4) Urban Sociology: SOC 137, SOC 143/URST 143, SOC 182/URST 182, SOC 184
      (5) Criminology and Deviance: SOC 144, SOC 147, SOC 149, SOC 159, SOC 180
      (6) Social Institutions and Change: SOC 120, SOC 122, SOC 123, SOC 139/MCS 139, SOC 158, SOC 160, SOC 181, SOC 183G
      (7) Family and Gender: SOC 140, SOC 141, SOC 142, SOC 152/WMST 152, SOC 153

   c) An additional 16 elective units in Sociology (No more than 4 units may be in any combination of SOC 190, SOC 197, SOC 198-I.)

Administrative Studies requirements (37 units)

1. Lower-division courses (17 units)

   a) BUS 010, BSAD 020A
   b) STAT 048 or equivalent (may be used to satisfy breadth requirements)
   c) CS 008 (may be used to satisfy breadth requirements)

2. Upper-division requirements (20 units)

   a) Two courses (8 units) from the list below:
      (1) ECON 102A or ECON 130 or ECON 162/BSAD 162
      (2) PSYC 140 or PSYC 142
      (3) SOC 150 or SOC 151 or SOC 171
      (4) POSC 181 or POSC 182 or POSC 183
      (5) ANTH 127 or ANTH 131

   These two courses must be outside the discipline of Sociology and cannot be courses included as part of the three course Business Administration track or their cross-listed equivalents.

   b) A three-course track (12 units) in Business Administration courses from one of the following:
      (1) Organizations (General): BUS 176/SOC 176, BUS 158/ANTH 105, SOC 150, SOC 151
      (2) Human Resources Management/Labor Relations: BUS 152/ECON 152, BUS 153/ECON 153, BUS 155, BUS 157, PSYC 142
      (3) Business and Society: BUS 102, PHIL 116, POSC 182, POSC 186
      (4) Marketing: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
      (5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
      (7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
      (8) Management Information Systems: BUS 101, BUS 171, BUS 173
      (9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 109, BUS 122, BUS 127/STAT 127

   Note In filling the dual requirements of the selected major, students may not count more than two courses toward both parts of their total requirements (Sociology requirements and Administrative Studies requirements).

For the Bachelor of Science

Sociology Department requirements (64 units)

Students will not be admitted into the major until lower-division requirements are satisfied. All courses in the major must be taken for a letter grade.

1. Lower-division requirements (20 units)

   a) A three-course track (12 units) in Sociology Department requirements
      (1) Social Organizations: SOC 110, SOC 168, SOC 169
      (2) Social Psychology: SOC 140, SOC 142, SOC 141, SOC 142, SOC 152/WMST 152, SOC 153
      (3) Criminology and Deviance: SOC 143/URST 143, SOC 158, SOC 159, SOC 159
      (4) Social Institutions and Change: BUS 103, and two from BUS 112, BUS 113, BUS 114, BUS 117
      (5) Managerial Accounting/Taxation: BUS 108, and two from BUS 166, BUS 168A, BUS 168B
      (7) Finance: BUS 106/ECON 134 and two from BUS 135A, BUS 136, BUS 137, BUS 138, BUS 139
      (8) Management Information Systems: BUS 101, BUS 171, BUS 173
      (9) Production Management: BUS 104/STAT 104, and two from BUS 105, BUS 109, BUS 122, BUS 127/STAT 127

   Note In filling the dual requirements of the selected major, students may not count more than two courses toward both parts of their total requirements (Sociology requirements and Administrative Studies requirements).

Sociology/Law and Society Major

The major requirements for the B.A. and B.S. degrees in Sociology/Law and Society are as follows:

For the Bachelor of Arts

Sociology Department requirements (14 courses [at least 56 units])

Students will not be admitted into the major until lower-division requirements are satisfied. All courses in the major must be taken for a letter grade.

1. Lower-division requirements (5 courses [at least 20 units])

   a) SOC 001, with a grade of “C” or better
   b) SOC 004, SOC 005 with a grade of “C” or better in each
   c) Two additional lower-division Sociology courses, with a grade of “C” or better in each

2. Upper-division requirements (9 courses [at least 36 units])

   a) SOC 168 or SOC 169
   b) A minimum of one course each selected from four of the following seven areas of emphasis:
      (1) Social Organizations: SOC 150, SOC 151, SOC 171, SOC 176/BUS 176
      (2) Social Psychology: SOC 173, SOC 174, SOC 175, SOC 177G, SOC 178
      (3) Social Inequality: SOC 129, SOC 130, SOC 133, SOC 135
      (4) Urban Sociology: SOC 137, SOC 143/URST 143, SOC 182/URST 182, SOC 184
      (5) Criminology and Deviance: SOC 144, SOC 147, SOC 149, SOC 159, SOC 180
      (6) Social Institutions and Change: SOC 120, SOC 122, SOC 123, SOC 139/MCS 139, SOC 158, SOC 160, SOC 181, SOC 183G
      (7) Family and Gender: SOC 140, SOC 141, SOC 142, SOC 152/WMST 152, SOC 153
   c) An additional four elective courses (at least 16 units) in Sociology (No more than 5 units from any combination of SOC 190, SOC 197, SOC 198-I.)

Law and Society requirements (36 units)

1. PHIL 007 or PHIL 007H
2. LWSO 100
3. One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
4. Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159.
5. Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, POSC 186, SOC 147, SOC 149, SOC 180.

6. LWSO 193, Senior Seminar

Note For sections 4. and 5. combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (Sociology requirements and Law and Society requirements).

For the Bachelor of Science

Sociology Department requirements (16 courses (at least 64 units))

Students will not be admitted into the major until lower-division requirements are satisfied. All courses in the major must be taken for a letter grade.

1. Lower-division requirements (5 courses (at least 20 units))
   a) SOC 001, with a grade of “C” or better
   b) SOC 004, SOC 005 with a grade of “C” or better in each
   c) Two additional lower-division Sociology courses, with a grade of “C” or better in each

2. Upper-division requirements (11 courses (at least 44 units))
   a) SOC 110, SOC 168, SOC 169
   b) A minimum of one course each selected from four of the following seven areas of emphasis:
      (1) Social Organizations: SOC 150, SOC 151, SOC 171, SOC 176/ BUS 176
      (2) Social Psychology: SOC 173, SOC 174, SOC 175, SOC 177G, SOC 178
      (3) Social Inequality: SOC 129, SOC 130, SOC 133, SOC 135
      (4) Urban Sociology: SOC 137, SOC 143/URST 143, SOC 182/URST 182, SOC 184
      (5) Criminology and Deviance: SOC 144, SOC 147, SOC 149, SOC 159, SOC 180
      (6) Social Institutions and Change: SOC 120, SOC 122, SOC 123, SOC 139/MCS 139, SOC 158, SOC 160, SOC 181, SOC 183G
      (7) Family and Gender: SOC 140, SOC 141, SOC 142, SOC 152/WMST 152, SOC 153
   c) An additional four elective courses (at least 16 units) in Sociology (No more than 5 units from any combination of SOC 190, SOC 197, SOC 198-I.)

Law and Society requirements (36 units)

1. PHIL 007 or PHIL 007H
2. LWSO 100
3. One course chosen from ECON 111, POSC 114, PSYC 012, SOC 004 (or equivalent course in research methods)
4. Three courses chosen from ANTH 127, ECON 119, HISE 153, PHIL 165, POSC 167, PSYC 175, SOC 159.
5. Two courses chosen from ENSC 174, HISA 120A, HISA 120B, HISE 123, LWSO 175 (E-Z), PHIL 164, POSC 111, POSC 166, POSC 168, POSC 186, SOC 147, SOC 149, SOC 180.
6. LWSO 193, Senior Seminar

Note For sections 4. and 5. combined, not more than two courses may be taken from the same department. In filling the dual requirements of the major, students may not count more than two courses toward both parts of their total requirements (Sociology requirements and Law and Society requirements).

Minor

The requirements for the minor in Sociology are as follows:

1. SOC 001, SOC 004, SOC 005
2. Sixteen (16) upper-division units from
   a) SOC 168 or SOC 169
   b) Any three additional upper-division courses in Sociology with no more than 4 units in any combination of SOC 190, SOC 197, SOC 198-I

There can be no substitution for the courses listed without prior departmental approval.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Sociology Undergraduate Honors Program

Students who meet the department requirements for academic excellence are invited at the end of their junior year to participate in the Sociology Undergraduate Honors Program during their senior year. The students enroll in SOC 195 to work on an honors thesis under the supervision of a faculty member, for a total of 12 units distributed over three quarters. Students in the program also participate in SOC 199H, a year-long seminar led by the chair of Undergraduate Affairs Committee, for which they receive a total of 3 additional units of credit.

Education Abroad Program

The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer or undergraduate advisor for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program

The Department of Sociology offers the M.A. and Ph.D. degrees in Sociology. The graduate program in Sociology is designed to prepare students for teaching and research careers in the discipline of sociology. The graduate program is designed as a full-time course of study for students seeking the Ph.D. degree. The M.A. degree in Sociology is awarded as part of a student’s required progress toward admittance into the Ph.D. program in Sociology. The Department of Sociology does not award an M.A. degree to a student who already received an M.A. degree in Sociology from another institution.

Doctoral Degree

Admission Admission into the graduate program is based on the following criteria:

1. Prior academic performance, especially in undergraduate or graduate Sociology classes
2. Performance on the GRE
3. Letters of reference from persons familiar with an applicant’s potential for achieving academic excellence
4. The extent to which an applicant’s areas of expressed interest coincide with teaching and research emphases in the department

Applicants to the graduate program in Sociology are encouraged to submit a copy of a professional or term paper with their application for consideration in the admissions process. In general, students are admitted for the fall quarter of each academic year. Applicants to the graduate program for mid-year admissions are not recommended because the sequence of core courses is designed to begin with the fall quarter. The deadline for an application for admission for the fall quarter is May 1 and January 5 for various university fellowship programs. Applicants who lack adequate undergraduate preparation in sociology must make up such deficiencies before work can be credited toward the graduate program. A detailed statement of degree requirements and procedures for the graduate degree is available at sociology.ucr.edu/academic/graduate.html. General university requirements of the Graduate Division are at www.g uardian.ucr.edu and in the Graduate Studies section of this catalog.

The graduate program is designed to allow students to proceed through three distinct stages in their pursuit of the Ph.D. degree: the basic
core program, the period of specialization, and writing the dissertation.

**Basic Core Program**  All students must complete the basic core program, regardless of whether they hold a baccalaureate or master’s degree at the time of admission. A student is expected to complete the basic core program in not less than three and not more than six academic quarters. The chair of the graduate affairs committee advises students about the core program.

**Course Requirements**
1. In the core program, the minimum requirement is 40 units of academic work with no grade less than a “B”. Work in the basic core courses must be distributed as follows:
   a) Core sequence in theory: SOC 202A, SOC 202B
   b) Core sequence in methodology: SOC 201A, SOC 201B
   c) Core sequence in statistics: SOC 203A, SOC 203B
   d) Proseminar in Sociology: SOC 232

**Note** Under normal circumstances, the core sequences in theory, methodology, and statistics, and the proseminar are to be completed within the first year.

   e) Research colloquium: SOC 293 (required each quarter until student is advanced to candidacy)
   f) Research practicum: SOC 250
   g) A minimum of one course from each of two specialization areas

**Note** Students who have had extensive graduate training in a core course area at another graduate school may petition the graduate affairs committee to be examined by a special faculty committee for possible exemption from that core requirement.

**Examination Paper and Oral Examination** Each student must complete a paper that serves as the comprehensive examination for completion of the master’s degree. This paper reflects the student's areas of theoretical and substantive interest since entrance into the program, and it is written in a form, content, and style appropriate for publication or presentation to a sociological audience. A three-person faculty committee oversees the evaluation of the paper and an oral examination of the student. The paper must be completed by the fall quarter of the student’s third year in the program. On the basis of a favorable recommendation from the three-person faculty committee, the faculty votes to recommend the awarding of the M.A. degree in Sociology. If the M.A. is awarded or if the student already has an M.A. in Sociology, the faculty then votes on whether the student should continue in the Ph.D. program. If a student is allowed to continue in the Ph.D. program, the faculty then votes on whether to accept the two areas of specialization in which the student requests to be examined.

**Period of Specialization** After admission to the period of specialization, students are expected to consult with faculty who constitute the membership of each standing specialization committee. Under the faculty's guidance, a student is expected to work out a program of graduate seminars, directed reading courses, and research experiences that prepare the student for examination in the chosen two areas of specialization. The primary areas of specialization offered in the department are as follows:

1. Criminology and Sociological Studies
2. Family and Social Psychology
3. Gender Studies
4. Organizations and Institutions
5. Political Economy and Global Social Change
6. Race and Class Inequality
7. Sociological Theory

A student’s program must include at least one academic quarter of supervised research experience through enrollment in SOC 297 and/or by working as a research assistant. Also required is the equivalent of at least one academic quarter of classroom teaching experience at the college level. A student must complete three courses in each of the two specialization areas with a grade of “B” or better in each course.

**Examination Sequence**
1. Standing committees composed of faculty in each area administer the written qualifying examinations in the student's two areas of specialization. A student must complete written examinations in each of the two areas of specialization before the end of the fourth year of graduate study.
2. Upon completion of 1) the two written area examinations, 2) the selection of a dissertation committee approved by the graduate advisor, and 3) a dissertation proposal, the student must complete and pass an oral examination covering the areas of specialization and the dissertation proposal. The oral examination is conducted by a committee of at least five faculty members, including 1) at least one faculty member from each of the two specialization areas, 2) three members of the student’s dissertation committee (who may also represent the areas of specialization), and 3) one “outside member” from another department representing the faculty as a whole.

Before advancement to candidacy is approved, a student must successfully complete a minimum of eight courses: three in each of the two specialization areas and one in each of two other specialization areas, with a minimum grade of “B” in each of the courses.

Students who pass the oral examination and all course requirements are advanced to candidacy for the Ph.D. degree.

**Dissertation and Final Oral Examination** The dissertation is normally completed within one year after advancement to candidacy. After the dissertation is prepared according to the rules and format of the Graduate Division and signed and approved by a student’s dissertation committee, an oral defense of the dissertation is held. The defense may be waived in exceptional circumstances.

**Lower-Division Courses**

**SOC 001. Introduction to Sociology** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Covers the basic concepts and theories relating to the study of humans as participants in group life, analysis of culture, social institutions, personality development, and processes of social interaction. Credit is only awarded for one of SOC 001 or SOC 001H.

**SOC 001H. Honors Introduction to Sociology** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Honors course corresponding to SOC 001. An in-depth look at concepts and theories relating to the study of humans as participants in group life, analysis of culture, social institutions, personality development, and processes of social interaction. Satisfactory (S) or No Credit (NC) grading is not available. Credit is awarded only for one of SOC 001 or SOC 001H.

**SOC 004. Methods of Sociological Inquiry** (5) Lecture, 3 hours; discussion, 1 hour; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Applies the fundamentals of science to social research. Investigates problems of research design, sampling, measurement of social phenomena, conduct of field studies, and interpretation of qualitative and quantitative social data.

**SOC 005. Statistical Analysis** (5) Lecture, 3 hours; discussion, 1 hour; outside research, 3 hours. Prerequisite(s): SOC 004. Covers logical and procedural aspects of the application of statistical methods for data reduction and hypothesis testing in sociology. Includes descriptive, inferential, and nonparametric statistics.

**SOC 006. Introduction to Social Science Data Processing** (5) Lecture, 3 hours; discussion, 1 hour; individual study, 3 hours. Prerequisite(s): SOC 004. Covers principles of the design of data objects and structures commonly used in social science research. Includes consideration of coding of qualitative and quantitative data, index and scale construction, data object design (documentation, identification, storage structure), and use of common scientific software.

**SOC 010. The City: An Introduction** (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introductory exploration of urban processes. Subjects examined include definition, form, structure, and growth of urban regions as seen from the viewpoints of various disciplines. Cross-listed with URST 010.

**SOC 015. Social Problems** (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. The application of major sociological theories, concepts, and perspectives in an analytical approach to the study of social problems in contemporary society.

**SOC 018. Introduction to Global Change and Inequality** (4) Lecture, 3 hours; extra reading, 3 hours. Introduces basic concepts and perspectives in the
SOC 020. American Society (5) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Examines the culture and structure of American society. Topics include beliefs, key institutions, community patterns, and systems of inequality.

SOC 028. Introduction to the Sociology of Gender (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduces gender as a system of inequality that organizes social life and shapes the distribution of resources, power, and privilege. Prerequisite(s): none.

SOC 030. Identity and Society (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. Studies the nature of the self, one's identities, and their role in social behavior. Examines the processes of self-verification, self-esteem, self-efficacy, and authenticity using social psychological theories.

SOC 031. Couples and Families (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. Examines the major trends in marriage, families, and intimate relationships. Focuses on how inequality and diversity affect loving and family relations. Discusses the dynamics of gender inequality among families and couples and how family life is shaped by race and ethnicity, social class, divorce, and sexuality. Reaction papers and exams will be expected.

SOC 035. Racial and Ethnic Issues in American Society (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): none. Introduces issues and topics associated with racial and ethnic populations in U.S. society. Focuses on social processes that stratify American society by ethnicity and race.

SOC 036. Inequality in American Society (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): none. Examines inequality in modern American society and how gender, race, and ethnicity, and social class maintain inequality.

SOC 040. Introduction to Criminology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Analyzes the nature and patterning of criminality, with attention to theoretical and methodological issues encountered in research. Examines explanations and crime control policies regarding linkages among social conflicts and inequalities, criminal laws and enforcement practices, and social deviance.

SOC 041. Juvenile Delinquency (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Examines the nature of delinquency and juvenile justice in American society. Emphasis is on divergent models for administering justice, including pre-court stages, intake procedures, custody treatment, detention and release, adjudication, disposition, and post-adjudicatory supervision, including institutionalization.

Upper-Division Courses

SOC 110. Multivariate Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 005. Involves computer analysis of social and behavioral data using statistical inference, multiple-regression, simulation, and multivariate nonparametric techniques.

SOC 111. Computational Modeling and Simulation (4) Lecture, 2 hours; workshop, 1 hour; outside research, 3 hours. Prerequisite(s): an introductory course in the social sciences. Introduces computational modeling and simulation methods for theory development. Examines “systems,” “complexity,” and “dynamics” ideas as they are applied in sciences. Explores models of processes that are applied across all social science disciplines, including aggregation, diffusion, influence, segregation, phase-transition, and bargaining/exchange. Covers the basics of building “agent-based” and “systems-dynamics” computational models.

