Message from the Chancellor

Dear Students,

I am delighted to welcome you to UC Merced, the 10th campus of the University of California and the first American research university built in the 21st century. UC Merced is an academically competitive research university that offers an intimate campus atmosphere where both undergraduate and graduate students have the opportunity to engage in research with faculty members who are nationally recognized scholars. Congratulations for choosing to participate in this very special learning environment.

At UC Merced, you will acquire knowledge and skills through classroom and lab instruction, participation with faculty in cutting edge research and the discovery of new knowledge that benefits society, and engagement in community-based service learning activities. Internships, cultural programs, leadership opportunities and a broad range of other co-curricular activities will complement the learning that takes place inside the classroom and laboratories. This unique academic synergy, coupled with a commitment to inclusive excellence and interdisciplinary learning, equips students to address the complex challenges facing the world today. The faculty, administration and staff are truly dedicated to student success.

The campus is set against the backdrop of the magnificent Sierra Nevada mountains and offers many recreational and cultural opportunities. The attractive UC Merced campus features state-of-the art facilities and a strong commitment to environmental sustainability, including the use of alternative energy. As a UC Merced student, you will join faculty, staff and alumni who are proud to be national leaders in innovation.

We are excited that you have chosen UC Merced to further your educational and professional goals, and I am thrilled to service as Chancellor at the same time that you begin your university career. I look forward to making your acquaintance and that of your family.

Dorothy Leland
Chancellor

"We can't solve problems by using the same kind of thinking we used when we created them."

— Albert Einstein

About the 2011-2013 Catalog

ACCREDITATION

UC Merced is accredited by the Western Association of Schools and Colleges.

CATALOG YEAR

Official degree and major requirements are listed in this catalog. Undergraduate and graduate students are subject to requirements based on a particular catalog, referred to as the student's "catalog year." The catalog year is determined for new students as the catalog in effect at the time of their initial enrollment in courses at UC Merced, provided there is no break of more than 3 consecutive terms (e.g., 2 semesters and 1 summer) in enrollment. It is campus policy to introduce changes in graduation requirements such that students who began their careers with UC Merced before the change will not be hindered substantially in the orderly pursuit of their degrees. Changes in requirements that increase the number or distribution of courses required normally will not be applied to students with earlier catalog years, provided there is no break in enrollment exceeding 3 terms. The student's catalog year determines both the major and general education requirements for degree completion. Students may elect to adhere to a different catalog year if they wish to follow the general education and major requirements listed in a catalog published subsequently to that which was in place at the time of their initial enrollment; the student must note this in a petition to his or her School.

Students transferring from other institutions may elect either (1) those major requirements in effect at the time of transfer to UC Merced; or (2) those in effect up to two years prior to matriculation, provided that their transcripts from earlier schools indicate commitment to the major within that period and that they have adequate preparation for upper-division coursework.

INSTITUTIONAL RESPONSIBILITY

Undergraduate and graduate students who have made significant progress toward a degree in a specific major can assume that a degree will be granted if they meet all catalog degree requirements and maintain continuous enrollment and progress. Should UC Merced find it necessary to discontinue a specific major, every effort will be made to allow currently enrolled majors to complete their degrees within a reasonable period of time. This may include (1) movement to a similar or related degree track; (2) substitution of requirements; (3) development of an individual major proposal; or (4) completion of courses at another University of California campus through the Intercampus Visitor Program. Students with questions concerning this policy should contact their major and school advising offices. In all cases, any financial obligations are the responsibility of the individual student involved.

NONDISCRIMINATION

The University of California, in accordance with applicable federal and state laws and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access and treatment in University programs and activities.

Inquiries regarding the University's student related nondiscrimination policies may be directed to Student Judicial Affairs.

SEXUAL HARASSMENT

Sexual harassment of all persons who participate in University programs and activities is prohibited by law and by University regulation (Policy 380-12). Sexual harassment is unacceptable and will not be condoned on the UC Merced campus.

PLEASE NOTE: This catalog contains information about UC Merced. Because the UC Merced Catalog must be prepared well in advance of the years it covers, changes in some programs and courses inevitably will occur. The selection of courses to be offered each semester is subject to change without notice, and some courses are not offered each year. The Schedule of Classes, available on the Web shortly before registration begins, provides more current information on courses, instructors, enrollment procedures and restrictions, class hours, room assignments, and final examination schedules. Students should consult the appropriate School or campus unit for even more up-to-date information. Their contact information can be found in the contact information section of this catalog. It is the responsibility of the student to become familiar with the announcements and regulations of the university that are printed in this catalog and other campus publications. The catalog is the document of record for degree requirements and is updated in print form every two years. For the most up-to-date information on requirements, please visit: www.ucmerced.edu.

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How To Obtain The Catalog

Copies of this catalog may be obtained from:

Bobcat Campus Store
Phone: (209) 228-2665
Website: bookstore.ucmerced.edu

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Contents

Academic Calendars

FALL SEMESTER 2011

Fall Instruction Begins	Thursday	August 25, 2011
Labor Day Holiday	Monday	September 5, 2011
Veterans Day Holiday	Friday	November 11, 2011
Thanksgiving Holiday	Thursday - Friday	November 24 - 25, 2011
Fall Instruction Ends	Friday	December 9, 2011
Final Exam Preparation	Saturday - Sunday	December 10 - 11, 2011
Final Exams	Monday - Friday	December 12 - 16, 2011
Fall Semester Ends	Friday	December 16, 2011

SPRING SEMESTER 2012

Martin Luther King Jr. Holiday	Monday	January 16, 2012
Spring Instruction Begins	Tuesday	January 17, 2012
Presidents Day	Monday	February 20, 2012
Spring Recess	Monday - Thursday	March 26 - 29, 2012
Cesar Chavez Holiday	Friday	March 30, 2012
Instruction Ends	Friday	May 4, 2012
Final Exam Preparation	Saturday - Sunday	May 5 - 6, 2012
Final Exams	Monday - Friday	May 7 - 11, 2012
Semester Ends	Friday	May 11, 2012

FALL SEMESTER 2012

Fall Instruction Begins	Thursday	August 23, 2012
Labor Day Holiday	Monday	September 3, 2012
Veterans Day Holiday	Monday	November 12, 2012
Thanksgiving Holiday	Thursday - Friday	November 22 - 23, 2012
Fall Instruction Ends	Friday	December 7, 2012
Final Exam Preparation	Saturday - Sunday	December 8 - 9, 2012
Final Exams	Monday - Friday	December 10 - 14, 2012
Fall Semester Ends	Friday	December 14, 2012

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Martin Luther King Jr. Holiday	Monday	January 21, 2013
Spring Instruction Begins	Tuesday	January 22, 2013
Presidents Day	Monday	February 18, 2013
Spring Recess	Monday - Thursday	March 25 - 28, 2013
Cesar Chavez Holiday	Friday	March 29, 2013
Instruction Ends	Friday	May 10, 2013
Final Exam Preparation	Saturday - Sunday	May 11 - 12, 2013
Final Exams	Monday - Friday	May 13 - 17, 2013
Semester Ends	Friday	May 17, 2013

Information regarding summer session dates and course offerings can be found at summersession.ucmerced.edu.