SOC 120. Human Social Institutions (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. A comparative analysis of the historical and evolutionary development of basic human institutions, including economy, kinship, religion, polity, law, education, medicine, and science. Emphasis is on the historical emergence and differentiation of social institutions and their role in social behavior. Examines the processes of self-verification, self-esteem, self-efficacy, and authenticity using social psychological theories.

SOC 122. Social Change (5) Lecture, 3 hours; outside research, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. A study of patterns of social change, resistance to change, and change-producing processes and agencies.

SOC 123. Human Societies (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H. A study of social change, the transition from food collecting to food producing, early Germanic societies, the rise of the West, and the causes of the industrial revolution.

SOC 125. Evolutionary Sociology (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Examines the objectives and scope of a cross-section of approaches that use evolutionary reasoning to examine social change. Emphasis is on the origins of social organization, including the origins of cooperation and exchange, the development of simple social institutions, changes in complex social institutions, and the role of social change in the evolution of human society.

SOC 126. Primate Societies (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Examines the characteristics of primate societies, their role in social evolution and human evolution, and the implications for social organization and social behavior.

SOC 128. Chicano Sociology (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Analyzes the experience of Mexican Americans in society by considering their social status from region to region, political and economic trends, and social relations and integration with non-Mexicans. Cross-listed with ETS 128.
SOC 139. Mass Media and Popular Culture (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. A comparative analysis of the television, radio, record, cinema, and journalism industries as social institutions and a discussion of contemporary developments in mass communications theory. A study of the relationship between the social processes of modern society and the content of popular culture. Cross-listed with MCS 139.

SOC 140. The Sociology of Women (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. Analyzes the role women have played in society, with an emphasis on modern American society. Considers some of the social determinants of women's positions and the efforts being made to bring about change.

SOC 141. Men and Masculinity (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. A comparative and historical exploration of the social and personal meanings of masculinity with special emphasis on the American experience. Topics include socialization, sports and war, friendship, intimacy, sexuality, fathering, and work. Particular attention is paid to the role of masculinity in systems of gender inequality.

SOC 142. Sociology of the Family (5) Lecture, 3 hours; discussion, 1 hour; field, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. A comparative and historical treatment of the family. Explores major theoretical frameworks developed for conceptualizing the family as a social system within the context of the relation between social structure and family group processes.

SOC 143. Urban Sociology (5) Lecture, 3 hours; extra reading, 3 hours; field, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. A comparative examination of metropolitan and other urban communities, with emphasis on processes of urbanization. Cross-listed with URST 143.

SOC 144. Family Violence (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. Addresses causes, identification, and prevention of all types of intrafamily abuse: child, sibling, spouse, and parent. Examines theories and research findings for practical field application. For upper-division students whose careers will bring contact with victims and/or perpetrators of family violence.

SOC 145. Law and Subordination (5) Lecture, 3 hours; field, 6 hours. Prerequisite(s): upper-division standing in Ethnic Studies or Sociology; ETST 128/SOC 128. A comparative and historical analysis of subordinated communities and law with special emphasis on integrating theoretical understanding of racial, class, and gender subordination. Field experience working directly with groups that have traditionally lacked equal access to the legal and judicial system. Cross-listed with ETST 145.

SOC 147. Corrections (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. Involves a review, analysis, and criticism of the major theories and practices of resocialization of adult and juvenile offenders. Surveys the history, application, and theory of probation, parole, incarceration, and delinquency prevention programs. Discusses the methods involved in evaluating the effectiveness of correctional programs. May provide opportunities for field work.

SOC 149. Organized Crime (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H. A review of the operations, structures, history, and theories of syndicated crime in the United States. Special emphasis is given to the implications of organized crime on the development of criminalistical theory, the operation of formal organizations, and American ethnic relations.

SOC 150. The Sociology of Economic Organizations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines how the scope and nature of formal and informal organizations are shaped by sociological processes external to them, such as the influence of governments, institutions, networks, and resources. Illustrates the processes with examples from contemporary United States and from other periods and cultures.

SOC 151. Formal Organizations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the structures of formal organizations, the forces that shape them, and the impact they have on their participants, their environments, and one another. Surveys the major classical and contemporary theories of human behavior in organizations.

SOC 152. Theory of Gender Inequality (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or WMST 001. Studies theoretical debates regarding sex and gender differences, the origins and institutionalization of gender inequality, and the intersection of sexism, racism, and heterosexism. Cross-listed with WMST 152.

SOC 153. Sexualities (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H; SOC 028. Examines sexual practices and identities from a sociological perspective. Discusses the evolution of knowledge about sexuality, historical and cultural variations in sexual norms and identities, sexual politics and popular culture, and the social control of sexuality (e.g., moral panics, sexual violence, and state regulation of sexual identities or practices).

SOC 154. Sport and Gender (4) Lecture, 4 hours; individual study, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or WMST 001. Considers the intersection of politics, economics, society, culture, and representation in sport. Combines theoretical work and applied study for students interested in social theory and cultural studies. Assumes that gender is a fundamental factor in sport and vice versa. Cross-listed with WMST 154.

SOC 155 (E-Z). Topics in the Sociology of Gender (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H; SOC 028. Intensively studies selected topics in the sociology of gender. E. Feminist Movements in the United States; G. Queer Theory. Segments are repeatable.

SOC 156. Community (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Involves a historical and comparative treatment of the community as a social system; political and economic forces shaping the sense of community, and influences of urbanization, industrialization, and bureaucratization on local social systems.

SOC 157. Social Networks (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Examines the linkages among individuals in social networks. Topics include neighborhood and community networks, corporate and elite networks, and personal “ego” networks. Emphasis placed on the dynamics of social structures, how they operate to restrict individual behavior, and how they convey resources for social support and career success.

SOC 158. Sociology of Religion (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. A comparative and analytic treatment of religion as a social institution. Focuses on the relationships of religion and other social institutions with particular emphasis on the American experience. Topics include religion as an agent of change as well as stability in society.

SOC 159. Sociology of Law (5) Lecture, 3 hours; discussion, 1 hour; field, 3 hours. Prerequisite(s): SOC 001 with a grade of “C” or better or SOC 001H with a grade of “C” or better, SOC 004 with a grade of “C” or better. Introduction to sociological perspectives and research on the nature, sources, dimensions, and impact of law. Particular attention is given to the “values question” in defining and studying law as a set of social phenomena; conceptual issues and methodological strategies in establishing and interpreting linkages between legal and other social structures and processes; and analyzing the uses and limits of law in maintaining order and promoting social change.

SOC 160. Sociology of Education (5) Lecture, 3 hours; extra reading, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Comparative analysis of educational institutions in complex societies and their relation to the society’s political and economic structure. Examines the school as a societal subsystem consisting of teacher, student, and administrator roles with its own evolving subculture.

SOC 161. Immigration and Society (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Analyzes the origins of immigration and its nature, patterns, and trends in the twentieth century in Western societies, with special emphasis on the United States. Topics include theories of immigration, causes of immigration, sources of immigrants, immigration laws, reactions to immigrants, and the effects of immigration on the host society.

SOC 162. Linguistic Diversity in the United States (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Examines the linguistic diversity that has characterized the sociohistorical development of United States society.

SOC 163. Social Forces and the Educational Condition of Chicanos (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the social forces that have shaped the Chicanos’ educational condition and evaluates models in the sociology of education that explain their educational situation. Cross-listed with ETST 163.

SOC 165. Sociolinguistics and the Chicano Community (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the regional and social variation in language use within the Chicano community. Specific issues addressed are the maintenance of Spanish language use, private versus public domains of language use, the need for bilingual social services, language as a human right versus language as a constitutional right, and the political economy context of language. General sociolinguistic theory and methodology are also addressed. Cross-listed with ETST 165.

SOC 168. Development of Sociological Theory (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. The emergence of sociology as a systematic discipline; critical analysis of sociological theory from 1850 to 1920 including the theories of Comte, Tocqueville, Spencer, Marx, Simmel, Weber, Durkheim, and others during this period.

SOC 169. Modern Sociological Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001. Analysis and critical evaluation of sociological theory from 1920 to the present; growth of current sociological theories and recent trends in conceptual formulations.

SOC 171. Alternatives to Bureaucratic Organizations (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. Examines organizational models that...
challenge the alleged superiority of bureaucratic organization. Topics range from cooperatives, professional partnerships, and worker-owned firms to the use of participative management, autonomous teams, and employee stock ownership in otherwise conventionally owned firms. Recommended for Business Administration majors.

SOC 173. Social Psychology: Sociological Orientation (5) Lecture, 3 hours; discussion, 1 hour; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Study of the sociological contributions to theory and research in social psychology bearing on the relationship between culture and group life to human behavior and personality.

SOC 174. Socialization and Personality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. An analysis of socialization from various theoretical perspectives with emphasis on the impact of patterns of child rearing on personality development. Treatment is historical and cross-cultural, with particular attention to the relation among family structure, social structure, and socialization processes.

SOC 175. Social Roles and Interaction (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): SOC 001 with a grade of “C” or better or SOC 001H with a grade of “C” or better. Covers the nature of face-to-face contact between persons in everyday life; the relation between the social self, social roles, and communication in the day-to-day activities of people in informal groups, in closed establishments, and in public contacts.

SOC 176. The Sociology of Work in Organizations (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. Emphasizes the roles of individuals in organizations. Topics include the effects of jobs on workers, long-term trends in the nature of work, and differences in work among major segments of the labor force. Cross-listed with BUS 176.

SOC 177 (E-Z). Topics in Social Psychology: Sociological Orientation (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. Topics selected to cover the individual and social change, attribution theory, experimentation in social psychology, exchange and consistency theories in social psychology, and applied social psychology. E. Social Psychology of Gender; G. Theories of Interpersonal Behavior.

SOC 178. Sociology of Emotions (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 001 or SOC 001H; SOC 030. Intensively studies selected topics in social psychology, such as the individual and social change, attribution theory, experimentation in social psychology, exchange and consistency theories in social psychology, and applied social psychology. E. Social Psychology of Gender; G. Theories of Interpersonal Behavior.

SOC 181. World-Systems and Globalization (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. Systematic comparisons of societies and world-systems with emphasis on changes in the logic of social development.

SOC 182. Urban Problems (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An interdisciplinary examination of selected urban problems such as civil disorders, transportation, housing, welfare, and planning. Cross-listed with URST 182.

SOC 183 (E-Z). Special Topics in Sociology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. Special topics in sociology not a regular part of the curricular offerings in the department. G. Collective Behavior; H. Aging in America; N. Fear and the Media; P. Poverty and Welfare; T. Intersocietal Conflict: Political Islam, Terrorism, and the United States; V. Power and Society; W. Social Mobility.

SOC 184. Environmental Sociology (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 001 or SOC 001H. A sociological approach to the study of mainstream environmentalism, societal implications of environmental reform, the nature of distributive impacts (costs and benefits), environmental conflict resolution, land-use decision making, and the placement of noxious facilities in minority, working class, and poor communities.

SOC 190. Special Studies (1-5) Individual study, 3-15 hours. Prerequisite(s): upper-division standing; consent of instructor and Department Chair. Individual study, directed by a faculty member, to meet special curricular needs. Course is repeatable to a maximum of 15 units.

SOC 195. Senior Thesis (2-4) Total credit may not exceed 12 units. Required for all participants in the department’s senior honors program, who must enroll for 4 units per quarter for a total of three quarters. Students wishing to undertake senior thesis projects outside the senior honors program, may enroll in SOC 195 for 2-4 units per quarter for one, two, or three quarters.

SOC 197. Research for Undergraduates (1-4) variable hours. Prerequisite(s): upper-division standing with consent of instructor. Directed original research. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SOC 198-I. Individual Internship in Sociology (1-12) Written work, 1-12 hours; internship, 2-24 hours. Prerequisite(s): senior standing; grades of “C” or better in SOC 001 or SOC 001H, SOC 004, and 12 upper-division units in sociology; consent of instructor. Individual internship in community agencies to observe community processes. Course is repeatable to a maximum of 16 units.

SOC 199H. Senior Honors Research (1) Required seminar for all participants in the department’s senior honors program. Must be taken in conjunction with SOC 195, and for a total of three quarters.

Graduate Courses

SOC 201A. Research Perspectives: Quantitative Methods (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 005 or equivalent, graduate standing; or consent of instructor. An analysis of epidemiological questions, conceptualization and measurement issues, survey research design, sampling, design of survey instruments, principles of survey administration, experimental design, and data processing.

SOC 201B. Research Perspectives: Qualitative Methods (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 004 or equivalent, graduate standing; or consent of instructor. An overview of the uses of qualitative methods in sociology. Topics include epistemological questions, participant and systematic observation, intensive interviewing, participatory methods, and the uses of documentary and historical resources.

SOC 202A. History of Sociological Theory (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the development of sociological theory from 1830 to 1930, stressing the major ideas, concepts, and principles developed by early social theorists.

SOC 202B. Contemporary Sociological Theory (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 202A or consent of instructor. Examines sociological theory from 1930 to the present, stressing the major ideas, analyses, and principles developed by contemporary theorists.

SOC 203A. Descriptive and Multivariate Statistics (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 005 or equivalent, SOC 201A or SOC 201B, graduate standing; consent of instructor. Covers principles of partial and joint association, variance, and statistical estimation through the use of log-linear, multiple regression, and ANOVA models.

SOC 203B. Multiequation and Measurement Models (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 005 or equivalent, SOC 201A, SOC 201B, SOC 203A, graduate standing; or consent of instructor. Covers principles of multiequation systems, latent variables, and factors through the use of confirmatory factor and covariance structure models. Covers reliability and validity assessment for scaling techniques.

SOC 205. Categorical and Survival Data Analysis (4) Seminar, 3 hours; laboratory, 1 hour; extra reading, 2 hours. Prerequisite(s): SOC 201A, SOC 201B, SOC 203A, SOC 203B; graduate standing or consent of instructor. Introduces students to the analysis of limited dependent variables in social science and epidemiologic research. Covers in detail survival analysis, including recent advances and emerging controversies. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 210. Citizenship (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Considers theories of citizenship. Focuses on the intersection of politics, economics, and culture, combining theoretical work and applied study. Designed for graduate students interested in social and political theory, cultural studies, and cultural policy studies. Sociology graduate students who are not advanced to candidacy for the Ph.D. receive a letter grade; other students receive a letter grade or petition for a Satisfactory (S) or No Credit (NC) grade.

SOC 211. Media Sociology (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Surveys research on the production of news, mass entertainment, and culture, with emphasis on constructions of audiences and the production of news, mass entertainment, and culture, with emphasis on constructions of audiences and the introduction of new media technologies. Sociology graduate students who are not advanced to candidacy for the Ph.D. receive a letter grade; other students receive a letter grade or petition for a Satisfactory (S) or No Credit (NC) grade.
SOC 232. Proseminar in Sociology (2) Lecture, 2 hours. Prerequisite(s): admission to the graduate program. Graduate orientation to sociology as a scholarly discipline and empirical science. Required of all first year graduate students. Graded Satisfactory (S) or No Credit (NC).

SOC 240. Sociology of Gender (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Course will cover a broad variety of issues in the sociology of gender including socialization to gender roles, sexuality and sexual relations, housework, changing patterns of labor force participation, women in politics, and other gender-related topics. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and advisor.

SOC 242 (E-Z). Sociological Theory (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing; consent of instructor. Advanced study in sociological theory: E. History of Theory; F. Issues in Contemporary Theory; G. Issues in Theory Construction; M. Macrostructural Analysis. May be graded Satisfactory (S) or No Credit (NC) with permission of Graduate Advisor.

SOC 243 (E-Z). Special Topics in Sociology (4) Lecture, 3 hours; assignment of the remaining hours varies from semester to semester. Prerequisite(s): graduate standing; consent of instructor. Critical analysis of current theory and research in special areas of sociology. Covers a single topic not contained in a regular course. Each topic is announced when the course is offered. Students who take the course to meet specialization requirements receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

SOC 244. Institutional Analysis (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. The comparative and historical analysis of human social institutions, with emphasis on: (a) the emergence and development of the basic institutional systems of economy, polity, kinship, religion, law, and education; (b) the structure and process of these institutions in varying types of societies; (c) the interrelation of these institutions to each other and to other structuring processes. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and advisor.

SOC 245. Large-Scale Organizations (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A review of the sociological literature on large-scale organizations. Provides an introduction to rational, political, ecological, economic, and institutional models of large-scale organizations. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and advisor.

SOC 246. Race and Class Inequality (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduction to the various theories of racial and class inequality. Areas covered will include social scientific explanations for racial and ethnic inequality; ideological justifications for racial, ethnic, and class inequality; intersection of caste, class, and race in world inequality; and strategies to end inequality. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and advisor.

SOC 248. Core Course on Social Psychology (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A review of the sociological literature on social psychology. Students who take the course to meet specialization requirements receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

SOC 249. Contemporary Research and Theory in Criminology and Sociological Studies (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Review of basic issues and major contributions in studies of crime, deviance, and law. May be taken Satisfactory (S) or No Credit (NC) with permission of instructor and advisor.

SOC 250. Research Practicum (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): SOC 201A, SOC 201B. A seminar of supervised research in which students are expected to integrate theory with data, within the context of work on a topic of individual interest. May be taken Satisfactory (S) or No Credit (NC) for 4 hours. Course is repeatable.

SOC 251. Current Research in Political Economy and Global Social Change (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Reviews current research in the field of political economy and global social change, with special emphasis on new developments and promising new directions. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 252. Current Research in Economic and Organizational Sociology (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on recent literature in economic and organizational sociology, including recent developments in network, institutional, and ecological approaches. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 253. Current Research in Organizations and Institutions (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Reviews the latest research and theory on organizations and institutions, focusing on the relationship between organizations and institutions or between one institutional complex and the organizational systems within it. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 254. Current Research in Social Psychology (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Reviews current theory and research and addresses future directions in social psychology. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 255 (E-Z). Topics in Large-Scale Organizations (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced study of large-scale organizations. I. Organizational Theory, L. Methods of Organizational Research; M. The Sociology of Work; N. Economic Organization; O. Social Organization of Sciences. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 256. Current Research in Feminist and Gender Sociology (4) Seminar, 2 hours; extra reading, 3 hours; written work, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Reviews current theory and research in feminist and gender sociology, with particular attention to new developments in the field. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Course is repeatable as content changes to a maximum of 12 units.

SOC 257 (E-Z). Topics in Institutional Analysis (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced seminars in institutional analysis.

E. Economic Sociology. F. The Sociology of Family and Kinship; G. The Sociology of Education; J. Political Sociology. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 258. Current Research in the Sociology of Families and Loving Relationships (4) Seminar, 2 hours; extra reading, 3 hours; written work, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Reviews current theory and research in the sociological study of families, marriage, and loving relationships. Focuses on issues of gender, race, class, and sexual inequalities. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a grade on the basis of assigned extra work or examination.

SOC 261. World-Systems Analysis (4) Seminar, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on social evolution, world-systems analysis, and globalization. Students who take the course to meet specialization requirements receive a letter grade; other students receive a letter grade or Satisfactory (S) or No Credit (NC) grade.

SOC 262. Theory and Method in Gender Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Provides students with an overview of recent debates about theory and method in gender studies. Explores relationships between feminist theory, feminist practice, and social science. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 263. Women and Work in World Historical Perspective (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 264 (E-Z). Topics in Gender Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced study in the sociology of gender. E. Gender and Families; F. Domestic and Sexual Violence; G. The Sociology of Men; M. Gender in Comparative Perspectives; P. Gender, Politics, and Public Policy; T. Transnational Sex, Romance, and Marriage. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 265 (E-Z). Topics in Race and Class Inequality (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced study in race and class inequality. F. Black America; I. Chicano Sociology; J. World Inequality; R. Racial, Ethnic, and Immigrant Families. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 266. Race and Ethnic Relations (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. A review of sociological literature on race and ethnic minorities, patterns of conflict and ethnic antagonism, and systems of dominance. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 268. Law, Race, Class, and Gender (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Presents an analysis of how issues of race, class, and gender shape legal thought and jurisprudence. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and advisor.
SOC 278. Punishment and Correction: Evaluating Theories and Policies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Takes a critical and evaluative approach to the punishment and correctional systems, assessing what “works and doesn’t work” in efforts to reduce crime and delinquency. Examines prisons, probation, and other crime control measures from a perspective emphasizing the need for systematic evaluation research. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 279. Analysis of the Criminal Justice Process (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): either graduate standing and SOC 249 or consent of instructor. This course examines in depth the penal social control agencies of the police, the courts, and the correctional system both from ideological and operational points of view. The effects on the individual and society of these mechanisms as well as alternative approaches to formal control mechanisms are examined. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and advisor.

SOC 280 (E-Z). Topics in Criminology and Sociological Studies (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced seminars in criminology and sociological studies. E. Patterns of Criminal and Deviant Behavior; F. Ecological Perspectives on Crime and Delinquency; G. Biological and Psychological Studies of Crime and Delinquency; I. Conflict and Radical Approaches in Criminology and Sociological Studies; J. Sociological Theories of Law; K. Law, Power, and Social Conflict; M. Political Criminality. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 281. Political Economy and Global Social Change (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Focuses on classical and contemporary political economy, social movements, and the historical development of social systems. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 282. International Migration (4) Seminar, 4 hours. Prerequisite(s): SOC 201A, SOC 203A. A hands-on research course in the concepts, theories, and techniques used in the analysis of international migration. Covers the nature and origins of patterns and trends in global migration from colonial times to the twenty-first century. Provides an overview of migration theories, migration policies, and current research on immigration. Course is repeatable.

SOC 284. Sociology of the Family (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Covers major theoretical frameworks and empirical research on the sociology of the family. Reviews research on courtship, marriage, parenthood, divorce, child socialization, and intergenerational family relations from a comparative perspective. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 285 (E-Z). Topics in Family and Social Psychology (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Advanced study in family and social psychology. E. Theory in Social Psychology; G. The Interaction Process; I. Sociolinguistics; J. Social Psychology of Emotions; K. Small Groups; M. Social Psychology of the Family; N. Social Psychology of Gender; P. Families and the Life Course; S. Self and Identity. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.

SOC 290. Directed Studies (1-6) scheduled research, 3-15 hours; consultation, 1 hour. Prerequisite(s): graduate standing and consent of instructor. This course is designed to provide students with reading and research work under the tutorial supervision of a faculty member in support of developing their knowledge of specialty areas and/or preparing original research work. With consent of the graduate advisor, this course may be taken for a letter grade to satisfy required seminars in the period of specialization if regular seminars are not available. Otherwise course will be graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SOC 291. Individual Study in Coordinated Areas (1-12) Individual study, 3-36 hours. Prerequisite(s): graduate standing. A program of study designed to advise and assist candidates who are preparing for doctoral examinations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SOC 292. Research Topics in Sociology (2) Lecture, 2 hours. Prerequisite(s): graduate standing in Sociology. A series of lectures by guest, staff, and advanced graduate students on research topics in Sociology. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

SOC 297. Directed Research (1-6) Graded Satisfactory (S) or No Credit (NC).

SOC 299. Research for Thesis or Dissertation (1-12) Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

SOC 301. Directed Studies in the Teaching of Sociology (2) Consultation, 1 hour, practicum, 3 hours. Prerequisite(s): consent of instructor; prior or concurrent enrollment in the Teaching Assistant Development Program offered by the Graduate Division. Discussion and evaluation of pedagogical techniques and materials used in the teaching of sociology at the college level. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SOC 302. Teaching Practicum (2-4) Consultation, 1 hour, practicum, 3-9 hours. Prerequisite(s): teaching assistant status in the Sociology Department or consent of instructor. Supervised teaching in a college-level class. Deals with the problems and techniques of teaching, including handling discussions, preparation and grading of examinations and written work, and student-instructor relations. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SOC 401. Grant Writing in the Social Sciences (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Presents an overview of successful grant writing. Topics include preproposal planning, the grant writing process, logic and research model development, integrating proposal elements, and what to do if a grant is rejected. Participants actively develop a research proposal and review potential funding sources. Graded Satisfactory (S) or No Credit (NC).

Soil and Water Sciences

Subject abbreviation: SWSC

College of Natural and Agricultural Sciences

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Jiangying “Jay” Gan, Ph.D. Environmental Chemistry
(Environmental Sciences)
Robert C. Graham, Ph.D. Soil Mineralogy and Pedology
(Environmental Sciences)
David R. Parker, Ph.D. Soil Biogeochemistry
(Environmental Sciences)
Daniel Schlenk, Ph.D. Aquatic Ecotoxicology
(Environmental Sciences)
Jiri Simunek, Ph.D. Hydrology
(Environmental Sciences)
Laosheng Wu, Ph.D. Soil Physics
(Environmental Sciences)
Marylyn V. Yates, Ph.D. Environmental Microbiology
(Environmental Sciences)
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Professors Emeriti
Andrew C.-S. Chang, Ph.D. Agricultural Engineering
(Environmental Sciences)
Walter J. Farmer, Ph.D. Soil Chemistry
(Environmental Sciences)
William A. Jury, Ph.D. Soil Physics
(Environmental Sciences)
John Letey, Jr., Ph.D. Soil Physics
(Environmental Sciences)
Lanny J. Lund, Ph.D. Soil Morphology, Genesis, and Classification
(Environmental Sciences)
Albert L. Page, Ph.D. Soil Chemistry
(Environmental Sciences)

Associate Professors
Michael A. Anderson, Ph.D. Environmental Chemistry
(Environmental Sciences)
David M. Crohn, Ph.D. Biosystems Engineering
(Environmental Sciences)

Adjunct Assistant Professors
Brian Lanoil, Ph.D. Environmental Microbiology
(Environmental Sciences)
Lisa Stein, Ph.D. Environmental Microbiology
(Environmental Sciences)

Cooperating Faculty
Michael A. Allen, Ph.D. (Biology/Plant Pathology)
Mark R. Matsumoto, Ph.D. (Chemical and Environmental Engineering)
Harry W.K. Tom, Ph.D. (Physics and Astronomy)

The graduate program in Soil and Water Sciences is not currently accepting new students. Students interested in graduate study in soil or water sciences can be accommodated in other graduate programs and are encouraged to contact the Environmental Sciences Student Affairs Offices at (951)827-5103 or (951)827-2441 for more information on how to apply.
Graduate Program

The graduate program in Soil and Water Sciences is administered by the Department of Environmental Sciences and offers both M.S. and Ph.D. degrees.

Admission The university requires GRE General Test scores (verbal, quantitative, analytical). As well as fulfilling the university requirements for admission to the Graduate Division, students must satisfy certain program requirements. Admission to the program requires a baccalaureate degree with preparation in both physical and life sciences. Students should have completed one year of general chemistry, as well as courses in general physics, organic chemistry, calculus through integrals, general biology, statistics, and physical geology or physical geography. Students who have not taken these courses are directed by the admissions and review committee and their major advisor to the appropriate curriculum to correct the deficiencies.

Course Work Students, in consultation with their advisory committee and other faculty as appropriate, develop a program of course work to satisfy the degree requirements and the career objective. A study list of required and elective courses must be completed by the end of the second quarter of study and submitted to the admissions and review committee.

Students must complete one course in each of the following four broad categories of soil and water sciences: chemistry, physics, biology, and natural structure and diversity. Students may have completed these prior to admission or they may take them early in their graduate program. Courses at UCR that meet the requirement of each category are listed below.

Chemistry
- ENSC 104/SWSC 104 (Environmental Soil Chemistry)
- CHEM 136/ENSC 136/ENTX 136/SWSC 136 (Chemistry of Natural Waters)

Physics
- ENSC 107/SWSC 107 (Soil Physics)
- ENSC 163 (Hyrology)

Biology
- ENSC 133/MCBL 133/SWSC 133 (Environmental Microbiology)
- BPSC 134/ENSC 134/SWSC 134 (Soil Conditions and Plant Growth)
- ENSC 141/MCBL 141/SWSC 141 (Public Health Microbiology)

Natural Structure and Diversity
- ENSC 138/GEO 138/SWSC 138 (Soil Morphology and Classification)
- ENSC 140/SWSC 140 (Linnology)

For a complete description of the program’s requirements, students are referred to the Guidelines for Graduate Students available in the Environmental Sciences Student Affairs Office. Other general university requirements for advanced degrees are given in the Graduate Studies section of this catalog.

Master’s Degree

The Department of Environmental Sciences offers the M.S. degree in Soil and Water Sciences. Only seminar courses, directed study, internship, thesis and dissertation hours may be taken on a Satisfactory (S)/No Credit (NC) basis.

Plan I (Thesis) Students must complete a minimum of 36 quarter units of graduate and upper-division undergraduate courses in or significantly related to, soil and water sciences. At least 12 of the 36 units must be in graduate courses. A maximum of 12 of these units may be in graduate research for the thesis. No more than 4 units of SWSC 290 and 2 units of SWSC 250 may be applied toward the degree. Students must pass a final oral examination.

Plan II (Comprehensive Examination) Students must complete a minimum of 36 quarter units of graduate and upper-division undergraduate courses in or significantly related to soil and water sciences. The written exam, which is three to four hours long, is prepared and evaluated by a committee appointed by the department chair. The exam is taken during the latter part of the final quarter of the M.S. program. Students must take the exam in the last six weeks of the quarter in which the course was taken. Students failing the examination twice are dismissed from the program.

Doctoral Degree

The Department of Environmental Sciences offers the Ph.D. in Soil and Water Sciences. The Ph.D. program provides specialized, research-based training in a variety of soil and water sciences fields. In addition to the four core courses enumerated above, the minimum requirements for the Ph.D. degree include the following:

1. Complete all course work with an average GPA of 3.0 or greater
2. Pass both the written and oral qualifying examinations
3. Complete at least 4 units of Teaching Practicum (SWSC 302)
4. Submitting an approved research dissertation

Course Work Before advancement to candidacy, Students must complete all required course work as approved by their advisory committee with an average GPA of 3.0 or greater.

Written and Oral Qualifying Examinations

Students must pass written qualifying examinations administered by a five-member committee and an oral examination administered by the same committee; the latter includes the defense of an original research proposal. The examining committee must include one member from outside the graduate program. After successfully completing these examinations and complying with university rules, students are advanced to candidacy.

Dissertation

Students must submit a dissertation consisting of original research in the field of soil and water sciences. The dissertation must be accepted by a three-member dissertation committee. Students must then pass a final oral examination, which deals primarily with the dissertation and is conducted by the dissertation committee.

Normative Time to Degree

15 quarters

Upper-Division Courses

SWSC 100. Introduction to Soil Science (4) F Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC; GEO 001 is recommended. Explores the fundamental principles of soil science and soils as a natural resource. An introduction to the morphology, physics, chemistry, microbiology, fertility, classification, development, and management of soils in relation to the environment. Cross-listed with ENSC 100. Credit is awarded for only one of ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H. Amrhein

SWSC 100H. Honors Introduction to Soil Science (4) F Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor; both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC; GEO 001 is recommended. Honors course corresponding to SWSC 100. Explores the fundamental principles of soil science and soils as a natural resource. An introduction to the morphology, physics, chemistry, microbiology, fertility, classification, development, and management of soils in relation to the environment. Satisfactory (S) or No Credit (NC) grading is not available. Cross-listed with ENSC 100H. Credit is awarded for only one of ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H. Amrhein

SWSC 104. Environmental Soil Chemistry (4) F Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 005 or ENSC 100/SWSC 100 or ENSC 100H/SWSC 100H or consent of instructor. Quantitative study of the chemistry of the solid, liquid, and gas phases in soils and sediments. Topics include solid and solution speciation, mineral solubility, ion exchange and adsorption reactions, oxidation-reduction, and the chemistry of organic contaminants and toxic trace elements in soils. Cross-listed with ENSC 104. Parker

SWSC 107. Soil Physics (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B or MATH 09H; PHYS 002A; or consent of instructor. Topics include physical properties of soils and methods of evaluation. Emphasis is on movement of water, heat, gases, and chemicals through soil. Cross-listed with ENSC 107. Wu
SWSC 120. Soil Ecology (3) S Lecture, 3 hours. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 05LA; both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 1HLC. Examination of soil biota and their relationships with plants and the soil environment. Emphasis is on soil biotic interactions that influence soil fertility, plant disease, and plant growth. Examines the importance of the different microbial and faunal groups from the rhizosphere to the ecosystem level. Cross-listed with ENSC 120 and NEM 120. Crowley, De Ley

SWSC 127. Fate and Transport of Contaminants in Soil (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 1HLC; ENSE 1005/SWSC 100; or ENSC 100H/SWSC 100H; MATH 0909 or MATH 09HB. Topics include interactions of environmental conditions with abiotic and biotic transformation and transport of major organic and inorganic contaminants in soil. Cross-listed with ENSC 127. Gan

SWSC 133. Environmental Microbiology (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 05LA, BIOL 05SB, or consent of instructor. Introduction to nonpathogenic microorganisms in the environment. Topics include an introduction to microbial biology and microbial and metabolic genetic diversity; methods; symbiotic interactions; biofilms; and geomicrobiology and biogeochemistry. Explores life in extreme environments and the effects of the physical and chemical environment on microbes. Cross-listed with ENSC 133 and MCBL 133.

SWSC 134. Soil Conditions and Plant Growth (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 104/BPSC 104, ENSE 1005/SWSC 100 or ENSC 100H/SWSC 100H; or consent of instructor. A study of the chemical, physical, and biological properties of soils and their influence on plant growth and development. Topics include soil-plant-water relations; fundamentals of plant mineral nutrition; soil nutrient pools and cycles; soil acidity, alkalinity, salinity, and sodicity; root symbioses and rhizosphere processes. Cross-listed with BPSC 134 and ENSC 134. Crowley

SWSC 136. Chemistry of Natural Waters (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 005 with a grade of "C-" or better or ENSE 104/SWSC 104 with a grade of "C-" or better or consent of instructor. Introduction to processes controlling the chemical composition of natural waters. Topics include chemical equilibria, acid-base and coordination chemistry, oxidation-reduction reactions, precipitation-solution, air-water exchange, and use of equilibrium and kinetic models for describing marine nutrient, trace metal, and sediment chemistry. Cross-listed with CHEM 136, ENSE 136, and ENTX 136. Ziemann

SWSC 138. Soil Morphology and Classification (4) S Lecture, 3 hours; laboratory, normally 3 hours; two 1-day field trips. Prerequisite(s): ENSE 1005/SWSC 100 or ENSC 100H/SWSC 100H; GEO 001 or GEO 002; or consent of instructor. The study of soils as they occur in the field and their relations to current and past environmental conditions. Use of field and laboratory data to understand soil genesis, causes of soil variability, fundamentals of soil classification, and land use potential. Emphasizes the description and interpretation of soils and landscapes in the field. Cross-listed with ENSC 138 and GEO 138. Graham

SWSC 140. Limnology (4) S Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 1HLC; ENSC 101. Study of surface waters. Considers in detail the physical and chemical processes in surface waters, aquatic biology, ecosystem dynamics, and aspects of surface water quality and modeling. Cross-listed with ENSC 140. Anderson

SWSC 141. Public Health Microbiology (4) F Lecture, 4 hours. Prerequisite(s): BIOL 002 or both BIOL 005A and BIOL 05LA; BIOL 003 or BIOL 005B; upper-division standing; or consent of instructor. Introduction to transmission of human pathogenic microorganisms through environmental media, including drinking water, wastewater, and air. Topics include characterization of environmentally transmitted pathogens, microbial risk assessment, sampling and detection methods for microorganisms in environmental samples, waterborne disease outbreaks, recycling or reuse of wastewater, microbial regulations and standards, and indoor air microbiology. Cross-listed with ENSC 141 and MCBL 141. Yates

SWSC 190. Special Studies (1-5 S, F, W, conference and discussion, variable time. Prerequisite(s): advanced standing. Directed group study in soil and water sciences for advanced undergraduates. Course is repeatable.

SWSC 197. Research for Undergraduates (1-4) F, W, S conference and discussion, variable time. Prerequisite(s): advanced standing. Individual research on a problem relating to soil and water sciences to be conducted under the guidance of an instructor. Course is repeatable.