Undergraduate Degrees

Anthropology, B.A.

Applied Mathematical Sciences, B.S.
Emphases: Computational Biology
Computer Science
Economics
Engineering
Environmental
Physics

Bioengineering, B.S.

Biological Sciences, B.S.
Emphases: Developmental Biology
Ecology and Evolutionary Biology
Human Biology
Microbiology and Immunology
Molecular and Cell Biology

Chemical Sciences, B.S.
Emphases: Biological Chemistry
Chemistry
Environmental Chemistry
Materials Chemistry

Cognitive Science, B.A. and B.S.

Computer Science and Engineering, B.S.

Earth Systems Science, B.S.

Economics, B.A.

Environmental Engineering, B.S.

History, B.A.
Concentrations: World History
United States History

Literatures and Cultures, B.A.
Concentrations: Literatures of the English Speaking World
Literatures of the Spanish Speaking World

Management, B.S.

Materials Science and Engineering, B.S.

Mechanical Engineering, B.S.

Physics, B.S.
Emphases: Atomic/Molecular/Optical
Biophysics
Condensed Matter and Materials Physics
Mathematical Physics

Political Science, B.A.

Psychology, B.A.

Sociology, B.A.

MINORS
Minor in American Studies
Minor in Anthropology
Minor in Applied Mathematics
Minor in Arts
Minor in Chemical Sciences
Minor in Chicano/a Studies
Minor in Cognitive Science
Minor in Economics
Minor in Environmental Science and Sustainability
Minor in History
Minor in Literatures and Cultures
Minor in Management
Minor in Natural Sciences Education
Minor in Philosophy
Minor in Physics
Minor in Political Science
Minor in Psychology
Minor in Interdisciplinary Public Health
Minor in Services Science
Minor in Sociology
Minor in Spanish
Minor in Writing

PLANNED ENGINEERING MAJORS
Electrical Engineering, B.S.

PLANNED SOCIAL SCIENCES, HUMANITIES AND ARTS MAJORS
Arts, B.A.
Philosophy, B.A.
Spanish Language and Cultures, B.A.

PLANNED NATURAL SCIENCES MAJORS
Biochemistry, B.S.

Graduate Degrees

Cognitive and Information Sciences, Ph.D.

Environmental Systems, M.S., Ph.D.

Psychological Sciences, Ph.D.

Quantitative and Systems Biology, M.S., Ph.D.

Individual Graduate Programs and Groups M.A., M.S., Ph.D.
Graduate Group Emphases include:
Applied Mathematics
Biological Engineering and Small-Scale Technologies
Electrical Engineering and Computer Science
Mechanical Engineering and Applied Mechanics
Physics and Chemistry
Social and Cognitive Sciences
World Cultures

For updates and changes to program offerings, consult with the Graduate Division.

UC Merced Contact Directory

UNIVERSITY OF CALIFORNIA, MERCED
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(209) 228-4682 (CAT-GoUC)
E-mail: admissions@ucmerced.edu
admissions.ucmerced.edu

ADMISSIONS-GRADUATE DIVISION
Kolligian Library Room 227
(209) 228-4723 (CAT-GRAD)
E-mail: graddiv@ucmerced.edu
graduatedivision.ucmerced.edu

BOBCAT CAMPUS STORE
Kolligian Library Room 160
(209) 228-2665 (CAT-BOOK)
bookstore.ucmerced.edu

CAMPUS TOURS
Campus Visitor Center
(209) 228-6316
E-mail: tours@ucmerced.edu

CAREER SERVICES
Kolligian Library Room 127
(209) 228-7272 (CATS-CSC)
E-mail: careerservices@ucmerced.edu
careerservices.ucmerced.edu

COLLEGE ONE
Kolligian Library Room 167
(209) 228-7458
E-mail: collegeone@ucmerced.edu

COUNSELING SERVICES
Joseph Edward Gallo Recreation and Wellness Center
(209) 228-7337 (CAT-PEER)
E-mail: counseling@ucmerced.edu
counseling.ucmerced.edu

DINING SERVICES
Dining Commons
(209) 228-3463 (CAT-DINE)
dining.ucmerced.edu

DISABILITY SERVICES
Kolligian Library Room 109
(209) 228-7884
E-mail: disabilityservices@ucmerced.edu
disability.ucmerced.edu

FINANCIAL AID AND SCHOLARSHIPS
Kolligian Library Room 122
(209) 228-4243 (CAT-4AID)
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financialaid.ucmerced.edu

HEALTH SERVICES
Joseph Edward Gallo Recreation and Wellness Center
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E-mail: health@ucmerced.edu
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Kolligian Library Room 101
(209) 228-4722
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library.ucmerced.edu

RECREATION AND ATHLETICS
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E-mail: recreation@ucmerced.edu
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OFFICE OF THE REGISTRAR
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(209) 228-2734 (CAT-2REG)
E-mail: registrar@ucmerced.edu
registrar.ucmerced.edu

OFFICE OF RESEARCH
(209) 228-4429
research.ucmerced.edu

POLICE DEPARTMENT
(209) 228-2677 (CAT-COPS)
E-mail: police@ucmerced.edu
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SCHOOL OF ENGINEERING
Science and Engineering Bldg. Room 270
(209) 228-4411
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engineering.ucmerced.edu

SCHOOL OF NATURAL SCIENCES
Science and Engineering Bldg. Room 370
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E-mail: naturalsciences@ucmerced.edu
naturalsciences.ucmerced.edu

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS
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E-mail: ssha@ucmerced.edu
ssha.ucmerced.edu

SIERRA NEVADA RESEARCH INSTITUTE
(209) 228-4429

STUDENT ADVISING AND LEARNING CENTER
Kolligian Library Room 172
(209) 228-7252 (CAT-SALC)
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learning.ucmerced.edu

STUDENT BUSINESS SERVICES
Kolligian Library Room 122
(209) 228-4114
E-mail: sbs@ucmerced.edu
sbs.ucmerced.edu

STUDENT LIFE
Kolligian Library Room 184
(209) 228-5433 (CAT-LIFE)
E-mail: studentlife@ucmerced.edu
students.ucmerced.edu

STUDENTS FIRST CENTER
Kolligian Library Room 122
(209) 228-7178 (CATS-1ST)
E-mail: studentsfirst@ucmerced.edu
studentsfirst.ucmerced.edu

STUDENT GOVERNMENT (Undergraduate)
Kolligian Library Room 184
(209) 228-4688 (CAT-GOVT)
asucm.ucmerced.edu

SUMMER SESSIONS
Kolligian Library 122
(209) 228-2736
E-mail: summersession@ucmerced.edu
summersession.ucmerced.edu

VICE CHANCELLOR FOR STUDENT AFFAIRS
Kolligian Library 3rd floor west wing
(209) 228-4482
studentaffairs.ucmerced.edu

UC MERCED CENTERS

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2000 K Street, Suite 300
Bakersfield, CA 93301
(661) 861-7955

Fresno
550 East Shaw Avenue
Fresno, CA 93710
(559) 241-7400

Merced Tri-College Center
3600 M Street
Merced, CA 95348
(209) 381-6545

Welcome To UC Merced

The University of California, Merced offers students the benefits of a major research university—the first to be built in the 21st century—with the personalized attention of an intimate campus setting.

> It really made me a leader. Let's face it, coming to UC Merced, there were clearly more cows than students at the time of its opening. I would never be the type of person to start or lead organizations, but UC Merced has given me the opportunity to develop organizations and events. We really are graduating from UC Merced as not only founders, but driven leaders.
>
> —Heather Orrell, Quantitative Systems Biology

UC Merced is the tenth and newest campus of the University of California and is committed to excellence in teaching, research and public service.

"Innovative" and "hands-on" are central themes in the approach to learning at UC Merced, where students are encouraged to explore emerging areas of knowledge. Undergraduate and graduate students have unparalleled access to UC Merced's distinguished faculty and state-of-the-art facilities. Working alongside these leading scholars, students can participate in ground-breaking research that often crosses and links a wide array of disciplines. Research institutes created at UC Merced to conduct region- and state-wide research with national and international import include the Sierra Nevada Research Institute, the Health Sciences Research Institute, and UC Solar.

THE CAMPUS

UC Merced's three schools—the School of Engineering, School of Natural Sciences and School of Social Sciences, Humanities and Arts—offer undergraduate and graduate degree programs and emphasize links between disciplines. State-of-the-art library resources and laboratories further enrich students' educational experience.

Adjacent to Lake Yosemite Park and just outside the city of Merced, UC Merced is continuing to develop in its convenient location at the center of California. Nestled between the Sierra Nevada range to the east and the Coast Ranges to the west, the over 800-acre campus is situated within a two-hour drive from San Francisco, the Pacific Ocean and Sacramento; less than two hours from Yosemite National Park and other Sierra Nevada destinations; and an hour from Fresno. Even closer to campus, the surrounding communities in Merced, Stanislaus and Mariposa Counties offer a unique selection of cultural, entertainment and recreational options for students to experience.

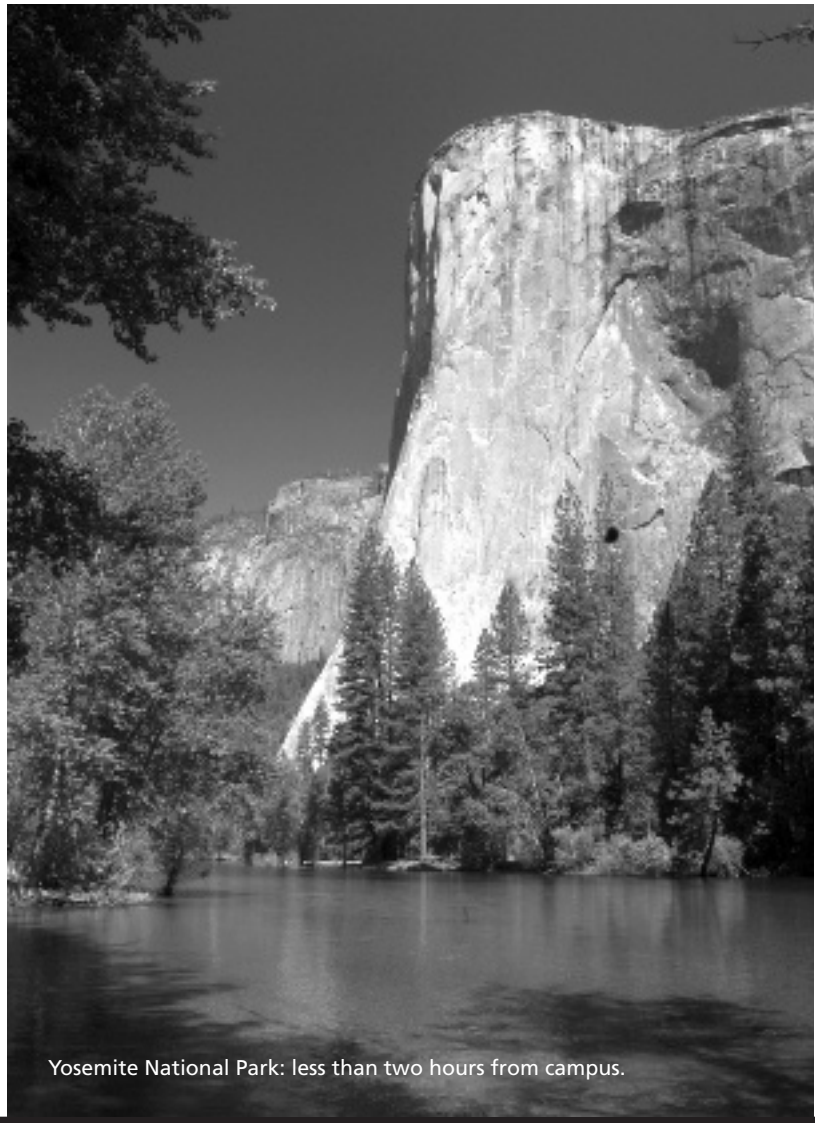
Full development of the campus is anticipated within about three decades, or around the year 2035, when UC Merced will serve an estimated 25,000 students.

AN INSTITUTION DESIGNED FOR STUDENTS

UC Merced students have a once-in-a-lifetime chance to help create the student life experience for the students who will follow. You are invited to add to campus traditions, create new student organizations and activities, and offer your ideas on student services, planning priorities and university growth and development.

As a student at UC Merced, you can gain valuable skills through internships and service learning, expand your cultural and international awareness and understanding, develop your leadership potential and make lifelong friends through involvement in a variety of student and academic programs. Student government, intercultural and residential programs, intramurals, club sports and athletic teams, university events and a variety of clubs and organizations are among your many choices. Students also have access to a wide array of support services as well as academic, social, recreational and wellness activities.