Graduate Courses

SWSC 203. Surface Chemistry of Soils (4) W, Even Years Lecture, 4 hours. Prerequisite(s): CHEM 109 or CHEM 110A; ENSE 104/SWSC 104; or consent of instructor. Quantitative description of the properties of and reactions at the soil-water interface, including charge properties, the electric double layer, ion exchange, and surface complexation reactions. Anderson

SWSC 204. Environmental Organic Chemistry (4) Lecture, 4 hours. Prerequisite(s): CHEM 109 or CHEM 110A; CHEM 112A, CHEM 112B; or consent of instructor. ENSE 104/SWSC 104 is recommended. Considers the properties and reactions of organic contaminants in soils and surface waters, including partitioning, exchange, and transformation reactions. Anderson

SWSC 206. Principles and Theories Relating to Arid Zone Soils (4) Lecture, 3 hours; seminar, 1 hour. Prerequisite(s): ENSE 104/SWSC 104. Characteristics of soils in arid regions; soil and water resources; genesis and properties of salt-affected soils, principles and methods of reclamation; agro- nomic factors; salt tolerance, nutrition, and crop selection criteria. Amrhein

SWSC 208. Ecotoxicology (4) W Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): BIOL 005A, BIOL 005B, CHEM 112A, CHEM 112B; or consent of instructor. Introduction to the impact of chemicals upon ecological systems. Examination of the fate and effects of environmental chemicals in various hierarchical systems of biological organization to learn how to carry out precise and accurate assessments of ecological risk. Cross-listed with ENSC 208 and ENTX 208. Schlenk

SWSC 211. Microbial Ecology (3) S, Even Years Lecture, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Application of ecological principles to microbial communities. Emphasizes methods for analysis of diversity and community structure and statistical methods relating genetic and biochemical fingerprints to functional properties. Case studies explore applications for agriculture, disease biocontrol, and bioremediation of environmental contaminants. Cross-listed with MCBL 211. Crowley

SWSC 213. Soil Mineralogy (3) W, Even Years Lecture, 3 hours. Prerequisite(s): both CHEM 001C and CHEM 011C or both CHEM 01HC and CHEM 1HLC; GEO 001. ENSE 104/SWSC 104 and ENSE 138/GEOL 138/SWSC 138 are recommended. Covers the composition, structure, and classification of minerals commonly found in soils. Focuses on the origin, occurrence, and properties of soil minerals in relation to chemical, pedologic, and geomorphic conditions. Includes theory of mineral identification techniques, including X-ray diffraction, thermal and infrared analysis, and electron microscopy. Graham

SWSC 213L. Soil Mineralogy Laboratory (4) W, Even Years Discussion, 1 hour; laboratory, 9 hours. Prerequisite(s): concurrent enrollment in SWSC 213. Training in methods of soil mineralogical analysis, including sample preparation, X-ray diffraction, electron microscopy, thermal analysis, infrared spectroscopy, and surface area analysis. Data interpretation and presentation. Graham

SWSC 214. Soil and Water Chemistry Laboratory (2) Laboratory, 6 hours. Prerequisite(s): concurrent enrollment in ENSE 104/SWSC 104 or consent of instructor. A series of advanced laboratory exercises involving modern analytical methods for soils, sediments, and surface waters. Topics include trace metal speciation, isotope exchange kinetics, mineral solubility, adsorption isotherms, redox couples, and partitioning and biodegradation of organic contaminants. Cross-listed with ENSC 214. Parker

SWSC 217. Vadose Zone Processes (4) W, Even Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 0909 or MATH 09HB, ENSE 107/SWSC 107; or consent of instructor. A study of physical and mathematical descriptions of transient flow and transport processes in the vadose zone. Emphasis is on numerical solutions to equations describing the movement of water, gas, contaminants and heat, including chemical and biological reactions. Explores mathematical models for direct and inverse solutions, spatial heterogeneity, and determination of soil hydraulic properties. Cross-listed with ENSC 217. Simunek

SWSC 226. Soil Geomorphology (4) F, Odd Years Lecture, 2 hours; laboratory, 6 hours; two Saturday field trips per quarter. Prerequisite(s): ENSE 138/GEOL 138/SWSC 138, GEO 162, or equivalents. Examines the interaction of pedogenic and geomorphic processes during the Quaternary, with an emphasis on the rate of these processes. Group research includes field data collection and analysis. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with GEO 226. Graham, Kendrick

SWSC 232. Biogeochemistry (4) W, Odd Years Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): graduate standing; consent of instructor. A study of the biogeochemical cycling and exchange of carbon and important nutrients (N, S, base cations) between the lithosphere, hydrosphere, and atmosphere. Quantitatively describes processes at scales ranging from local to global. Addresses modern concerns about water and atmospheric quality, including global climate change. Cross-listed with ENSE 232. Parker

SWSC 245. Chemistry and Physics of Aerosols (3) F, Odd Years Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CHEM 109, CHEM 110B, or consent of instructor. Fundamentals of chemical and physical processes controlling behavior and properties of airborne particles. Topics include particle mechanics; electrical, optical, and thermodynamic properties; nucleation; surface and aqueous-phase chemistry; gas-particle
Southeast Asian Studies Graduate Program

Subject abbreviation: SEAS
College of Humanities, Arts, and Social Sciences

Hendrik M.J. Maier, Ph.D., Director
Program Office, 2402 Humanities and Social Sciences
(951) 827-5007; seatrip.ucr.edu

Committee in Charge
Mariam Beevi Lam, Ph.D. (Comparative Literature and Foreign Languages)
René T.A. Lysloff, Ph.D. (Music)
Sally A. Ness, Ph.D. (Anthropology)
Deborah A. Wong, Ph.D. (Music)

Graduate Program

The Master’s Program in Southeast Asian Studies is an interdepartmental program centered on the study of the arts and cultures of Southeast Asia and its diasporas. To understand Southeast Asia as a region, students need to make sense of and engage with its diverse expressive forms of culture (including visual arts, literature, and performance) which are crucial in building and maintaining individual and group identity within and across national or ethnic boundaries.

This program is designed for students with a strong interest in Southeast Asia, including those already admitted or enrolled in another graduate program. Students can be concurrently enrolled in both the Southeast Asian Studies M.A. program and another graduate degree program.

Admission
All applicants must fulfill the standard admission requirements as established by the Graduate Division. Additionally, applicants must submit a Statement of Purpose to indicate a serious interest in Southeast Asian Studies (or a specific country or area in this region) as well as a writing sample (such as a past term paper or course essay) to demonstrate basic skills of scholarship.

Foreign Language
Students must acquire (or increase) a distinct level of proficiency in at least one language relevant to Southeast Asian Studies prior to beginning research for the thesis and no later than the fifth quarter in the program. The required proficiency can be demonstrated by way of an exam or by completing one year of coursework with a “B” or better.

International students from Southeast Asia may use their native language to fulfill this requirement.

Course Work
All students are required to pass the Proseminar in Southeast Asian Studies (SEAS 200) with a “B” or better. Additionally, students must pass (with a “B” or better) four of the following six seminar courses:

- SEAS 201 Southeast Asian performance
- SEAS 202 Southeast Asian religions
- SEAS 203 Southeast Asian cultures
- SEAS 204 History of Southeast Asia
- SEAS 205 Literatures of Southeast Asia
- SEAS 206 Media in Southeast Asia

In addition, students may select four other graduate seminars or approved upper division undergraduate courses in accordance with their main field of interest and after approval by the Graduate Advisor and the student’s Thesis Committee. A total of 48 units of coursework, including thesis, are required for the degree in Southeast Asian Studies.

Students concurrently enrolled in another graduate program may, when appropriate, include units earned in that program toward the 48 units of the M.A. in Southeast Asian Studies. However, there must be at least 36 units uniquely applied to the Southeast Asian Studies degree.

Plan I (Thesis)
Students enrolled in the Southeast Asian Studies Graduate Program (for the terminal M.A.) must submit an essay (thesis) of 30-40 pages reflecting original research, written under the supervision of a member of the program who also functions as the chair of their Thesis Committee. At the beginning of the second year students should write a research proposal outlining their research project. Approximately ten pages in length this proposal should describe the aims of the research and provide a broader theoretical framework. After this is approved students begin to conduct individual research in the field or in the library. Students must enroll in a minimum of 8 units of thesis study under the supervision of a Southeast Asian Studies faculty. Before filing the thesis with the Graduate Division students must pass a formal oral examination.

Plan II (Comprehensive Exam)
Students concurrently enrolled in another degree program requiring an M.A. thesis may (with the approval of the Southeast Asian Studies faculty) be awarded the M.A. degree by passing a comprehensive examination.

University Requirements
All master’s students must be enrolled for at least three quarters to fulfill the University residency requirement and must hold at least a 3.00 GPA in all upper division and graduate level course work related to the degree. A minimum of 48 units must be completed of which 36 must be graduate level (200 level) or approved upper division undergraduate (100 level) and apply only to the M.A. in Southeast Asian Studies.

Normative Time to Degree
Two years

Professional Course

SWSC 302. Teaching Practicum (1-4) F, W, S
Practicum, 4-12 hours. Prerequisite(s): graduate standing. Supervised teaching in Soil and Water Sciences or Environmental Sciences courses. Required for all teaching assistants in Soil and Water Sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Southeast Asian Studies Graduate Program / 397
Graduate Courses

SEAS 145. Buddhism in Southeast Asia (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): RLST 106 or consent of instructor. Explores various texts, magical practices, forms of meditation, rituals, and beliefs of ancient and modern Buddhism, focusing on the ways in which they are transformed by nuns, monks, and the laity in Burma, Cambodia, Laos, Thailand, and California. Cross-listed with RLST 145.

SEAS 200. Topics in Southeast Asian Studies (4) Seminar, 3 hours; written work, 2 hours; term paper, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Introduces students to central historical currents, theoretical approaches in Southeast Asian history, and the scholarly discussions about it, with an emphasis on historical perspectives. Materials are in English. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with CPLT 200.

SEAS 203. Southeast Asian Cultures (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Introduces students to central historical problems, historiographical debates, materials, and theoretical approaches in Southeast Asian history. Readings each week focus on a different theme. Course is repeatable to a maximum of 8 units. Cross-listed with HIST 242.

SEAS 205. Literature of Southeast Asia (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Explores themes and theories related to understanding literature and literary culture in Southeast Asia, insisting that the space of literature reaches beyond the text to include all disciplines. Students critically read, engage in, and question discourses of nationhood, identity, loss, mourning, history, and memoir. Course is repeatable as content changes to a maximum of 12 units. Cross-listed with CPLT 205.

SEAS 243A. Seminar in Southeast Asian History (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Discusses Southeast Asian topics from regional, comparative, and local perspectives. May be undertaken as a one- or two-quarter course (HIST 243A/SEAS 243A, HIST 243B/SEAS 243B). After completing both HIST 243A/SEAS 243A and HIST 243B/SEAS 243B, students may repeat the sequence once for credit; total credit for each course may not exceed 8 units. Cross-listed with HIST 243B.

SEAS 290. Directed Studies (1-5) Individual study, 3-18 hours. Prerequisite(s): consent of instructor and graduate advisor. Directed study to meet special curricular needs. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SEAS 292. Concurrent Analytical Studies in Southeast Asian Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Taken concurrently with a 100-series course, but on an individual basis. Devoted to research, criticism, and written work at the graduate level related to the 100-series course. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

SEAS 299. Research for the Thesis (1-12) Thesis, 3-36 hours. Prerequisite(s): consent of thesis director. Research and preparation for the thesis. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Statistics

Subject abbreviation: STAT

College of Natural and Agricultural Sciences
Daniel R. Jeske, Ph.D., Chair
Department Office
2626 Statistics-Computer Building
statistics.ucr.edu

Business Office
(951) 827-3774

Graduate Student Affairs
(951) 827-4716 or (800) 735-0717

CNAS Undergraduate Advising Center
1223 Pierce Hall
(951) 827-7294

Professors
Barry C. Arnold, Ph.D.
Subir Ghosh, Ph.D.
Daniel R. Jeske, Ph.D.
Keh-Shin Lii, Ph.D.

Professors Emeriti
Robert J. Beaver, Ph.D.
D. V. Gokhale, Ph.D.
S. James Press, Ph.D.
Christopher A. Robertson, Ph.D.
David J. Strauss, Ph.D.

Assistant Professors
Xinping Cui, Ph.D.
James M. Flegal, Ph.D.
Jun Li, Ph.D.
Chang Xuan Mao, Ph.D.

Lecturers
Jennifer Denson, M.S.
Linda M. Penas, Ph.D.
Jill Smith, M.S.

Major

The Department of Statistics is concerned with teaching, research, and statistical consulting. The courses offered present a comprehensive spectrum of statistical and probability theory, in so far as such theory is necessary for the understanding and analysis of observational data. The applications of the theory delineated in the courses may be made in any field of experience. Laboratory classes in which examples related to the student’s actual field of interest are worked out, play an essential part. The department offers both B.A. and B.S. degrees in Statistics as well as a B.S. in Statistics with options in Statistical Computing and Quantitative Management; the M.S. degree in Statistics; and the Ph.D. degree in Applied Statistics.

The courses STAT 040, STAT 048, STAT 100A, STAT 100B, STAT 104/BUS 104, STAT 110, STAT 130, STAT 140, STAT 146, and STAT 155 are intended for students of other departments who wish a knowledge of statistical techniques. Some of them may be taken as electives by statistics majors. The objective of these courses is to acquaint the student with the elements of statistics with only the necessary amount of mathematical training.

STAT 147 and STAT 157 are computer-oriented courses intended for students who would like to learn about computer programming in the most important languages and who would like to learn about statistical computing.

In addition to teaching, the Department of Statistics is responsible to the dean of the College of Natural and Agricultural Sciences and director of the Agricultural Experiment Station for collaboration with research workers in the biological and agricultural fields. A consultative service in the design, analysis, and interpretation of experimental data relating to the agricultural sciences is provided.

Computing Laboratories

The Department of Statistics has a strong applied orientation that involves the use of statistical computing while solving real world problems that arise in many disciplines. The department has two interactive multimedia computer laboratories with Pentium-class clients and a SUN Microsystems Netra server, and also has a UNIX-based laboratory that contains multiple SUN Microsystems Blade and Ultra 24 workstations. Each of the labs provides users access to a wide variety of statistical software packages and are networked to both the Internet and the campus WiFi network. The CRAY Supercomputer at the San Diego Supercomputer Center (SDSC) is also available to faculty and graduate students, as are the 30 PC workstations in a computing laboratory that is maintained by the Statistical Consulting Collaboratory.

Statistical Consulting Center

The Statistical Consulting Collaboratory provides a broad range of analytical and statistical support services, including design of experiments, statistical inference, hypothesis testing, and data modeling for the campus community, and promotes cooperative research between statisticians and other investigators in all fields of the application of statistics. The Collaboratory is
staffed by a faculty director, two Ph.D. statisticians and graduate students.

Daniel R. Jeske, Ph.D., Faculty Director
Karen Huayin Xu, Ph.D., Associate Director
Scott M. Lesch, Ph.D., Principal Consulting Statistician

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the college’s breadth requirements. Consult with a department advisor for course planning.

Major Requirements

The department offers both a B.A. and a B.S. degree in Statistics as well as a B.S. in Statistics with options in Statistical Computing and Quantitative Management.

The major requirements for the B.A. and the B.S. degrees in Statistics are as follows:

For the Bachelor of Arts

1. Core requirements (24–25 units)
   a) CS 010, MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A
   b) Four (4) additional units in Mathematics, chosen from MATH 023, MATH 113, or MATH 131

2. Upper-division requirements
   a) Thirty-six (36) units of upper-division course work
      (1) STAT 147, STAT 155, STAT 157, STAT 170A, STAT 170B
      (2) Twelve (12) units chosen from STAT 127/BUS 127, STAT 130, STAT 146, STAT 160A, STAT 160B, STAT 160C, STAT 171
      (3) Four (4) units of STAT 197 taken at the end of Senior year
   b) Sixteen (16) units of additional course work chosen, with the approval of the major advisor, from Statistics courses numbered 104 and higher or from related fields.
   
   Note An introductory Statistics class such as STAT 048, or STAT 100A is strongly recommended.

Statistical Computing Option

The requirements for this option are in addition to the requirements for the B.S. in Statistics, except that the option requirement takes the place of the 16 units in 2.b) above.

1. Lower-division requirements (8 units): CS 012, CS 014
2. Upper-division requirements (16 units)
   a) MATH 113
   b) Twelve (12) units of course work selected from
      (1) CS 141, CS 177
      (2) MATH 112, MATH 120
      (3) STAT 198-I
   c) MATH 135A, MATH 135B recommended

Quantitative Management Option

The requirements for this option are in addition to the requirements for the B.S. in Statistics, except that the option requirement takes the place of the 16 units in 2.b) above.

1. Lower-division requirements (16–17 units)
   a) ECON 003
   b) BUS 010, BSAD 020A, BSAD 020B

2. Upper-division requirements (16 units)
   a) MATH 113
   b) Three courses from one area
      (1) Marketing: BUS 103, BUS 113, BUS 117
      (2) Finance: BUS 106/ECON 134, BUS 135A, BUS 135B, BUS 136, BUS 138
      (3) Accounting: BUS 108, BUS 165A, BUS 165B, BUS 168A, BUS 168B
      (4) Management Information Systems: BUS 101, BUS 171, BUS 173

Minor

The minor in Applied Statistics is designed to give students in either the social sciences or the physical sciences a cohesive set of statistics courses to deal with the data analytic aspects of their disciplines and to understand the statistical summaries that are encountered in everyday activities.

The requirements for the minor consist of at least 24 and not more than 28 upper-division units in Statistics to include the following:

1. STAT 100A, STAT 100B
2. Eight (8) units from STAT 110, STAT 127/BUS 127, STAT 130, STAT 140, STAT 146
3. Four (4) units from STAT 147, STAT 157
4. Four (4) additional units from 2. or 3. above

Of the specified upper-division units, a minimum of 16 must be unique to the minor and may not be used to satisfy major requirements.

No more than 4 units may be in courses numbered 190 through 199.

See Minors under the College of Natural and Agricultural Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Graduate Programs

The Department of Statistics offers the M.S. degree in Statistics and the Ph.D. degree in Applied Statistics.

Admission

Domestic and international applicants must supply scores from the GRE general exam. In addition, TOEFL scores must be supplied by all applicants whose first language is not English. The department considers applications for teaching assistantships at the same time as those for fellowships. Normally, applications for fellowships are awarded by February or March for students admitted for the following Fall quarter.

Students in the Ph.D. program who have satisfied all requirements for the master’s degree may apply for this degree while completing requirements for the Ph.D. program.

Master’s Program

The Department of Statistics offers the M.S. degree in Statistics.