You belong here!



Yosemite National Park: less than two hours from campus.

McFadden/Willis Reading Room in the Kolligian Library.

My freshman year was the greatest as I found true friendship in my roommates, an awesome job at the Career Services Center, and met tons of people who have aided in my continuing success as a student.

— Ashley Eagleson, Psychology

ACADEMIC BUILDINGS

The first phase of campus development includes four academic buildings, in addition to housing and dining complexes, and the Joseph E. Gallo Recreation and Wellness Center. At the heart of the campus, featuring a library collection that blends books and bytes, the Leo and Dottie Kolligian Library is home to campus student services and administrative offices. It also is a welcoming meeting place for individual study, small group work and encounters with your friends. The majority of your classrooms and lecture halls are located in the Classroom Building, adjacent to the Carol Tomlinson-Keasey Quad. The Classroom Building features the 377-seat Lakireddy Auditorium, and other programmed space including teaching laboratories, and faculty and graduate student offices. The three-story Science and Engineering Building accommodates teaching in both wet and dry research laboratories and computing laboratories. The Social Sciences and Management Building houses faculty offices, research labs, art classrooms and exhibition space and classrooms. Future buildings on the over 800 acre campus include a second Science and Engineering Building, scheduled to open in 2014, a Classroom and Academic Office Building and additional student housing.

UC Merced On Campus And In The Valley

THE COMMUNITY

In the neighboring city of Merced, students will find a small, vibrant community. Currently home to more than 80,000 residents, the city retains the charm of a small town—with short commute times—and many of the amenities of a larger community.

Many educational, cultural and co-curricular activities connect students with the city of Merced and the surrounding region, and students are encouraged to experience the warmth of UC Merced's host community and discover its treasures. Wandering through the pedestrian-friendly downtown is a good place to start. Brick paved walking areas, alleys decorated with murals and Italian trellises, an award-winning multicultural arts center, a community playhouse and several historically significant buildings are among the features. Merced also is home to shops, restaurants, farmers markets and retail stores, with additional choices available in the nearby cities of Modesto and Fresno.

SERVING THE SAN JOAQUIN VALLEY THROUGH THE 10TH UNIVERSITY OF CALIFORNIA CAMPUS

UC Merced's history dates back to 1988, when the University of California Board of Regents first authorized planning for at least one additional campus based on projections of long-range enrollment demand.

The Regents targeted the San Joaquin Valley as the region where the tenth University of California campus should be located. As one of the fastest-growing regions in the state, the Valley population was one of the most distant from the nine existing UC campuses. The Regents wanted to encourage more Valley students to attend the University and to extend the University's role in contributing to the region. Locating UC Merced in the San Joaquin Valley has given the campus access to a rich natural laboratory for scientific and cultural research. UC Merced's proximity to the Sierra Nevada has also led to creation of a special relationship for education and research with three crown jewels of the U.S. National Park Service: Kings Canyon, Sequoia and Yosemite National Parks.

The University Of California

FIAT LUX. LET THERE BE LIGHT

Established in 1868, fewer than 20 years after California became a state, the University of California opened with 10 faculty members offering classes to 40 students the following year in Oakland. By 1873, the first academic buildings were completed on the UC Berkeley campus and the University moved to its new home. Today, the University of California serves more than 200,000 students and includes approximately 120,000 faculty and staff members. Encompassing 10 campuses, five medical centers, five law schools and a Statewide Division of Agriculture and Natural Resources, the University also manages three national laboratories for the U.S. Department of Energy. The University has awarded more than 1.5 million degrees and has more than 1.2 million living alumni.

UC FACULTY

A leading center for innovation for almost 150 years, the University of California has responded to the needs of California through research, education and public service, and has helped to transform the world. University of California faculty members and researchers are pioneers in fields as diverse as agriculture, biological sciences, engineering, the environment, the arts, economics, medicine and technology, and over 50 have garnered Nobel Prizes for their pioneering discoveries and advances of knowledge. Among the University's current faculty are more members of the National Academy of Sciences than at any other university in the United States.

UNIVERSITY OF CALIFORNIA: AN ECONOMIC FORCE IN CALIFORNIA

The University also fuels the state and national economies through the creation of thousands of California jobs and billions of dollars in revenues, countless discoveries that improve our quality of life and research to support innovation in fields critical to the future of our country. Technology developed by the University powers many of the state's top and emerging industries, and University of California faculty and alumni have founded or led such major companies as Chiron, Genentech, Intel Corp., Apple Inc. and Gap, Inc. A driving force in the daily life of Californians, the University is a critical source of civic leaders, social service programs and providers, and teachers at all levels of education.

RESEARCH AND EDUCATION NETWORK

Teaching and research are strengthened within the University through an extensive network of laboratories, museums and galleries, UC Extension centers, and research and field stations, which provide valuable public service to the communities of California and the nation. The University of California further extends its resources to the public through its performing arts centers, athletic facilities and botanical gardens. With collections totaling more than 30 million volumes, the University's libraries are yet another valuable public asset

WITH THE SMALL COMMUNITY, IT REALLY HAS ALLOWED ME TO PERSONALLY GET TO KNOW MY PEERS, FACULTY, ADMINISTRATORS, AND ESPECIALLY ABOUT MYSELF.

—Kim Che, Union City, Biological Sciences Major

and are surpassed in size on the North American continent only by the Library of Congress collection.

UC ACADEMIC PREPARATION INITIATIVES TO K-12 AND COMMUNITY COLLEGE STUDENTS

Beyond its tripartite mission of teaching, research and public service, the University is committed to expanding the educational horizons of California's students and is engaged in a growing number of initiatives to bolster achievement in the state's schools and better prepare students for college. UC Merced's academic preparation efforts, led by our Center for Educational Partnerships, connect with K-12 students through mentoring, tutoring, college advising and other academic programs, while community college students benefit from services that help them prepare for transfer to the University. The University of California's school partnerships offer curriculum development, direct instruction and community engagement, sophisticated data analysis of required student tests and additional assistance for many of California's lowest performing schools. For teachers and administrators, the University of California provides professional development opportunities designed to improve skills and effectiveness. Overall, the University of California's K-12 academic preparation initiatives directly affect hundreds of thousands of students and educators each year.

GOVERNANCE OF THE UNIVERSITY OF CALIFORNIA

The University of California system is governed by the 26-member Board of Regents, including 18 general members appointed by the Governor. Charged with setting general policy and making budgetary decisions for the University, the Regents also appoint the UC President, the 10 campus chancellors and other top administrators for individual campuses and system-wide positions. Authority for University-wide academic matters is delegated to the Academic Senate, which is composed of faculty members and administrative officers from throughout the University of California system. For each campus, a division of the University of California Academic Senate guides academic policy. Students also have the opportunity to participate in policy-making at both the campus-wide and system-wide levels. For information about UC Merced's Academic Senate, please visit senate.ucmerced.edu. For information on the University of California System, please visit www.universityofcalifornia.edu.

Environmental Stewardship

ENVIRONMENTAL STEWARDSHIP: BUILDING

UC Merced is using the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™) system for all major campus development and construction. The LEED™ system provides a national standard for what constitutes a "green building." Using these stewardship elements in campus development will have the following environmental, economic, health and community benefits:

Sustainable Sites – 100% of the campus storm water flows into on site retention ponds that treat building and site contaminants.

Recycling and Regional Materials – Construction practices recycle and/or divert more than 90% of the job site waste from landfills, limit the distance that materials are transported to the site and incorporate recycled content materials and sustainable harvested wood products.

Indoor Environment – Buildings are designed to provide increased ventilation and use natural daylight, creating a more pleasant working environment inside.

Water Conservation – Water reduction in the buildings and landscape will lower the use of potable water up to 50% above minimum state standards by using fixtures that conserve wastewater, waterless urinals, drought-tolerant planting for landscaping and deep root tubes for trees, which direct water straight to the roots and eliminate excessive watering.

Indoor Air Quality – Paints, carpets and composite woods with low volatile organic compounds have been selected as a means to reduce indoor contaminants that might irritate or harm the comfort and wellbeing of building occupants.

Energy – Campus buildings are designed to energy performance targets that are significantly better (30-60%) than required by California law (Title 24) and than found at other University of California campuses. The campus also employs a centralized heating and cooling strategy that significantly improves efficiency and shifts the electricity used for cooling to nighttime hours. This minimizes UC Merced's impact on the state energy infrastructure.

Living Laboratory – UC Merced has installed an advanced building energy management and control system that allows centralized operation and monitoring of all building functions. This level of monitoring and control provides a unique opportunity to manage the campus efficiently and be a living laboratory for faculty and students to study and advance building energy science.

ENVIRONMENTAL STEWARDSHIP: LANDSCAPE PRESERVATION

Thanks to support from the State of California, the Virginia Smith Trust and groups such as the David and Lucile Packard Foundation and The Nature Conservancy, the creation of UC Merced will help protect an important part of California's natural wetland and rangeland heritage. The Packard Foundation's historic gift to UC Merced preserves more than 5,000 acres of vernal pool habitat next to the campus. Funding from the State of California has supported conservation easements, allowing continued grazing and preservation of thousands of acres of additional seasonal wetland habitat in eastern Merced County. As Founding Chancellor Carol Tomlinson-Keasey observed, "The creation of UC Merced provides an unparalleled opportunity for environmental preservation. Vernal pool habitat in eastern Merced County has been disappearing for decades. The preservation efforts undertaken as part of the creation of our campus will permanently protect thousands of acres of this sensitive habitat."

The campus is exploring opportunities to integrate education, research, conservation and recreation uses to promote the sustainability of UC Merced Conservation Land & Biological Resources.

ENVIRONMENTAL STEWARDSHIP: RECYCLING PROGRAM

UC Merced has made a commitment to campus recycling and currently uses a "single stream" recycling methodology. This process is in place on the main campus, at the Castle Facility, and in the Mondo Building. All recyclable metal, glass, plastic and paper products are placed into containers positioned at each individual residence, workstation and throughout campus. Materials are collected by custodial and grounds staff and shipped to sorting stations by a contract waste hauler. The Environmental Health & Safety Office coordinates the recycling of all electronic waste, light bulbs, batteries, and cell phones per state and federal law. Campus green waste is sent to the local landfill for mulching and reuse. Facilities Management and Dining Services continue to work cooperatively to address food related waste and a pre-consumer food composting program is in the planning stages. The university is committed to increasing its percentage of recycled materials that are diverted away from the county landfill.

ENVIRONMENTAL STEWARDSHIP: ENVIRONMENTAL PREFERABLE PURCHASING PROGRAM (EPP)

EPP considerations are incorporated into the qualitative analysis of competitive bids and contract awards. Campus furnishings, equipment, supplies and services are procured with a cradle-to cradle focus on environmentally preferable characteristics from raw material acquisition in manufacturing through the entire life cycle. Some examples of campus EPP results include: wood furniture from renewable forests, campus office seating up to 99% recyclable with 44% recycled content, Energy Star office equipment, computers, water coolers; laundry equipment among the highest rated in energy and water efficiency; copy paper with a minimum of 30% recycled content, library stacks and dorm room bed frames are recycled steel; and locally grown food and food containers composed of sugar cane. UC Merced received the "Best Practices Award" for "Buy Recycled – Sustainable Operations" at the 2006 UC/CSU Sustainability Conference hosted by UC Santa Barbara.

PLANNING AND DESIGNING FOR A SUSTAINABLE CAMPUS AND COMMUNITY

UC Merced's award winning Long Range Development Plan (LRDP) creates a development framework (land uses, circulation, and open space) to plan, design, build and operate the UC Merced campus at ever-increasing levels of sustainability.

The LRDP establishes goals and policies that mandate the use of broad-based, innovative sustainable techniques in facility and infrastructure design and construction. It includes integration with the research initiatives and innovations that are part of the overall campus research program, particularly in the area of solar power and building energy management systems.

Principles Of Community

The University of California, Merced is committed to serving the people of the San Joaquin Valley, California, the nation and the world through excellence in education, research and public service. We strive to provide educational opportunities for all.

Our founding principles of community guide both the individual and collective behaviors of students, faculty and staff. The university expects that all of its members will emulate these fundamental principles as individuals and as a community.

We celebrate the spirit of academic excellence and strive to promote our University and its strengths through our daily interactions with students, staff, faculty and the community at large.

We maintain a working and learning environment based on integrity, fairness, cooperation, professionalism and respect.

We are a community comprised of individuals with multiple cultures, lifestyles and beliefs. We celebrate this diversity for the breadth of ideas and perspectives it brings.

We value the creativity of our students, staff and faculty, and acknowledge both their individual and collaborative achievements.

We encourage health and wellness and strive to develop a sense of environmental responsibility and stewardship among all the members of our community.

We are committed to achieving tolerance in our community. All persons – faculty, staff and students – regardless of background or lifestyle should participate and work together in a collegial atmosphere that we strive to make free of any and all acts of discrimination or harassment.

We respect, support and value the civil and respectful expression of individual beliefs and opinions.