Admission

Students entering the program must either have completed a bachelor’s degree in Statistics (or the equivalent), or take STAT 160A, STAT 160B, STAT 160C, STAT 161 and STAT 170A, STAT 170B, STAT 171, covering basic areas of probability and statistics. These courses would not be counted as credit towards the master’s degree.

Students must also meet the other requirements for admission as specified by the Graduate Division. The program is Plan II (Comprehensive Examination) described in the Graduate Studies section of this catalog. No foreign language is required.

Plan II (Comprehensive Examination)

Graduate students in Statistics must take (or have taken) appropriate courses in Mathematics to give them the proper background for graduate work in Statistics. Important areas include Calculus (at least MATH 008B or MATH 009A, MATH 009B, MATH 009C, and MATH 010A) and Linear Algebra (at least MATH 131). Students are strongly encouraged to take at least one of the following: MATH 120 (Optimization), MATH 126 (Combinatorics), MATH 135A, MATH 135B (Numerical
Students usually have completed a course in hydrology, epidemiology, geology, administration. Specialties might include, for example, biology, economics, political science, psychology.

A statistical approach should arise. The student’s substantive field and is submitted in accordance with the requirements of the Graduate Division, Riverside.

The dissertation is pertinent to a problem area specified by the candidate’s substantive field and is submitted in accordance with the requirements of the Graduate Division, Riverside.

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The requirement may be waived if the student already has the background in the substantive area.

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STAT 147. Introduction to Statistical Computing (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 040 or equivalent. Introduction to computer-assisted data analysis and statistical inference using both the MINITAB and SAS packages. Topics include input, output, and editing of data; graphical procedures; descriptive statistics; cross-tabulation; inferential statistical techniques including estimation and testing; regression; and analysis of variance.

STAT 155. Probability and Statistics for Science and Engineering (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009C or MATH 09HC (MATH 009C or MATH 09HC may be taken concurrently). Covers sample spaces and probability; random variables and probability distributions; elements of statistical inference; and testing and estimation. Also addresses selected topics in multivariate distributions and introduces stochastic processes.

STAT 157. Statistical Computer Packages (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 100A, STAT 100B, or equivalents; STAT 147; or consent of instructor. A study of major statistical packages, including SAS and SPSS with emphasis on advanced SAS programming. Topics include advanced graphical procedures, linear models (regression and analysis of variance), multivariate techniques, and SAS macros.

STAT 160A. Elements of Probability and Statistical Theory (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009C or MATH 09HC (may be taken concurrently). Topics include statistical regularity, probability spaces, fundamental theorems in discrete probability, Bayes' theorem, random variables, densities and distribution functions, continuous distributions, transformations of random variables, and central limit theorem. Credit is awarded for only one of MATH 149A or STAT 160A.

STAT 160B. Elements of Probability and Statistical Theory (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A. Topics include distributions of sample statistics, statistical inference, and estimation. Credit is awarded for only one of MATH 149B or STAT 160B.

STAT 160C. Elements of Probability and Statistical Theory (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160B. Topics include hypothesis testing, chi-square tests, and nonparametric methods. Credit is awarded for only one of MATH 149C or STAT 160C.

STAT 161. Introduction to Probability Models (4)

STAT 170A. Regression Analysis (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 147, STAT 155, STAT 157, or equivalents. Topics include simple and multiple linear regression; scatter-plots; point and interval estimation; prediction; testing; calibration; interpretation and practical applications of multiple regression; simple, partial, and multiple correlation; variable selection methods; diagnostic procedures; and regression for longitudinal data.

STAT 170B. Design of Experiments (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 170A. Topics include principles of design; completely randomized designs and one-way analysis of variance; complete block designs and two-way analysis of variance; multiple comparisons; complete factorial experiments; fixed, random, and mixed models; split-plot designs; nested designs; analysis of covariance; sample size determination and power analysis.

STAT 171. General Statistical Models (4)

STAT 190. Special Studies (1-5) hours to be arranged. To be taken with the consent of the chair of the department as a means of meeting special curricular problems. Course is repeatable to a maximum of 10 units.

STAT 197. Research for Undergraduates (2-4) outside research, 3-6 hours; individual study, 3-6 hours. Prerequisite(s): upper-division standing or consent of instructor. An independent research project in Statistics. Requires a research project completed under the supervision of a Statistics faculty member or a group of faculty members. Students who make an oral presentation of the research project or submit a written research report receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable as research topic changes to a maximum of 8 units.

STAT 198. Internship in Statistics (1-12) internship, 2-24 hours; outside research, 1-12 hours. Prerequisite(s): STAT 100B, consent of instructor, upper-division standing. An internship to provide statistical field experience in governmental, industrial, or research units. Projects must be approved by the Statistics Department and the head of the unit in which the internship is to be carried out. Requires a written report. Gradated Satisfactory (S) or No Credit (NC). Course is repeatable to a minimum of 16 units, but total credit toward graduation may not exceed 12 units.

STAT 199H. Senior Honors Research (1-5) Prerequisite(s): senior standing with major concentration in statistics and with consent of instructor. Senior standing with major concentration in statistics and with consent of instructor. Course is repeatable to a maximum of 10 units.

Graduate Courses

STAT 200A. Advanced Design and Analysis of Experiments (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 170A, STAT 170B, STAT 171, or equivalents. Topics include fixed, mixed, and random effects models; complete and incomplete block designs; row-column designs; nested designs; split-plot designs; crossover designs; analysis of covariance; repeated measure designs; and optimality of designs.

STAT 200B. Advanced Design and Analysis of Experiments (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 170A, STAT 170B, STAT 171, or equivalents; STAT 200A. Topics include factorial experiments; confounding and fractional factorial experiments for symmetrical and asymmetrical factorially; experiments; orthogonal and balanced arrays; optimal fractional factorial designs; first and second order response surface designs; rotatability; and blocking of response surface designs; method of steepest ascent; canonical representation; and minimum bias, variance, and mean square error designs.

STAT 203A. Bayesian Statistics I (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160C or equivalent. Subjective probability, Renyi axiom system, Savage axioms, coherence, Bayes theorem, credibility intervals, Lindley paradox, empirical Bayes estimation, natural conjugate priors, de Finetti's theorem, approximation methods, Bayesian bootstrap, Bayesian computer programs.

STAT 203B. Bayesian Statistics II (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 203A. Assessing priors, nonparametric density estimation for expert group judgements, Bayesian regression, Bayesian analysis of variance, Bayesian regression with correlated disturbances and heteroscedasticity, Bayesian inference in time series models, Bayesian classification, Bayesian inference in spatial statistics, Bayesian factor analysis, disputed authorship.

STAT 205. Discrete Data Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 160C or equivalents; or consent of instructor. Contingency tables, log-linear models, information theory models, maximum likelihood estimation, goodness of fit, measures of association, computational procedures.

STAT 207A. Statistical Computing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 160C, STAT 170A, STAT 170B; or consent of instructor. Topics include computational aspects of least squares in linear statistical models, optimization in non-linear statistical models, numerical accuracy and error analysis, simulations and Monte Carlo methods for problems in statistical inference, pseudorandom numbers, and numerical approximations.

STAT 207B. Statistical Computing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 160C, STAT 170A, STAT 170B; or consent of instructor. Topics include resampling methods, expectation maximization (EM) algorithm, Markov chain and Monte Carlo methods, and other current computational methods.

STAT 209A. Statistical Data Mining (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 170A; or consent of instructor. Introduces principal data-mining methodologies, major software tools, and typical applications for structuring, understanding, and using large datasets effectively and efficiently. Statistics graduate students who have not completed all courses required for the degree receive a letter grade; other students receive a letter grade or petition for a Satisfactory (S) or No Credit (NC) grade.

STAT 209B. Statistical Data Mining (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 209A; or consent of instructor. Introduces principle data-mining methodologies, major software tools, and typical applications for structuring, understanding, and using large datasets effectively and efficiently. Statistics graduate students who have not completed all courses required for the degree receive a letter grade; other students receive a letter grade or petition for a Satisfactory (S) or No Credit (NC) grade.

STAT 210A. Theoretical Statistics and Probability (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010B, STAT 160C, or equivalents. Topics include conditional probability, independence, distribution functions, generating functions, convergence concepts, limit theorems, and order statistics.
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STAT 210B. Theoretical Statistics and Probability (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 210A. Topics include estimation, decision theory, Bayes and empirical Bayes rules, and efficiency.

STAT 210C. Theoretical Statistics and Probability (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 210B. Topics include hypothesis testing, sequential inference, distributions, and free and robust techniques.

STAT 215. Stochastic Processes (4)

STAT 216A. Time Series Analysis (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 160C, or equivalents. Topics include stationary processes, autoregression—moving average (ARIMA) processes, trend, seasonality, model building, estimation and forecasting, and spectral analysis and estimation.

STAT 216B. Time Series Analysis (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 216A or consent of instructor. Topics include spectral analysis and estimation, higher-order spectral analysis, Kalman filtering and prediction, and nonlinear, nonstationary, and non-Gaussian time series.

STAT 220A. Multivariate Analysis (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A, STAT 160B, STAT 160C, or equivalents. Familiarity with matrix algebra. Topics include algebra and calculus of vectors and matrices, special multivariate distributions (Normal, Wishart, Hotelling's T-squared, multivariate T, multivariate log-normal, etc.).

STAT 220B. Multivariate Analysis (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 220A or consent of instructor. Topics include categorical dependent variable regression, loglinear models, inference in the multivariate normal distribution, multivariate multiple regression, hypothesis testing, likelihood ratio tests, multivariate analysis of variance and covariance, principal components analysis, factor analysis, and classification and discrimination models.

STAT 230. Sampling Theory (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160C. Covers the theory of stratified, ratio, and regression methods of estimation and cluster and double sampling. Includes the concepts of sufficiency and its applications from finite populations, non-sampling errors, estimation of response bias and of optimum number of interviewers, and sampling inspection.

STAT 231A. Statistics for Biological Sciences (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 023, STAT 100A, STAT 100B, or equivalents, or consent of instructor. Topics include one- and two-sample tests, one- and two-way analysis of variance, multiple comparison, simple and multiple linear regression, nonparametric statistics, and categorical data. Statistics graduate students who have not completed all core courses may petition for a letter grade; other students receive a letter grade or petition for a Satisfactory (S) or No Credit (NC) grade.

STAT 231B. Statistics for Biological Sciences (4)
Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 231A or consent of instructor. Topics include logistic regression, analysis of covariance, advanced experimental design, randomization, bootstrapping, jack-knifing, and other procedures. Statistics graduate students who have not completed all core courses required for the degree receive a letter grade; other students receive a letter grade or petition for a Satisfactory (S) or No Credit (NC) grade.

STAT 240. Nonparametric Methods (4)

STAT 251. Statistics Colloquium (1)
Colloquium, 1.5 hours. Prerequisite(s): consent of instructor. Presentation of current research in statistics by faculty, advanced graduate students, and guest lecturers. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

STAT 255 (E-2). Seminar on Topics in Applied Statistics (3-4)
Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): graduate standing. Additional prerequisites are required for some segments of this course; see department. Discussions and lectures by graduate students and faculty on topics related to student and faculty research. In some courses students will receive letter grades only. In others, students may receive either a letter grade or Satisfactory (S) or No Credit (NC) grade; no petition is required, but students must see instructor for grading basis. The department will maintain a listing of all 255 segments and their unit value and grading basis. Normally graded Satisfactory (S) or No Credit (NC), but students may petition the instructor for a letter grade on the basis of assigned extra work or examination.

STAT 288. Literature Seminar (1)
Seminar, 1 hour. Students will make oral presentations summarizing important research papers in the statistics literature. All graduate students are encouraged to participate. Topics may vary each term. Graded Satisfactory (S) or No Credit (NC).

STAT 290. Directed Studies (1-6)
Prerequisite(s): graduate standing and consent of instructor. Individual studies on specially selected topics in statistical applications. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

STAT 291. Individual Studies in Coordinated Areas (1-6)
Outside study. Research, 3-12 hours. Prerequisite(s): consent of instructor and concurrent enrollment in 100-series course. To be taken on an individual basis. Student will complete a graduate paper related to the 100-series course. Graded Satisfactory (S) or No Credit (NC). May be repeated for credit.

STAT 292. Directed Research (1-6)
Prerequisite(s): graduate standing and consent of instructor. Directed research in applications of statistics in biological studies, including computer simulation. Graded Satisfactory (S) or No Credit (NC).

STAT 299. Research for Thesis or Dissertation (1-12)
Prerequisite(s): graduate standing and consent of instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Course

STAT 302. College Teaching Practicum (1-4)
Practicum, 3-12 hours. Prerequisite(s): graduate standing and consent of instructor. Required of all teaching assistants in the department. Credit not applicable to graduate unit requirements. Supervised teaching in college level classes under the supervision of the course instructor. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Theatre

Subject abbreviation: THEA
College of Humanities, Arts, and Social Sciences

D. Eric Barr, M.F.A., Chair
Department Office, 121 Arts
(951) 827-3343; theatre.ucr.edu

Professors
D. Eric Barr, M.F.A.
Richard Hornby, Ph.D.

Professor Emeritus
Richard D. Risso, Ph.D.

Associate Professors
Rickerby Hinds, M.F.A.
Robin Russin, M.F.A.

Assistant Professors
Charles Evered, M.F.A.
Erith Jaffe-Berg, Ph.D.
Stuart Krieger, B.A.
Haibo Yu, M.F.A.

Lecturers
Bonnie Cherrie, M.F.A.
Glen Dunzweiler, M.F.A.
Marc L. Longlois, M.F.A.

Major

The Department of Theatre offers a B.A. in Theatre. The major focuses on three broad areas of theatre — its literature, history, and criticism; performance, design, direction, and technology; and the elements of production. Students have the opportunity to write, perform, direct, and design. Four stages are available for rehearsals and performances: the 500-seat proscenium University Theatre, the new 150-seat Studio Theatre in the Arts building with state-of-the-moment equipment for facilities, the 120-seat Rehearsal Lab, and the 50-seat Barn Theatre.

Students are able to practice acting in faculty-directed shows, student productions, and class presentations. Special projects and studies are offered for advanced students to produce an original work or to study in more depth acting.
The Theatre Department encourages students to participate in the Education Abroad Program (EAP). Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Graduate Program

The Department of Theatre in conjunction with the Department of Creative Writing offers the M.F.A. degree in Creative Writing and Writing for the Performing Arts. See this section in the catalog.

Lower-Division Courses

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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
<th>Description</th>
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<tbody>
<tr>
<td>THEA 100</td>
<td>Introduction to Acting</td>
<td>4</td>
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THEA 070. Living Theatre (4) Lecture, 3 hours; discussion, 1 hour. The art of theatre through an introductory study of its component arts: dramatic, literary, acting, directing, and mise en scene and their historical development. Lectures, demonstrations, special projects.

Upper-Division Courses

THEA 100. Play Analysis (4) Lecture, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. Close analysis of selected plays: structure, character, imagery.

THEA 101. Introduction to Design (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A comprehensive introduction to design for theatre, film, and television. Topics include design principles and practice of set, costume, and lighting; the history of design; and conceptual approaches and research.

THEA 102. Production Techniques for Theatre, Film, and Television (4) Lecture, 3 hours; laboratory, 5 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of technical production practices, equipment, and architecture for theatre, film, and television design. The laboratory explores the application of production practices and principles of stagework in the fabrication of scene, costume, lighting, and sound design.

THEA 109. Acting: The Process (4) Lecture, 3 hours; studio, 4 hours. Prerequisite(s): THEA 109 or consent of instructor. A study of the acting fundamentals. Topics include concentration, motivation, and the psychophysical development of the actor's instrument. Explores basic approaches to characterization through monologues and introductory scene study.

THEA 110A. Acting: Fundamentals (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): THEA 109 or consent of instructor. A study of the acting fundamentals. Topics include concentration, motivation, and the psychophysical development of the actor's instrument. Explores basic approaches to characterization through monologues and introductory scene study.

THEA 110B. Acting: Techniques (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): THEA 110A or consent of instructor. An examination of acting techniques with an emphasis on the American Method. Topics include actions, objectives, and characterization. Includes analysis and performance of scenes from modern and contemporary drama.

THEA 111A. Acting: Styles (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): THEA 110A, THEA 110B, consent of instructor. Advanced scene study in classic and modern theatrical repertory. Examines works by Chekhov. Topics include performance styles and working with the text to emphasize environment, actions, and intentions.

THEA 111B. Acting: Styles (4) Lecture, 2 hours; studio, 4 hours. Prerequisite(s): THEA 111A, consent of instructor. Advanced scene study in English and European theatre to expand the actor's emotional range and character range. Emphasis is on works by Chekhov. Topics include performance styles and working with the text to emphasize environment, actions, and intentions.

THEA 112 (E-Z). Voice for Actors (4) Lecture, 2 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): upper-division standing or consent of instructor. Study in voice, vocal performance techniques, and theories for actors.

THEA 113 (E-Z). Movement for Actors and Performers (4) Lecture, 2 hours; workshop, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of movement techniques and theories for actors and performers. F. Stage Combat; M. Mime; N. Nonverbal Theatre.

THEA 115. Hip Hop Theatre (4) Lecture, 2 hours; workshop, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Provides students with tools to create new work by using elements of hip hop culture such as Graffiti Art, Emceein' (rappin'), Deejayin' and Breakdancin' as primary means of storytelling on stage. Exposes students to theoretical aspects of hip hop culture and a working knowledge of playwriting, acting, directing, and design.

THEA 120A. Literature and History of the Theatre: The Classical Period through the Italian Renaissance (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the literature and history of the theatre from the classical period through the Italian Renaissance. Focuses on analysis of representative plays, theatrical architecture, and production modes.

THEA 120B. Literature and History of the Theatre: The Elizabethan Period through the Nineteenth Century (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the literature and history of the theatre from the Elizabethan period through the nineteenth century. Focuses on analysis of representative plays, theatrical architecture, and production modes.

THEA 120C. Literature and History of the Modern and Contemporary Theatre (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the literature and history of the modern and contemporary theatre. Focuses on analysis of representative plays, theatrical architecture, and production modes.

THEA 121. World of the Play (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A study of a significant play in the context of the social, intellectual, and artistic movements of its time. Offered simultaneously with the Theatre Department's production of the play. May also consider related works and writings. Course is repeatable.

THEA 122. Theatre for Social Change (4) Lecture, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines theatre for social change, as created by grassroots theatrical organizations. Focus is on how community-based theatre groups develop works and how theatre in public or private spaces redefines traditional theatre practices.