APPROVED: JANUARY 2003

Note: These are the Founding Principles of Community of the University of California, Merced. In the years ahead, they will undoubtedly be reviewed and modified by future UC Merced faculty, students and staff.

TRIPLE ZERO COMMITMENT BY 2020

- ZERO NET ENERGY: Through efficiency and renewable energy production.
- ZERO WASTE: Divert from landfill all campus waste by reducing excess consumption and recycling to the maximum extent feasible.
- ZERO CARBON FOOTPRINT: Produce zero net carbon emissions and prevent as much carbon emissions as it produces.

ARCHITECTURE

Create a unique architectural identity for the campus by employing passive environmental system, such as shading, orientation and roof configuration, as design features on campus buildings; use of sustainable materials; and designing campus buildings to employ renewable energy production systems.

LANDSCAPE

Design campus landscaping to emphasize regional natives, avoid invasive or allergenic species, and select plants that are compatible with campus infrastructure, developing a palette of approved plant, ground cover and tree lists, as well as landscape design guidelines.

DINING

Considering its location in the San Joaquin Valley, UC Merced has the opportunity to access many foods locally, avoiding the environmental impacts of long-distance shipping while promoting the local economy. Products that are fresh, locally grown and produced, and environmentally friendly will be included in the campus' food offerings. Composting of food wastes will be explored as well.

UC Merced Dining is engaged in the campus' sustainable stewardship practices and committed to educate customers to enhance sustainability of our food resource and minimize waste. Some practices at UC Merced dining include:

- Responsible Purchasing (utilize local vendors, usage of green chemicals, biodegradable & compostable packaging, purchase from green businesses)
- Cooking Practices (batch cooking, scratch cooking, utilization of leftovers)
- Waste Reduction (commingled recycling, trash compacting, zero waste catering, biofuel from grease waste, pre-consumer composting, coffee grind composting)

Take advantage of the professors here at UC Merced! Every single professor has exceeded my expectations and they are so helpful and eager to talk to their students. I also encourage every student to study abroad.

—Erika Christine Maldonado, Social and Cognitive Sciences

Vice Chancellor Mary Miller helps students move in to the Valley Terraces.

I learned the value of hard work and being a leader. Being one of the first undergraduate students at UC Merced made me unafraid to start something new and be a leader.

—Claudia Zepeda, Psychology

UC Merced Mission Statement

The University of California, Merced's mission is embodied in its proud claim of being the first American research university of the twenty-first century. As the tenth campus of the University of California, UC Merced will achieve excellence in carrying out the University's mission of teaching, research and service, benefiting society through discovering and transmitting new knowledge and functioning as an active repository of organized knowledge. As a key tenet in carrying out this mission, UC Merced promotes and celebrates the diversity of all members of its community.

A research university is a community bound by learning, discovery and engagement. As the first American student-centered research university of the twenty-first century, UC Merced's strong graduate and research programs will mesh with high quality undergraduate programs. New knowledge increasingly depends on links among the disciplines, working together on questions that transcend the traditional disciplines. UC Merced fosters and encourages cross-disciplinary inquiry and discovery. Interdisciplinary practice in research will nourish undergraduate learning, building a foundation to connect the ways that academic disciplines understand and grapple with society's problems. Undergraduates will experience education inside and outside the classroom, applying what they learn through undergraduate research, service learning and leadership development. As apprentice scholars, graduate students will build their understanding of and ability to do independent research in their chosen field, as the groundwork for entering professional life. Lifelong learners will continue to hone their knowledge and workplace skills.

The twenty-first century has opened with the promise of new ways of connecting people to new knowledge and to one another. UC Merced is a network, not simply a single place, linking its students, faculty and staff to the educational resources of the state, nation and world. The idea of network extends to UC Merced's relationships with neighboring institutions: educational, cultural and social. Born as a member of the distinguished network known as the University of California, UC Merced seeks strong and mutually supportive relationships with a variety of collaborators in its region: public and private colleges and universities; federal and state organizations that share UC Merced's educational and research goals; and cultural and social institutions.

The idea of network will also be realized through the physical and intellectual integration between UC Merced and its surrounding community. The campus is planned as a model of physical sustainability for the twenty-first century, inviting all members of the campus and surrounding community to think and act as good stewards of the environment that they will convey to future generations.

UC Merced celebrates its location in the San Joaquin Valley, reflecting the poetry of its landscape, history, resources and diverse cultures, while capitalizing on and expanding the Valley's connections to the emerging global society. UC Merced recognizes that research that begins with the natural laboratory at home can extend what is known in the state, nation and world.

Overview Of Undergraduate And Graduate Study

COLLEGE ONE

College One is responsible for overseeing the general education experience at UC Merced. College One provides a network to connect students with advising and coursework that meet the UC Merced faculty principles for a well-rounded education.

SCHOOL OF ENGINEERING

Engineering combines scientific understanding with technical innovation to build things that determine our quality of life: new products and services, new technologies and methodologies, and new technological processes and industries. Engineering education at UC Merced provides students with the knowledge and know-how to solve societal problems and to become the technical leaders of tomorrow. The School of Engineering offers undergraduate majors in the fields of: Bioengineering, Computer Science and Engineering, Environmental Engineering, Materials Science and Engineering and Mechanical Engineering.

SCHOOL OF NATURAL SCIENCES

The School of Natural Sciences encompasses fields of study that are devoted to understanding our physical and natural world: mathematics, biology, physics, chemistry and environmental sciences. Advances in these fields promise solutions to many of humankind's most pressing problems, from fighting new diseases to creating sustainable energy sources. Students will gain a deep understanding of physical, chemical and biological processes. Natural Sciences currently offers five undergraduate majors: Applied Mathematical Sciences, Biological Sciences, Chemical Sciences, Earth Systems Science and Physics; five minors are available: Physics, Natural Sciences Education, Applied Mathematics, Chemical Sciences, and Environmental and Sustainability.

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS

The educational mission of the School of Social Sciences, Humanities and Arts is to create a rich learning environment for looking at human nature through the lenses of the many disciplines represented within the School as well as the disciplinary intersections where the interesting questions lie. Social Sciences, Humanities and Arts offers nine undergraduate majors—Anthropology, Cognitive Science, Economics, History, Literatures and Cultures, Management, Psychology, Political Science, and Sociology—as well as many minors and a History Honors Program.

GRADUATE EDUCATION AND RESEARCH

The UC Merced Division of Graduate Studies oversees masters and doctoral degree education. Society's most intractable problems are broad based and multifaceted. Viable solutions to these problems require multidisciplinary approaches that can benefit the people of California and the world beyond. UC Merced is committed to offering graduate students an opportunity to work on many of society's most pressing and important problems. UC Merced offers graduate programs and individually tailored graduate programs in a range of disciplines and areas. Each of these is highly interdisciplinary in approach and designed to facilitate interactions between faculty and students from a broad scope of traditional academic disciplines.