THEA 124A. American Theatre, 1900-1945 (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examination of the major American playwrights, theatrical figures, and movements from 1900 through World War II.

THEA 124B. American Theatre, 1945-Present (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examination of the major American playwrights, theatrical figures, and movements from World War II to the present.

THEA 125 (E-Z). History of the Theatre (4) Lecture, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the plays, playhouses, and players of the following theatrical eras: E. Classical Theatre; F. Medieval Theatre; G. Renaissance Theatre; I. Romantic Theatre; J. Realistic Theatre; K. Contemporary Theatre; M. American Theatre; N. Neo-Classic Theatre; S. American Musical Theatre; T. Asian Theatre; W. American Theatre and Drama of the Great Depression; X. Experimental Theatre in America. Segments are repeatable.

THEA 126A. History of Dress (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A study of the psychological, sociological, and economic history of fashion and dress from 4000 B.C. to A.D. 1700.

THEA 126B. History of Dress (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. A study of the psychological, sociological, and economic history of fashion and dress from A.D. 1700 to the present.

THEA 127. Theories of the Modern Theatre (4) Lecture, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the major theories underlying twentieth-century theatre practice. Special attention is paid to the ideas of important theatre artists such as Konstantin Stanislavsky, E. Gordon Craig, Antonin Artaud, and Bertolt Brecht.

THEA 131. Sound Design for the Theatre (4) Lecture, 2 hours; workshop, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces sound design for theatre productions. Covers topics such as critical listening, psycho-acoustics, computer editing, sound recording and processing, and copyright laws pertaining to sampling.

THEA 132. Lighting Design for Theatre, Film, and Television (4) Lecture, 3 hours; laboratory, 4 hours. Prerequisite(s): THEA 102 or consent of instructor. A survey of lighting design for theatre, film, and television. Students view and discuss examples of lighting design and participate in class projects. Develops skills associated with the creation and execution of a lighting design.

THEA 133. Design for Theatre, Film, and Television (4) Lecture, 4 hours. Prerequisite(s): THEA 101. An introduction to basic skills and techniques for theatre design and to issues of contemporary design for theatre, film, and television. Focus is on creative thinking, rendering, drafting, and model making.

THEA 135. Costume Design for Theatre (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): THEA 101. A study of theory, principles, and practice of costume design for theatre.

THEA 138. Art Direction for Film and Television (4) Lecture, 3 hours; individual study, 1.5 hours; screening, 1.5 hours. Prerequisite(s): THEA 101 or consent of instructor. An introduction to the design principles and methods professional art directors use in the entertainment industry. Projects related to feature film and television design explore current methods of presentation and composition in the film and television camera.

THEA 141. Drafting and Rendering for Theatre, Film, and Television (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): THEA 102 or consent of instructor. A study of basic drafting and drawing skills. Topics include drafting conventions, graphic skills, black and white drawing, color rendering, and story boarding.

THEA 142. Costume Construction (4) Lecture, 2 hours; laboratory, 6 hours. Prerequisite(s): upper-division standing or consent of instructor. A theoretical and practical study of theatrical costume production. Topics include draping and flat pattern development, fabric, fitting, and sewing techniques. Costume projects are required. Sewing skills are helpful but not essential.
THEA 143. Scene Painting (4) Discussion, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the skills needed to translate scaled painter’s elevations to full-size, two-dimensional and three-dimensional scenic elements. Covers fundamental paint application techniques such as wet blending, glazing, dry brushing, lining, and spattering. Includes a review of paints and materials commonly used in theatre, film, and television.

THEA 144. Makeup for Theatre, Film, and Television (4) Discussion, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. A study of the theory and practice of makeup for theatre, film, and television. Students complete advanced projects and a makeup research notebook. Includes demonstrations by industry professionals.

THEA 145. Computer-Aided Design (CAD) for Theatre, Film, and Television (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): THEA 102 or consent of instructor. Explores the established computer-aided design (CAD) applications in the design industry: 3RD Studio Max, Adobe Photoshop, and Vectorworks.

THEA 150A. Directing (4) Lecture, 4 hours. Prerequisite(s): THEA 110A, THEA 110B, or consent of instructor. A comprehensive introduction to directing for the stage. Topics include working with actors, articulation of stage space, and theories of directing.

THEA 150B. Directing (4) Lecture, 4 hours. Prerequisite(s): THEA 150A or consent of instructor. An examination of the rehearsal process with a focus on combining the elements of text, acting, and design.

THEA 155. Introduction to Film Production (4) Lecture, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces the skills needed for making a narrative film. Students examine and work with scripts, cameras, lighting, sound, and editing. Includes filmmaking projects.

THEA 161. African American Drama (4) Lecture, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the major African American plays and playwrights from the 1800s to the present.

THEA 164A. Beginning Playwriting (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): THEA 100 or CRWT 056 or consent of instructor. Seminar in the practice of playwriting centering on the construction of a plot. Cross-listed with CRWT 164A.

THEA 164B. Intermediate Playwriting (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): CRWT 164A/ THEA 164A. Seminar in the practice of playwriting. Revisions of works in progress with emphasis on character development and techniques for writing dialogue. Cross-listed with CRWT 164B.

THEA 164C. Advanced Playwriting (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): CRWT 164B/ THEA 164B. Seminar in the practice of playwriting. Playwrights’ participation in staged readings of their work. With consent of instructor, course is repeatable to a maximum of 8 units. Cross-listed with CRWT 164C.

THEA 165A. Plays in Production (4) Workshop, 8 hours. Prerequisite(s): CRWT 164A/ THEA 164A or CRWT 166A/MCS 166A/ THEA 166A or consent of instructor. Development and production of half-hour or one-hour plays written specifically for stage, soundstage, radio, television, or Web-based broadcasting. Students learn the basics of sound and video production to enhance their writing and rewriting process. Course is repeatable to a maximum of 8 units. Cross-listed with CRWT 167A.

THEA 165B. Plays in Production (4) Workshop, 8 hours. Prerequisite(s): CRWT 167A/ THEA 165A or consent of instructor. Advanced production and post-production of half-hour and one-hour drama (including comedy) for radio, video, or webcasting. Post-production of previously taped shows. Course is repeatable to a maximum of 8 units. Cross-listed with CRWT 167B.

THEA 166A. Screenwriting: Introduction (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 056 or consent of instructor. Explores the fundamentals of screenwriting. Includes story development, plotting, and characterization as they are used in creating a complete script for television or feature film. Cross-listed with CRWT 166A and MCS 166A.

THEA 166B. Screenwriting: Outline to First Draft (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 166A/MCS 166A/ THEA 166A or consent of instructor. Explores the fundamentals of screenwriting. Includes story development, plotting, and characterization as they are used in creating a complete script for television or feature film. Course is repeatable. Cross-listed with CRWT 166B and MCS 166B.

THEA 166C. Screenwriting: Rewrites and Writing for Television (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 166B/MCS 166B/ THEA 166B or consent of instructor. Explores the fundamentals of screenwriting. Includes story development, plotting, and characterization as they are used in creating a complete script for television or feature film. Course is repeatable. Cross-listed with CRWT 166C and MCS 166C.

THEA 167. Writing for Television: Creating the One-Hour Series Drama (4) Seminar, 3 hours; written work, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces the craft of writing for television with the primary focus on production of original work. Students write a one-hour pilot, create series guidelines, and formulate work leading to a 13-episode series. Course is repeatable to a maximum of 12 units.

THEA 168. Writing for the Family Audience (4) Lecture, 2 hours; discussion, 2 hours. Prerequisite(s): CRWT 166C/MCS 166C/ THEA 166C. An introduction to the demands and challenges of writing film and television projects designed for the family audience.

THEA 169. Rewriting the Script (4) Workshop, 4 hours. Prerequisite(s): CRWT 166C/ THEA 166C or CRWT 166C/MCS 166C/ THEA 166C. Consent of instructor is required for students repeating the course. Covers rewriting a full-length script (screenplay or play). Course is repeatable to a maximum of 8 units. Credit is awarded for only one of THEA 169 or THEA 269.

THEA 170. Advanced Dramatic Production (1-4) Studio, 5-20 hours. Prerequisite(s): consent of instructor; demonstrated ability in dramatic production. Advanced assignments in dramatic production, performance, and stage management. Course is repeatable.

THEA 176. Performing Arts of Asia (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A survey of music, dance, theater, and ritual in four major geocultural regions of Asia: Central, East, South, and Southeast. No Western music training is required. Course is repeatable to a maximum of 8 units. Cross-listed with ANTH 129, AST 129, DNGE 129, and MUS 129.

THEA 180 (E-Z). Theatre Practicum (4) Discussion, 4 hours. Prerequisite(s): upper-division standing or consent of instructor. An investigation of theatrical production theories and practices. E. Contemporary Mexican Theatre; L. Musical Comedy; M. Arts Management; Q. Plays in Progress; R. New Plays; S. Improvisation.

THEA 190. Special Studies (1-5) Prerequisite(s): consent of the chair of the department. Course is repeatable to a maximum of 20 units.

THEA 191 (E-Z). Seminar in Theatre (4) Seminar, 3 hours; discussion, 1 hour. Prerequisite(s): consent of instructor. Explores various topics on a rotating basis. Includes playwriting, acting, directing, scenic design, theatre history, and dramatic literature. J. Staging the Middle East; M. American Frontier in American Drama; N. Theatre of Eugene O’Neill; S. Script to Production; W. Women in Theatre: Theory and Performance.

THEA 195. Senior Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): senior standing; consent of Department Chair. Open by invitation only. Presentation of a significant piece of creative work with faculty supervision. Course is repeatable to a maximum of 8 units.

THEA 198-I. Individual Internship in Theatre (1-12) Internship, 2-24 hours; reading and written work, 1-12 hours. Prerequisite(s): upper-division standing; consent of instructor. An internship in a theatre, television, or film production company. The student works with directors or designers in one or more areas of professional production, such as acting, design, costumes, lighting, and sound. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 16 units.

THEA 199. Senior Research (1-4) Prerequisite(s): consent of chair of the department. Open to seniors by invitation only. Research in the practice and/or theory of the theatre.

Graduate Courses

THEA 200. Advanced Play Analysis (4) Seminar, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Analysis of dramatic structure from a sophisticated perspective. Covers strategies for dealing with openness, ambiguity, and metaphor. Also discusses tied versus gratuitous elements, archetypes, motifs, and symbolism.

THEA 201. The Writer's Life: Literary Strategies and Structures (4) Seminar, 3 hours; extra reading, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Explores the artistic, practical, and professional aspects of life as a working novelist, poet, playwright, screenwriter, or essayist. Topics include publishing, literary journals, commercial magazines, the film industry, the theatre industry, agents, and overview of genre and art. Cross-listed with CRWT 201.

THEA 210. Literature and Improvisation: The Intersection of Culture and Performance (4) Lecture, 3 hours; studio, 3 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the literary and performative tools needed to construct original, language-based plays. Combines improvisational performance with storytelling to challenge students to develop and explore the connectivity between cultural history, oral tradition passed on through personal narratives, and public discourse.

THEA 227. Theories of the Modern Theatre (4) Seminar, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Examines the major theories underlying twentieth-century theatre practice.
Emphasis is on the wide range of styles in modern theatre, including realism, symbolism, expressionism, surrealism, absurdism, Epic Theatre, and Theatre of Cruelty.

THEA 252 (E-Z). Theory and Craft of Writing (4) Seminar, 3 hours; outside research, 2 hours; extra reading, 1-2 hours. Prerequisite(s): graduate standing. Analyzes writing techniques, structures, and approaches to craft in traditional, contemporary, and avant garde literary works. F. Fiction; F. Poetry; G. Nonfiction; I. Playwriting; J. Screenwriting; K. First Person. Cross-listed with CRWT 252 (E-Z).

THEA 264. Playwriting (4) Workshop, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Intensive formal study of playwriting with emphasis on plot, character, theme, dialogue, and style. Course is repeatable.

THEA 265A. Four Forms (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): graduate standing. Explores similarities and differences of three kinds of creative writing: fiction, playwriting, and screenwriting. Students participate in live stagings and video shoots, translating stories from one form to another to highlight the unique qualities of each form as well as areas of commonality. Course is repeatable.

THEA 265B. Four Forms (4) Workshop, 3 hours; outside research, 3 hours. Prerequisite(s): THEA 265A; graduate standing. Students adapt a one-act play into a screenplay not longer than 15 pages. Demonstrates how to develop work dependent on dialogue into work dependent on visuals and action. Students shoot, edit, and screen their short films. Course is repeatable.

THEA 266. Screenwriting (4) Workshop, 3 hours; screening, 2 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Students outline and complete the first draft of a feature-length screenplay and complete a short paper comparing two movies in the same genre. Course is repeatable.

THEA 267. Writing for Television (4) Workshop, 3 hours; consultation, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Provides intensive formal study of writing for television. Emphasizes creating guidelines for a one-hour pilot and a 13-episode series. Course is repeatable to a maximum of 24 units.

THEA 269. Rewriting the Script (4) Workshop, 4 hours. Prerequisite(s): THEA 264 or THEA 266 or consent of instructor; consent of instructor is required for students repeating the course. Addresses the processes involved in rewriting a full-length script (screenplay or play). Course is repeatable to a maximum of 8 units. Credit is awarded for only one of THEA 169 or THEA 269.

THEA 280. Writers’ Colloquium (1) Colloquium, 1 hour. Prerequisite(s): graduate standing. Colloquia featuring writers in fiction, nonfiction, poetry, playwriting, and screenwriting. Students who present a seminar receive a letter grade; other students receive a Satisfactory (S) or No Credit (NC) grade. Course is repeatable to a maximum of 6 units. Cross-listed with CRWT 280.

THEA 281. Oscar Wilde and Late Victorian Theatre (4) Seminar, 4 hours. Prerequisite(s): graduate standing or consent of instructor. Oscar Wilde (1854-1900), an Irish, feminist, aesthete, socialist, homosexual Victorian author, becomes a focus for the study of late Victorian theatre and culture. Readings are of Wilde’s plays and nondramatic writings and plays by related playwrights such as Ibsen and Shaw.

THEA 282. Film Noir: Stories and Cinema from the Shadows (4) Seminar, 3 hours; screening, 2 hours; outside research, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Examines the genre of fiction and cinema known as “film noir.” Looks at films, writing, and art to understand how “film noir” reshapes the way America looks at itself. Each week examines a different aspect of the genre, combining readings and films to understand its roots and rules.

THEA 283. Shakespeare and Film (4) Seminar, 3 hours; screening, 2 hours; outside research, 1 hour. Prerequisite(s): graduate standing or consent of instructor. Examines the influence Shakespeare exerted on film, from faithful adaptations to broad reinventions. Compares Shakespeare in his period and ours, the wide range of movies that have taken from Shakespeare for inspiration, and how modern filmmakers deal with issues of language and structure.

THEA 290. Directed Studies (1-6) Outside research, 3-18 hours. Literature studies, directed by a faculty member, on special topics. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

THEA 292. Concurrent Analytical Studies in Theatre (1-4) Outside research, 3-12 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Taken concurrently with a 100-series course but on an individual basis. Devoted to research, criticism, and written work related to the 100-series course. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

THEA 299. Research for Thesis (1-12) Thesis, 3-36 hours. Prerequisite(s): consent of thesis director. Research for and preparation of the thesis. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

Professional Courses

THEA 301. Directed Studies in the Teaching of Theatre and Writing for the Performing Arts (1-4) Discussion, 1-4 hours. Prerequisite(s): graduate standing. Prepares students for teaching introductory undergraduate creative writing and theatre courses by offering a flexible curriculum of meetings and conferences on effective pedagogical methodology. Required of all teaching assistants for at least one quarter. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

THEA 302. Teaching Practicum (1-4) Practicum, 2-8 hours; consultation, 1-4 hours. Prerequisite(s): graduate standing. Supervised teaching in undergraduate Theatre courses. Credit is not applicable to graduate unit requirements. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

UC Riverside
Washington Academic Internship Program (UCDC)

Office of Undergraduate Education
321 Surge; uccd.ucr.edu

The UCR Washington Academic Internship Program provides undergraduate students with a multi-dimensional educational experience in Washington, D.C. Students undertake academic pursuits as well as cultural and social activities. The program combines course work with field research and internship experience. Students also have the opportunity to tour local sites and dialogue with distinguished professionals in the Speaker Series. For more information see UCR Washington Academic Internship Program in the front of this catalog.

Upper-Division Courses

ENGR 191W. Seminar in Writing, Washington, D.C. (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Washington Center Program. Examines aspects of the Washington, D.C., area, including cultural, political, and governmental institutions as well as the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Washington, D.C. Required of participants in the UCR Washington, D.C., Center Program. Cross-listed with HASS 191W and NASC 191W.

HASS 191W. Seminar in Washington, D.C. (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Washington Center Program. Examines aspects of the Washington, D.C., area, including cultural, political, and governmental institutions as well as the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Washington, D.C. Required of participants in the UCR Washington, D.C., Center Program. Cross-listed with ENGR 191W and NASC 191W.

NASC 191W. Seminar in Washington, D.C. (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor; admission to the UCR Washington Center Program. Examines aspects of the Washington, D.C., area, including cultural, political, and governmental institutions as well as the sciences, arts, and media. Requires a substantial research paper or project, the result of guided independent work drawing on the unique aspects of Washington, D.C. Required of participants in the UCR Washington, D.C., Center Program. Cross-listed with ENGR 191W and HASS 191W.
University Honors Program

Subject abbreviation: HNPG
College of Humanities, Arts, and Social Sciences

Christopher Chase-Dunn, Ph.D., Director
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Steven Axelrod, Ph.D. (English)
Timothy Close, Ph.D. (Botany and Plant Sciences)
Robin DiMatteo, Ph.D. (Psychology)
Bradley Hyman, Ph.D. (Biology)
Qing Jiang, Ph.D. (Mechanical Engineering)
Maurya Simon, Ph.D. (Creative Writing)
Deborah Wong, Ph.D. (English)

Outstanding students from all disciplines and majors can participate in the University Honors Program (UHP). The UHP lower-division curriculum provides special seminars, projects, and other courses designed to introduce honors students to the rewards of scholarship and research. First-year courses encourage innovative approaches to introductory courses and provide an avenue for faculty to present courses that concentrate on their research interests. UHP seminars expose students to methods of conceptualizing issues and framing questions that characterize disciplines. These seminars help prepare students for the independent research that upper-division honors demands. In the junior and senior years, each student in the UHP selects a topic for an honors project or thesis and pursues this topic under the supervision of an individual faculty member. The thesis or project is submitted by the end of the senior year. In both the upper division and lower division, the UHP challenges honors students to take an active role in shaping their education.