Research at UC Merced is integral to the educational experience. As apprentice scholars, graduate students join faculty in the work of discovery of new knowledge. Faculty research enriches undergraduate education through the continual updating of courses and curriculum, and special opportunities such as freshman seminars and undergraduate research programs. Interdisciplinary faculty research is fostered through research organizations such as the Sierra Nevada Research Institute, UC Solar and the Health Sciences Research Institute.

GO TO OFFICE HOURS! GET TO KNOW YOUR PROFESSORS. IT WILL LEAD TO POSSIBLE JOBS, RESEARCH POSITIONS AND GREAT LETTERS OF RECOMMENDATION.

—Kimberly Wilder, Literatures and Cultures of the English Speaking World

The UC Merced Library

Not what research libraries are...what they will be.

As a research library for the 21st century, the University of California, Merced Library is both a place on campus—in the form of the Leo and Dottie Kolligian Library—and an information nexus in the form of a digital presence on student and faculty computers.

The Kolligian Library houses a concentrated, highly dynamic collection of information resources and serves as a center for study, collaboration and research. The library's collections and services support undergraduate and graduate instructional programs as well as advanced research. Library resources and services are available throughout the campus as well as from remote computers connected to the campus virtual private network. Some library resources are in physical packages that sit on the shelves in such forms as books and DVDs. Others are in digital packages such as online journal articles, collections of sound recordings, data sets and geographic information systems.

In addition to library services and collections, the Kolligian Library houses many Student Affairs departments and campus administrative offices.

The main entrance to the building opens onto the Ed and Jeanne Kashian Floor, an open-air breezeway during fair weather and a lively focal point for social, educational and research activities on campus. The entrance way reading room has an adjacent coffee house and bookstore. Quieter spaces and collaborative workrooms are found throughout the building. Wireless and hard-wired computer network access is available in all library spaces. Equipped with the latest instructional technologies, the Gonella Discovery Room on the second floor is the hub for teaching UC Merced students the retrieval, evaluation and application of information resources. UC Merced librarians also show up in classrooms where they collaborate with faculty to improve the information literacy of students. The magnificent McFadden/Willis reading room on the fourth floor is open to all for study and quiet reflection.

As an information nexus, the Kolligian Library works with California Digital Library to provide instant, around-the-clock access to an unequaled collection of more than:

- 33,502 online scholarly journals
- 300 reference databases
- 632,186 online books
- 92,000 U.S. government documents
- 300,000+ digital images representing works in architecture and the visual arts
- 4,500 online statistical files

In addition, the 35 million volumes held by the libraries of the University of California System surpass the number of volumes held by the Library of Congress and constitute one of the largest collections in the world.

Using the UC MELVYL catalog, members of the UC Merced community can request rapid delivery of books and articles from any UC system library. The UC Merced library is actively involved in creating digital access to research information and fine art as well, and works with faculty to digitize, manage, and preserve materials used for teaching and research. For further information, contact us at library@ucmerced.edu or visit ucmercedlibrary.info.

Child Care

Early Childhood Education Center
(209) 228-5437 (CAT-KIDS)
E-mail: ecec@ucmerced.edu
http://ecec.ucmerced.edu/welcome/

The UC Merced Early Childhood Education Center (ECEC) serves the young children of the students, staff, and faculty of UC Merced and a number of community children with high quality early care and education. The ECEC follows the campus calendar and is open year-round Monday-Friday from 7:30 a.m. to 5:30 p.m. The center serves infants (6 weeks – 17 months), toddlers (18-30 months) and preschoolers (31 months to Kindergarten entry).

For more information, including waiting list information, center curriculum, tuition rates and low income assistance, please refer to the website (ecec.ucmerced.edu). If you are interested in a tour, please call the center (209) 228-5437 to schedule an appointment.

Once in a while a four-legged Bobcat is spotted around campus!

Information Technology

The use of computers and networks has become pervasive in higher education. The UC Merced vision for information technology supports the campus commitment to deploying the best of current and emerging technologies and practices to help students make maximum use of information technology for academic purposes, administrative transactions and other activities. Students can reach virtually all applications and information, including e-mail, course software, registration materials and much more, via a single electronic ID and a customizable portal, myUCMerced (my.ucmerced.edu).

From applying to UC Merced and tracking the application process to registering for courses and ultimately seeing grades, students use the Internet. For courses in which they are enrolled, the MyUCMerced portal allows students to connect with a website for each course. UC Merced's collaborative learning software puts students in touch with syllabi, course materials, library resources, assignments, grade books and course calendars; it lets students submit assignments and chat or send e-mail to other students and faculty in the course. The campus is laptop friendly, with wireless access common in outdoor areas, as well as in classrooms. Inside the Library, wireless access is available in the stacks, with electrical outlets in carrels and other work areas.

Students living on campus have 10/100 MB Ethernet connectivity to the campus network and secure access to the campus network is available for those living off campus. On campus all residents have their own connection to the network, with additional ports in the common rooms and wireless access in residences and the Yablokoff–Wallace Dining Commons. Additional residence service includes a drop-in computer lab and group laptop study area.

All students are supported through online assistance and a Student Help Desk, open every weekday. Several computer labs on campus permit instructional and drop-in use. The Library is equipped with wireless and plug-in Ethernet ports for internal and Internet information access. Students can check out laptops for use within the Library.

In the classroom, too, students find a learning environment enriched by information technology. All rooms support projection of computer-based information, as well as video. Some rooms permit recording of lectures for streaming video on individual course websites. Videoconferencing rooms support real-time interaction with remote sites via audio and video.

Because of the pervasive use of computer technology at UC Merced, it is strongly advised that students have their own personal computers, which should be capable of running typical Web and word processing applications. Students may find that their School has additional recommendations or requirements. Check the UC Merced website for more specific School information.

Recreation and Athletics

The Recreation and Athletics Program provides a wide variety of sports and recreational activities ranging from aerobics and other group fitness classes, to diverse intramural sports, sport clubs and comprehensive outdoor adventure trips.

The Joseph Edward Gallo Recreation and Wellness Center features a full complement of fitness classes, cardiovascular machines, weights and drop-in recreation such as basketball and volleyball. The Recreation Program also provides structured recreational opportunities in a range of intramural sports.