The program offers a variety of extracurricular and service learning activities. The UHP offers staff support for honors students, including support for fellowship applications, internships, application to graduate schools, and summer enrichment programs. A reading room, seminar room, and lounge and work space with computer facilities are available to honors students.

Lower-Division Courses

Admission to lower-division honors is based on an application, high school grades, and aptitude and achievement test scores. Students take honors courses and participate in workshops, personal growth, and community service activities.

Sophomore Applied Learning Component
The goal of the UHP is to challenge the many gifted students who enroll at UCR and at the same time to fully integrate them into the life of the campus. We have designed outstanding programming for first-year students through our Lower-Division Component, and we have excellent student-faculty research opportunities for juniors and seniors participating in Upper-Division Honors. But sophomores sometimes get caught in the transition. The UHP Sophomore Applied Learning Component was created for students to make more productive use of that transitional year. Interested students must apply to the program and meet the minimum GPA and units earned by the end of the freshman year at UCR. For details, visit honors.ucr.edu.

Upper-Division Honors
The upper-division UHP provides the student with the framework to produce a thesis or project, a substantial, independent product of scholarship, research, or creative activity. This structure is adaptable to almost any major and allows each student the flexibility to work with a faculty advisor to shape a research program to meet the ambitions of the project.

Continuing UCR students with an excellent academic record may apply or be nominated to participate in upper-division honors whether or not they completed lower-division honors. Students who transfer to UCR as juniors with excellent academic records may also apply or be nominated to the upper-division UHP.

During the junior year, students narrow their research focus, select a faculty supervisor, and prepare to undertake the honors project. The UHP provides support in all phases of this planning. The honors project is usually undertaken in the first two quarters of the senior year and is completed well before graduation.

The completed thesis is submitted to the faculty advisor and to a second faculty reader for approval. The approved thesis, a cumulative GPA of 3.4 in the major, and an upper-division GPA of at least 3.50 qualify the student for graduation with upper-division honors. The honors designation appears on the official transcript.

Education Abroad Program
The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Lower-Division Courses

ANTH 001H. Honors Cultural Anthropology (4) Description under Anthropology.
CHEM 01HA, CHEM 01HB, CHEM 01HC. Honors General Chemistry (4, 4, 4) Description under Chemistry.
CHEM 097H. Freshman Honors Project: Introduction to Research (1-4) Description under Chemistry.
CHEM 122H. Freshman Honors Project: Organic Chemistry (4) Description under Chemistry.
CHEM 123H. Honors Discussion for Organic Chemistry (4) Description under Chemistry.
CHEM 124H. Honors Discussion for Organic Chemistry (4) Description under Chemistry.
CRWT 097H. Freshman Honors Project: Poetry (4) Description under Creative Writing.
ECON 002H. Honors Introduction to Macroeconomics (4) Description under Economics.
ENSC 001H. Honors Natural Resources and the Environment (4) Description under Environmental Sciences.
ENSC 002H. Honors Environmental Quality (4) Description under Environmental Sciences.
ENSC 003H. Honors Contemporary Issues in the Environmental Sciences (4) Description under Environmental Science.
ETST 001H. Honors Introduction to the Study of Race and Ethnicity (4) Description under Ethnic Studies.
ETST 007H. Honors Introduction to Native American Studies in Comparative Perspective (4) Description under Ethnic Studies.
HIST 010H. Honors World History: Prehistory to 1500 (4) Description under History.
HIST 015H. Honors World History: 1500 to 1900 (4) Description under History.
HIST 020H. Honors World History: Twentieth Century (4) Description under History.
MATH 09HA, MATH 09HB, MATH 09HC. First Year Honors Calculus (4, 4, 4) Description under Mathematics.
PHIL 001H. Honors Introduction to Philosophy (4) Description under Philosophy.
PHIL 007H. Honors Introduction to Critical Thinking (4) Description under Philosophy.
PHIL 008H. Honors Introduction to Logic (4) Description under Philosophy.
RLST 005H. Honors Introduction to Asian Religions (4) Description under Religious Studies.
RLST 015H. Honors Death (4) Description under Religious Studies.
WMST 030H. Violence Against Women (4) Description under Women’s Studies.

Upper-Division Courses

AH 195H. Senior Honors Thesis. (1-4) Description under Art History.
BUS 199H. Senior Honors Research. (4) Description under Business Administration.
HIST 199H. Senior Honors Research. (1-5) Description under History.
HNPG 008. Ethics and College Student Life (2) Lecture, 1 hour; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Designed to help students think through typical ethical problems of college life and learn the art of moral reasoning and dialogue, which can then be applied to other situations. Students review case studies and explore selected themes central to the college experience nationwide. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 010. First-Year Colloquium (1) Colloquium, 1 hour. Prerequisite(s): open only to students in the University Honors Program who are freshmen or first-year transfer students. Introduces students to academic research conducted by UCR faculty. Presentations are multidisciplinary and cover the sciences, humanities, and social sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 2 units.

HNPG 012. Global Health, Agriculture, and Economic Development (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): admission to the University Honors Program or consent of instructor. Focuses on human health and agriculture in developing countries and their relationship to global poverty, economic development, and technology. Emphasizes developing solutions using an interdisciplinary focus. Provides potential leadership skills in addressing worldwide poverty. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 020. The Nature of Academic Research (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): sophomore standing in the University Honors Program or consent of instructor. Presentations by faculty from a cross section of campus disciplines on the nature of research in their disciplines and their own current projects. Presentations are followed by discussions with students. Students work on group projects comparing how research on a selected issue is approached by two related disciplines. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 023 (E-Z). Honors Seminar in Mathematics, Statistics, and Computer Science (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the Physical Sciences. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 025 (E-Z). Honors Seminar in Physical Sciences (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the Physical Sciences. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 031 (E-Z). Honors Seminar in the Fine Arts (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the Fine Arts. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 033 (E-Z). Honors Seminar in Humanities (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the Humanities. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 034 (E-Z). Honors Seminar in Religious Studies (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of religious studies. Topics and instructors vary and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 036 (E-Z). Honors Seminar in History (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of history. Topics and instructors vary and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 037 (E-Z). Honors Seminar in Literature (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of literature. Topics and instructors vary and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 038 (E-Z). Honors Seminar in Philosophy (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of philosophy. Topics and instructors vary and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 041 (E-Z). Honors Seminar in Economics and Political Science (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the following areas: Economics and Political Science. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 042 (E-Z). Honors Seminar in Anthropology, Psychology, and Sociology (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the following areas: Anthropology, Psychology, and Sociology. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 043 (E-Z). Honors Seminar in Social Sciences (4) Seminar, 3 hours; assignment of remaining hours varies from segment to segment. Prerequisite(s): admission to the University Honors Program or consent of instructor. Additional prerequisites may be required for segments of this course; see the University Honors Program. Introduces research and methods at the frontiers of one or more of the Social Sciences. Topics and instructors vary from year to year and are chosen by the Honors Program Executive Committee in consultation with departments. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 096A. Foundations of Leadership: Leadership Success Strategies (4) Seminar, 3 hours; term paper, 2 hours; written work, 2 hours. Prerequisite(s): admission to the University Honors Program (UHP) or consent of instructor; consent of the Director of the UHP. An introduction to leadership theory, ideology, language, and skills development. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 096B. Ethical Leadership in Practice: Philosophy of Leadership (4) Seminar, 3 hours; term paper, 2 hours; extra reading, 2 hours. Prerequisite(s): admission to the University Honors Program (UHP) or consent of instructor; consent of the Director of the UHP. HNPG 096A. An introduction to the nature, styles, skills, and concepts of ethical leadership that utilizes historic and contemporary models and emphasizes moral roots of responsible leadership. Examines an array of leadership styles and ethical considerations.
for leaders. Students apply what they are learning through campus and community involvement. Satisfactory (S) or No Credit (NC) grading is not available.

HNPG 096C. Mentors in Action: Student Leadership and Communities (4) Seminar, 3 hours; extra reading, 2 hours; practicum, 6 hours. Prerequisite(s): admission to the University Honors Program (UHP) or consent of instructor; consent of the Director of the UHP; HNPG 096A. Provides leadership experiences and the opportunity to develop leadership skills through the planning and implementing of student activities and services. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 8 units.

HNPG 097. Honors Lower-Division Research (2-4) Consultation, 1-4 hours; outside research, 2-4 hours; term paper, 2-4 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor; consent of the University Honors Program. Independent research or projects completed in consultation with a faculty member. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 4 units.

### Upper-Division Courses

**HNPG 195H. Senior Honors Thesis (1-4) Thesis, 3-12 hours. Prerequisite(s): admission to the University Honors Program; senior standing. Students complete research and write and present a senior honors thesis under the guidance of a faculty member of the University Honors Program. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 12 units.**

**HNPG 197H. Honors Research for Undergraduates (1-4) Outside research, 3-6 hours; individual study, 3-6 hours. Prerequisite(s): admission to the University Honors Program or consent of instructor; upper-division standing. An introduction to research under the supervision of University Honors Program faculty. Requires a research project. Satisfactory (S) or No Credit (NC) grading is not available. Course is repeatable to a maximum of 12 units.**

### Urban Studies Minor

**Subject abbreviation: URST**

**College of Humanities, Arts, and Social Sciences**

Mason Gaffney, Ph.D., Chair
Office, 4128 Sproul
(951) 827-3266; urbanstudies.ucr.edu

**Committee in Charge**

Richard Arnott, Ph.D. (Economics)
Gary Dymksi, Ph.D. (Economics)
John Gamir, Ph.D. (English)
Patricia Morton, Ph.D. (Art History)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Urban Studies minor is an adaptation of a well-developed interdisciplinary focus on urban concepts, issues, and problems in order to offer the chance for increased understanding of urban processes. The minor also provides preparation leading to increased employment opportunities at the municipal, state, or federal level, or to graduate work in one of several areas related to urban studies.

Requirements for the minor (24 units)

1. URST 010/SOC 010
2. URST 143/SOC 143
3. URST 146/ECON 146
4. URST 172/POSIP 172
5. URST 182/SOC 182
6. URST 184/AHS 184

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

### Lower-Division Courses

**URST 010. The City: An Introduction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): none. An introductory exploration of urban processes. Subjects examined include definition, form, structure and growth of urban regions as seen from the viewpoints of various disciplines. Cross-listed with SOC 010.**

**URST 014. Popular Musics of the World (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to issues surrounding popular and urban musics of the world, focusing on three major geographical areas: Africa, Asia, and the Americas. Emphasizes the relationship between mass-mediated music and issues of cultural hegemony, resistance, and subversion. Analyzes the cultural impact of media technology on music performance and reception. Cross-listed with ETST 014 and MUS 014.**

**URST 021. Introduction to Architecture and Urbanism (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. An introductory look at the built environment including buildings, gardens, and cities, examined in terms of historical, cultural, social, technological, and political factors. Emphasis is on examples from Southern California. Cross-listed with AHS 021.**

### Upper-Division Courses

**URST 143. Urban Sociology (5) Lecture, 3 hours; extra reading, 3 hours; field, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or consent of instructor. A comparative examination of metropolitan and other urban communities, with an emphasis on processes of urbanization. Cross-listed with SOC 143.**

**URST 146. Urban Economic Problems (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 102A. The application of economic principles to the major problems of the modern urban community, such as poverty, discrimination, deterioration of the environment, and housing problems. Programs for alleviation or solution. Cross-listed with ECON 146.**

**URST 172. Urban Politics and Policies (4) Lecture, 3 hours; term paper and extra reading, 3 hours. Prerequisite(s): upper-division standing. POSIP 010 or POSIP 010H. A general analysis of urban politics in the United States. Topics include theories of urban politics, structure of political competition, leading political roles, and major policy problems. Cross-listed with POSIP 172.**

**URST 178. The Modern City (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the modern metropolis from the Industrial Revolution to the present. Explores the history and theory of modern urbanism through case studies of metropolitan areas with a rich urban culture, architecture, and morphological features. Investigates approaches to the problems of the large urban agglomeration in the context of social, political, and cultural conditions. Cross-listed with AHS 178.**

**URST 182. Urban Problems (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An interdisciplinary examination of selected urban problems such as civil disorders, transportation, housing, welfare, and planning. Cross-listed with SOC 182.**

**URST 184. Modern Architecture (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017C or AHS 021/URST 021 or upper-division standing or consent of instructor. Modern architecture and its sources from 1800. Cross-listed with AHS 184.**

**URST 185. Architectural Theory from Vitruvius to Venturi (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): AHS 017A or AHS 017B or AHS 017C or AHS 021/URST 021 or consent of instructor. History of architectural thought from Vitruvius to the present, with emphasis on the modern period. Surveys the major themes of architectural theory and investigates the relationship between ideas about architecture and architectural production. Cross-listed with AHS 185. Morton**

### Western American Studies Minor

**College of Humanities, Arts, and Social Sciences**

Clifford E. Trafzer, Ph.D., Chair
Office, 1303A Watkins Hall
(951) 827-5524
westernamericanstudies.ucr.edu

**Committee in Charge**

Edna Bonacich, Ph.D. (Sociology)
Piotr S. Gorecki, Ph.D. (History)
Ronald C. Topey, Ph.D. (History)
Stephen E. Cullenberg, Ph.D.
Dean, College of Humanities, Arts, and Social Sciences, ex officio

The Western American Studies minor is intended to provide the student with a basic understanding of the history and institutional development of the Western United States — the Great Plains, the Southwest, and California — including the geographical and cultural factors that have shaped their history.

Requirements for the Western American Studies minor are 20 units distributed as follows:

1. HISA 137, HISA 138
2. One course from each of the following groups:
   a) ETST 004/HIST 004, ETST 180/HISA 140, ETST 181/HISA 141, ETST 182/HISA 142, ETST 183/HISA 143

**Urban Studies / Western American Studies / 409**
b) ANTH 115E, ANTH 140F, ETST 110M

c) ETST 108-I, ETST 108L, ETST 110K

History majors are not allowed to count HISA 137 or HISA 138 toward both their major and a minor in Western American Studies. If HISA 137 or HISA 138 is counted toward the major, then for the minor and additional course from (a) and an additional course from (b) are required.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Women’s Studies

Subject abbreviation: WMST

College of Humanities, Arts, and Social Sciences

Alicia Arrizón, Ph.D., Chair
Department Office, 2033 CHASS INTN
(951) 827-6427; womensstudies.ucr.edu

Professors
Alicia Arrizón, Ph.D.
Christine Ward Gailey, Ph.D.
(William’s Studies/Anthropology)
Marguerite R. Waller, Ph.D. (Women’s Studies/Comparative Literature and Foreign Languages)

Associate Professor
Piya Chatterjee, Ph.D.

Assistant Professors
Amalia Cabezas, Ph.D.
Tracy Fisher, Ph.D.
Sherrine Hafez, Ph.D.
Tamara Ho, Ph.D.
Chikako Takeshita, Ph.D.
Jane Ward, Ph.D.

Assistant Professors
Amalia Cabezas, Ph.D.

Acting Assistant Professor
Caroline Tushabe, M.A.

Major

The Women’s Studies Department offers a coherent interdisciplinary curriculum with a major field of study in the areas of gender and sexuality. Each student is required to take a total of 12 courses.

At the upper-division level, the department provides concentrations in gender and cultural production, gender and families, sexualities and gender, and gender and work.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Humanities, Arts, and Social Sciences, Colleges and Programs section.

Major Requirements

The major requirements for the B.A. degree in Women’s Studies are as follows:

1. Lower-division requirements (three courses [at least 12 units])

a) WMST 001
b) Two of the following: WMST 010; WMST 020; WMST 030 or WMST 030H

2. Upper-division requirements (nine courses [at least 36 units])

a) WMST 100
b) At least two of the following: WMST 193, WMST 195, WMST 198-I

c) Six courses of electives chosen from the list below with the following distribution requirements:

(1) One course focusing on African American women, Asian American women, Chicanas/Latinas, or Native American women in the United States or on women from societies in Latin America, Asia, the Middle East, or Africa

(2) One course focusing on issues of sexuality, sexual orientation, sexual identification, or masculinity and femininity

(3) No more than one course from the following: WMST 190, WMST 193, WMST 195, or WMST 198-I

Elective Course Work

Upper-division Women’s Studies courses or courses in another department that are cross-listed with Women’s Studies.

Courses in other departments that are not cross-listed with Women’s Studies and are on the following “approved elective” list:

ENGL 122 (E-Z)/LGBS 122 (E-Z) (Literature and Sexualities)
ENGL 123A (Women and Literature: Poetry)
ENGL 123B (Women and Literature: Autobiography)
ENGL 124A (Female Novelistic Traditions: Eighteenth and Nineteenth Centuries)
ENGL 124B (Female Novelistic Traditions: Twentieth Century)
ENGL 128J (Austen)
ENGL 128N (George Eliot)
ENGL 128Q (Dickinson)
ENGL 128R (Woolf)
ENGL 143 (E-Z)/MCIS 143 (E-Z) (Gender, Sexuality, and Visual Cultures)
ENGL 143F/MCIS 143F (Film and Gender)
ETST 113/HISA 134 (African American Women)
ETST 114 (Contemporary Latina Writing in the U.S.)
ETST 122 (Family, Sex Roles, and the Chicano)
ETST 124 (The Chicana)
ETST 131 (Race, Class, and Gender)
HISE 148A (Women and Gender in Early Modern Europe, 1348-1800)

HISE 148B (Women and Gender in Europe, 1800-present)

ITAL 162 (Contemporary Italian Women Writers in Translation)
SOC 140 (The Sociology of Women)
SOC 141 (Men and Masculinity)
SOC 177E (Sex Roles)
SPN 111W (Women in Latin American Literature)

Minor

The minor in Women’s Studies consists of six courses (at least 24 units) distributed as follows:

1. Two courses from the following: WMST 001; WMST 010; WMST 020; WMST 030 or WMST 030H

2. WMST 100 or WMST 193

3. Three elective courses from the elective list above. In fulfilling this requirement, only one WMST 190 course is permitted, and that WMST 190 course must be for 4 units.

See Minors under the College of Humanities, Arts, and Social Sciences in the Colleges and Programs section of this catalog for additional information on minors.

Education Abroad Program

The EAP is an excellent opportunity to travel and learn more about another country and its culture while taking courses to earn units toward graduation. Students should plan study abroad well in advance to ensure that the courses taken fit with their overall program at UCR. Consult the departmental student affairs officer for assistance. For further details visit UCR’s International Education Center at internationalcenter.ucr.edu or call (951) 827-4113.

See Education Abroad Program under International Education Center in the Student Services section of this catalog. A list of participating countries is found under Education Abroad Program in the Programs and Courses section. Search for programs by specific areas at eap.ucop.edu/programwizard.

Lower-Division Courses

WMST 001. Gender and Sexuality (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Introduction to theories of sex and gender differences, the origins of patriarchy, and variations in sexual behavior and sexual norms. Fulfills the Social Sciences Requirement for the College of Humanities, Arts, and Social Sciences.

WMST 010. Women and Culture (5) Lecture, 3 hours; written work, 3 hours; individual study, 1 hour; outside research, 2 hours. Prerequisite(s): none. Topics include the roles of women in cultural creation and production; the relation of women artists to the societies of their time; and the images of women in the art and literature of the modern world. Themes and periods covered may vary. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

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Upper-Division Courses

WMST 100. Gender Theory (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. A cross-cultural, multidisciplinary course investigating the development of feminist theory and exploring the construction of gender and sexuality, with emphasis on the "feminine" and the "feminine" in a variety of cultural contexts. Fulfills the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 101. Women, Work, and Capitalism (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): WMST 001 or consent of instructor. Considers ways in which women's labor is key to the growth of transnational corporations. Examines how class, race, and gender identities impact, contest, and shape gender identities and relations. Analyzes patterns of women's work in the new international division of labor through case studies of export processing zones, reproductive labor, and sex tourism. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 103. Sexualities and Culture (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): WMST 001 or consent of instructor. Examines the field of sexuality studies using a comparative, cross-cultural approach. Emphasizes the relation between culture, history, and political economy in the emergence of sexual practices and sexualized identities. Examines theories of sexuality and identity, with particular attention to violence, human rights, and political agency. Cross-listed with ANTH 145. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 105. Women, Race, and Violence: Intersectional and Transnational Perspectives (4) Lecture, 3 hours; screening, 8 hours per quarter; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduces the theories of violence against women through intersectional feminist perspectives. Involves the analysis of violence in societies, which are marked by race, ethnicity, nation, class, and sexual orientation. Compares cross-cultural and transnational perspectives. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 106. Feminist Bioethics (4) Lecture, 3 hours; extra reading, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. An exploration of the ways in which feminist theory provides insight on contemporary issues in bioethics. Topics include women in clinical research, cosmetic surgery, abortion, contract gestation, fetal protection policies, and the politics of mental illness. Cross-listed with PHIL 171. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 107. Feminisms, Race, and Antiracisms: Critical Theories and Intersectional Perspectives (4) Seminar, 3 hours; extra reading, 1 hour; individual study, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines how path-breaking scholarship by women of color in the United States and in developing countries has been central to rethinking theoretical foundations and to new ways of knowing, understanding, and practicing political movements that challenges and analyzes issues concerning race, antiracism, human rights, citizenship, empire, globalization, and social justice. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 108. Philosophical Issues of Race and Gender (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines philosophical issues concerning race and gender. Themes include the role of cultural and biological criteria in defining these concepts; the roles of race and gender in personal identity; the nature of racism, sexism, and their variants; and policy implications such as affirmative action and the civil status of homosexual relationships. Cross-listed with PHIL 108. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 109. Women, Politics, and Social Movements: Global Perspectives (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An introduction to "Third World" women's politics. Covers women's politics from a global perspective. Although international in breadth, emphasis is placed on South Asia, sub-Saharan Africa, and the Caribbean. Cross-listed with ANTH 109. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 110. Vienna: Sensuality and Seduction (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Cultural study of Vienna from fin de siècle to the present through literature, film, philosophy, and the visual arts. Topics include sexuality, visual desire, crisis of language, anti-Semitism, and the post-World War II confrontation with the Nazi period. All readings are in English; selected readings in German for German majors and minors. Cross-listed with CPLT 110A, EUR 110A, and GER 110A. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 122. Gender in Southeast Asian Diasporic Literature and Film (5) Lecture, 3 hours; screening, 3 hours; written work, 1 hour; extra reading, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Looks at former Indochinese refugees who are producing literature and films in the United States and France. Examines how "Indochina" has been constructed, and in particular, has been gendered female in the colonial imaginary. Explores how Southeast Asian immigrants are returning to the Western gaze. Cross-listed with MCG 142. Fulfills
either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 124. Asian American Women: Writing the Self in Literature and Film (4) Lecture, 3 hours; screening, 1 hour; written work, 1 hour; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Looks at Asian American autobiographies and films written and directed by women. Explores why the genre of autobiography is enabling and contentious within Asian American women's writings. Examines films to see how such women filmmakers contend with memory, gender, and identity. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 126. Gender, Sexuality, and Music in Cross-Cultural Perspectives (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An overview of gendered performance genres from a number of cultures. Seeks to familiarize the student with gender-specific music and notions of gender that are often constructed, maintained, transmitted, and transformed through music and performance. Designed for students interested in music, anthropology, and gender studies. Cross-listed with ANTH 177 and MUS 126. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 127. Dance, Gender, Sexuality (4) Lecture, 3 hours; outside research, 1 hour; term paper, 1 hour; written work, 1 hour. Prerequisite(s): DANCE 019 (may be taken concurrently) or consent of instructor. Explores some of the ways that studying dance, an art form whose medium is the body, illuminates feminist, gender, and sexuality studies — and vice versa. Includes weekly video screenings and readings. No previous dance experience required. Cross-listed with DANCE 131. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 130. Gender, Sex, and Sexuality in Early America (4) Lecture, 3 hours; term paper, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduction to issues of gender, sex, and sexuality in the culture of early America. Based on both primary and secondary literature. Cross-listed with HIS 130. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 132. U.S. Women, Gender, and Sexuality: 1620-1850 (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers topics in early American women’s lives — work, politics, and sexuality — while charting the developments of gendered systems in the United States. Topics may include masculinity, the rise of the middle class, and the private-public dichotomy. Cross-listed with HSA 132. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 133. Women, Gender, and Sexuality in U.S. History: 1850-Present (4) Lecture, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Introduces students to major themes in the history of U.S. women and gender issues. Drawing upon recent work in the field, it explores the relationships between gendered meanings of politics and the politics of gender in the late nineteenth and twentieth centuries in the United States. Cross-listed with HIS 133. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 134. Queer Identities and Movements in the United States (4) Lecture, 3 hours; extra reading, 1 hour; individual study, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the evolution of feminist activism in the United States from the late nineteenth century to the present, with an emphasis on feminist organizing since the 1960s. Explores how homophobia, race, and class inequality in the first and second wave movements produced narrow definitions of women’s issues. Considers efforts to redefine feminism and the postfeminism era. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 135. Love, Desire, and Lesbian Sexuality (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on “text” as a way to frame one’s position, listen to women’s voices, and explore lesbian experiences. By discussing critical theory and commentaries, autobiography, performance, and visual and popular culture, students examine the cultural, political, parental, abortion, technology, and assisted reproduction issues that impact lesbian subjectivity. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 136. Women and Grassroots Organizing in the United States (4) Seminar, 3 hours; extra reading, 1 hour; individual study, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Considers the complexity of women’s experiences within the context of culture, society, politics, economy, and history. Examines challenges that women face in a society that creates divisions based on race, class, and gender. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 138. Gender and the Sex Trade (4) Lecture, 3 hours; extra reading, 1 hour; individual study, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Addresses structural issues related to sexualized entertainment, including pornography, sex work, escort services, sex tourism, erotic dancing, and strip shows. Discusses how gender, race, class, citizenship, and sexuality shape the stratification of the industry. Analyzes how issues such as HIV/AIDS, trafficking in women, forced prostitution, and child prostitution impact the sex trade and people working in this industry. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 140. Reproduction: Policies, Politics, and Practices (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing. Examines reproductive policies, politics, and practices from a cross-cultural and historical perspective. Discusses political and economic processes and sociocultural dynamics, population control, sex preference, infanticide and neonatal neglect, adoption and foster parenting, and the assisted conception, and gestational surrogacy. Cross-listed with ANTH 147. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 141. Ethics and Families (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An analysis of some of the ethical issues that arise in and with regard to family formations, kinship, and the institution of marriage in the United States. Focuses on “text” as a way to frame one’s position, listen to people’s voices, and explore ethical issues. By discussing critical theory and commentaries, autobiography, performance, and visual and popular culture, students examine the cultural, political, parental, and institutional dynamics of family formation. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 142 (E-Z). Women’s Writing in Modern Asia and Asian America (4) Seminar, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Covers comparative histories of feminist literary movements, gender and immigration, autobiography, translation, and subjectivity. Asian literature will be circulated in the original language to students with reading ability (not required). E. Chinese and Chinese American Writing; J. Japanese and Japanese American Writing; K. Korean and Korean American Writing; V. Vietnamese and Vietnamese American Writing. Cross-listed with CPLT 142 (E-Z). Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 146. History of Native American Women (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines selected important aspects of the lives of Native North American women, including their political, economic, and religious participation in their societies. Further traces historic changes in Native women’s lives as a result of the colonization of the New World and examines the complex imagery of Native women that developed from colonial contact. Cross-listed with HIS 146. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 149. Gender, Kinship, and Social Change (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): WMST 001. Examines theories of gender and kinship, the formation of gender hierarchies and their uneven development, and the dynamics of “family” and gender in stratified social formations. Analyzes the relationship between family forms and political and economic processes. Cross-listed with ANTH 149. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 150. Gender and the State (4) Lecture, 3 hours; extra reading, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the various meanings of gender as it is articulated in, reproduced by, and shaped within the state. Discusses gender-state relations, the engendering of politics, state formations, policy, and politics in various historical, political, cultural, and social contexts. Cross-listed with ANTH 148. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 151. Islam, Women, and the State (4) Lecture, 3 hours; individual study, 2 hours; extra reading, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Examines the links between women, Islamic practices, and the politics of state formation and nation building. Explores how women constitute the terrain of struggle between the traditional and modern, colonialism and nationalism, and religion and politics. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 152. Theory of Gender Inequality (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or WMST 001. Studies theoretical debates regarding sex and gender differences, the origins of institutionalization of gender inequality, and the intersection of sexism, racism, and heterosexism. Cross-listed with SOC 152. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.
WMST 154. Sport and Gender (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): SOC 001 or SOC 001H or WMST 001. Considers the intersection of politics, economics, society, culture, and representation in sport. Combines theoretical work and applied study for students interested in social theory and cultural studies. Assumes that gender is a fundamental factor in sport and vice versa. Cross-listed with SOC 154. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 155. Women’s Labor and the Economy (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): ECON 003 or ECON 004. Focuses on economic analyses of four topics: women’s work in and out of the home; the structural differences in occupation, earnings, and income; marriage, divorce, and childbearing; and public policy regarding women’s work and standard of living. Explores differences among women by race, ethnicity, class, marital status, and parental responsibilities. Cross-listed with ECON 155. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 156. Women and Citizenship (4) Lecture, 3 hours; extra reading, 1 hour; outside research, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Introduces complex religious and social issues related to the role of women in modern Islamic societies ranging from North America to Southeast Asia through an examination of Muslim writings produced during the past century. Cross-listed with RLST 163. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 164. Gender and Development in Latin America (4) Seminar, 3 hours; outside research, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Discusses the role and contribution of Latin American and Caribbean women within their societies. The effects of national economic development on women; gender differences in participation and in integration into the policy-making process are emphasized. Cross-listed with ANTH 164 and LNST 164. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 165 (E-Z). Themes in Vietnamese Literature (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. An exploration of Vietnamese literature in translation as an open-ended question or issue. Explores how these women evolved from artists practicing in the “in-between” space of border cultures is mapped. Also considers the significance of those textual traditions in which it was possible for women to become artists, as well as how gender has shaped archaeological investigations. Cross-listed with LNST 109, MCS 179, and SPN 179. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 166. Chicana/o Cultural Studies and Gender Politics (4) Lecture, 3 hours; individual study, 1 hour; extra reading, 1 hour; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores the field of Chican@ cultural studies and investigates the gender politics that attest to its intersectional approach. Considers how power and gendered politics have impacted the restructuring of the split subject in Chican@ cultural studies. Cross-listed with MCS 127. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 168. Gender and Power in Muslim Societies (4) Lecture, 3 hours; extra reading, 1 hour; written work, 2 hours. Prerequisite(s): upper-division standing or consent of instructor. Examines the dynamics of gender relations within the context of the Muslim world. Analyzes processes of power which influence concepts of femininity, masculinity, the body and sexuality. Explores heterogeneity of the Muslim world, as well as its unifying cultural and social history. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 169. Gender, Identity, and Visual Display in Washington, D.C. (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): admission to the UCR Washington Center Program. Examines the image of women and the role of women in fashioning visual culture through museums and collections in Washington, D.C. Investigates the representation of women in art; the woman artist; and women as patrons, donors, and decorators in Washington. Cross-listed with AHS 166. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 170. Women Artists in Renaissance Europe, 1400-1600 (4) Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Explores the social roles and literary and cultural issues under which it was possible for women to become artists, how these women evolved from artists practicing in the cloistered convent to artists participating in the competitive public marketplace, what they painted, and who their patrons were. Cross-listed with AHS 165 and HISE 133. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 175. Gender, Ethnicity, and Borders (4) Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): ETST 001 or WMST 010 or upper-division standing. Examines literary, theatrical, and visual sites where the “in-between” space of border cultures is mapped. Explores dynamics of gender and power in human rights activism. Examines the history and evolution of human rights discourse, discourses of liberation, and critical responses to the strategy of framing women’s rights as human rights in a comparative, transnational framework. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 176. Gender, Human Rights, and Transnationalism (4) Lecture, 3 hours; individual study, 2 hours; written work, 1 hour. Prerequisite(s): upper-division standing or consent of instructor. Explores dynamics of gender and power in human rights activism. Examines the history and evolution of human rights discourse, discourses of liberation, and critical responses to the strategy of framing women’s rights as human rights in a comparative, transnational framework. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 179. Gender, Media, and Latin America (5) Lecture, 3 hours; screening, 3 hours; outside research, 3 hours. Prerequisite(s): ANTH 001 or ANTH 001H or ANTH 005 or WMST 001 or consent instructor. Considers gender roles in ancient and historically recent human societies, as well as how gender has shaped archaeological investigations. Considers the possibilities and limitations of these media for representing gender in the Latin American context. Cross-listed with LNST 109, MCS 179, and SPN 179. Fulfills the Humanities requirement for the College of Humanities, Arts, and Social Sciences.

WMST 185. Gender, Race, and Medicine (4) Lecture, 3 hours; research, 3 hours. Prerequisite(s): MOS 020 or upper-division standing or consent of instructor. Explores the way Latin Americans have thought of and represented gender across a variety of media, including essays, film, novel or short story, and performance. Considers how power and gendered politics have impacted the restructuring of the split subject in Chicana/o cultural studies. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.
sexual, diasporic) in cross-cultural contexts. Examines contemporary issues and theorizations concerning the intersection and politics of race, gender, and identity. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 187. Women, Gender, and Technology (4)
Lecture, 3 hours; extra reading, 2 hours; term paper, 1 hour. Prerequisite(s): WMST 001. Introduces historical and sociological studies of gender and technology. Examines how women have been affected by technological developments and how gender ideologies informed the design and implementation of various technologies. Explores the relations among technology, material culture, sustainability, and power. Technologies covered include those in the household, the workplace, and cyberspace. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 188. Gender and Performance (4)
Lecture, 3 hours; extra reading, 3 hours. Prerequisite(s): upper-division standing or consent of instructor. Focuses on theoretical debates that construct and inform relations between the concepts of gender and performance. Considers the ways gendered bodies have been represented in performance. A broad definition of performance is applicable, and texts cover photographs, films, dance, performance art, drama, and current events. Fulfills the Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

WMST 189. Gender, Technology, and the Body (4)
Lecture, 3 hours; individual study, 3 hours. Prerequisite(s): LGBS 001 or WMST 001. Examines various technologies that alter our bodies and investigates how technological interventions in the body reproduce and reshape gender ideologies in contemporary Western culture. Explores theoretical approaches to feminism, body, and technology. Topics include cosmetic, sex-reassignment, and weight loss surgeries; reproductive, contraceptive, and medical technologies; anti-depressants; sex toys; and body piercing. Cross-listed with LGBS 189. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 190. Special Studies (1-4) Individual study, 3-12 hours. Prerequisite(s): upper-division standing or consent of instructor. Independent study and research by qualified undergraduate students.

WMST 193. Senior Seminar (4) Seminar, 3 hours; three term papers. Prerequisite(s): senior standing or consent of instructor. Students develop and present a research paper in Women’s Studies on an interdisciplinary theme or problem that has been selected by the faculty member holding the seminar. Course is repeatable to a maximum of 8 units. Fulfills either the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences, but not both.

WMST 195. Senior Thesis (4) Term paper, 12 hours. Prerequisite(s): senior standing and consent of instructor. Students work independently with a faculty member to prepare a thesis. Course is repeatable to a maximum of 8 units.

WMST 198-I. Individual Internship (4-8) Internship, 8-16 hours; individual study, 4-8 hours; consultation, .5-1 hour per quarter. Prerequisite(s): upper-division standing; consent of instructor. Internship in a community agency or university outreach program related to Women's Studies. The internship is supervised by a Women’s Studies faculty member and the agency or program coordinator. Requires a project paper. Course is repeatable to a maximum of 8 units. Does not fulfill the Humanities or Social Sciences requirement for the College of Humanities, Arts, and Social Sciences.

Professional Course

WMST 302. Teaching Practicum (2-4) Seminar, 2 hours; outside research, 1 hour; practicum, 1-2 hours; extra reading, 2-3 hours. Prerequisite(s): appointment as a teaching assistant in the Department of Women’s Studies. Supervised training for teaching in lower- and upper-division Women’s Studies courses. Seminar considers feminist pedagogy, including gender and dynamics in the classroom; comparative and historical approaches to teaching about gender and sexuality; techniques for discussing sensitive topics; providing resource referrals for students facing gender or sexuality issues; preparation; grading written work; and student relations. Graded Satisfactory (S) or No Credit (NC).