For those students who are looking for more competition, the Club Sports Program offers students the opportunity to be a part of teams that compete against other colleges and universities. Our current list of competitive sport club teams includes Men's and Women's Volleyball, Men's and Women's Soccer, Baseball, Softball, Men's Lacrosse, Badminton, Archery, table tennis, cheer and dance. For complete information on Recreation and Athletics, visit recreation.ucmerced.edu and www.ucmbobcats.com.

Recreation and Athletics also offers a full range of group fitness classes for students. These classes range from group cycling and yoga, to cardio and core stability classes. There is a class to fit everyone's interest and ability. In addition to group fitness classes, the Campus Recreation Fitness Program also offers one-on-one personal training sessions and "Ask the Trainer" sessions in the weight room to answer any fitness related question you may have.

Also making its home in the Joseph Edward Gallo Recreation Center is the Wilderness Center. The Wilderness Center serves as the "portal to the outdoors" for UC Merced students. The Wilderness Center has resources in Yosemite National Park, Sequoia and Kings Canyon National Parks and California State Parks. Equipment rental is also available from the Wilderness Center.

Recreational opportunities are plentiful at UC Merced. Immediately adjacent to the campus, Lake Yosemite offers swimming, boating and other outdoor activities. The City of Merced has an extensive network of biking and running paths, as well as city parks including a zoo and children's amusement area.

UC Merced competes in the Cal Pac Conference of the NAIA in Men's and Women's Cross Country, Women's Volleyball, Men's and Women's Basketball, and Men's and Women's Soccer.

Student Life

ARTS AND ENTERTAINMENT

UC Merced is part of a vibrant community in the San Joaquin Valley and is located close to the city of Merced. The city has a population of over 80,000 and offers restaurants, parks, a weekly farmers' market and an active multicultural arts center. In addition to the local cinemas, Playhouse Merced has a full calendar of live performances. A variety of speakers and shows make appearances in town, and UC Merced works with faculty, staff and student clubs and organizations to add to those events.

In addition, Modesto (45 minutes to the north of Merced), Fresno (one hour to the south of Merced) and the San Francisco Bay area (two hours to the west of Merced) have an abundance of museums, theaters, arts centers, and events. The San Joaquin Valley region is home to a variety of attractions such as the Lee Institute for Japanese Art in Hanford, Gallo Art Center in Modesto, Hilmar Cheese Factory, Castle Air Museum, and Mariposa Museum and History Center, with many other destinations to be found on the Merced Conference and Visitors Bureau website at www.yosemite-gateway.org/Attractions/yosemite.php.

STUDENT LIFE ACTIVITIES AND SPECIAL EVENTS

UC Merced is a place where our students have the desire and opportunity to create traditions and leave legacies that will carry forward for years to come. For students looking to get involved on campus, student involvement opportunities abound. On a weekly basis activities and events are provided for students to enhance their out of the classroom experience. UC Merced activities and events range from concerts to carnivals, fashion shows to festivals, and include off campus adventures to places like San Francisco, Fresno, and Modesto for shopping sprees, cultural activities, and athletic events.

The Office of Student Life also partners with faculty, staff, and students to organize large scale campus events. Annual events such as Welcome Week, Family Weekend, Winter Ball, Cinco de Mayo Fiesta, New Student Success Conference, Asian Fest, Pride Week and the Gauntlet Games engage the entire UCM community. If planning events and bringing spirit to campus is your joy, then joining the Campus Activities Board (CAB) may be just what you're looking for. The Campus Activities Board coordinates and sponsors exciting activities for UC Merced students, and is a great way to get involved in campus life.

STUDENT GOVERNMENT, CLUBS AND ORGANIZATIONS

UC Merced students have established UC Merced's Associated Student Government (asucm.ucmerced.edu), as well as clubs and organizations that enrich campus life. These organizations create opportunities for students with common interests to help shape the direction of the newest UC campus, build friendships, and provide opportunities for social and academic networking. Over 130 clubs and organizations have been formed and fall into the following categories: cultural, special interest, community service, religious, academic/professional, wellness and art/music/dance. Sorority and Fraternity life is also underway at UC Merced. UCM students have established vibrant Greek letter organizations for the campus, furthering opportunities for student leadership and involvement.

STUDENT HOUSING IS AN AWESOME COMMUNITY TO BE A PART OF.

—Samuel Kim, student

THE BOBCAT CAMPUS STORE

The UC Merced Campus Store is your first choice for textbooks, electronics and computer accessories, Bobcat apparel, school supplies and snacks.

Books and Class Materials

We are your on-campus resource for new or used textbooks! They can be purchased through our online reservation system or by coming by the Campus Store. By reserving your textbooks, they will be delivered to campus, bundled together by our staff and marked with your name and ID for pickup in the Textbook Annex. This is your best chance at saving up to 25% off the new price. At the end of the semester, the bookstore buys back used textbooks for cash.

UC Merced Campus Store is an Authorized Apple Campus Store

As a college student, you are eligible for academic discounts on Apple Computers and software. We provide excellent service and support for your computer on campus, and we carry all of the necessary peripherals to assist in your academic success at UC Merced.

Your purchases made at the Bobcat Campus Store help the University grow! Visit our website at bookstore.ucmerced.edu for more information.

UC Merced Campus Store
P.O Box 2039
Merced, CA 95344
Phone (209) 228-2665
Fax (209) 228-4284
Website: bookstore.ucmerced.edu

LEADERSHIP DEVELOPMENT AND CIVIC ENGAGEMENT

Leadership development is an exciting part of student life at UC Merced. Whether you are a new, emerging, or seasoned student leader, opportunities for learning and growth abound. With leadership options that include conferences, mentor programs, workshops, lectures, and participation in programs such as the Bobcat Leadership Series, and the Yosemite Leadership Program, there are learning and leadership opportunities for everyone.

Involvement in civic engagement and community service is also a hallmark of student leadership at UC Merced. There are many opportunities for UCM students to volunteer, learn from and give back to the local community. Participation in events such as Kids Day, Relay For Life and California Coastal Cleanup provide students the opportunity to impact the Merced community by thinking globally and leading locally.

While everything really was new and strange at first, that quickly wore away as UC Merced became a home away from home. Classes can be hard sometimes, but you are rewarded in the end with new knowledge and experience.

—Emily DeCremer, Psychology

SOCIAL JUSTICE AND WOMEN'S PROGRAM INITIATIVES

UC Merced students represent a rich diversity of cultures. Through Social Justice and Women's Program initiatives, the UCM community is exposed to films, festivals, guest speakers and workshops that examine and celebrate the diversity of our world. Annual events like Pride Week, Women's History Month, the Social Justice Film Series and the Clothesline Project, provide UCM students an opportunity to learn, share and celebrate the rich fabric of diversity and culture evident both on campus and beyond.

For a list of registered clubs and organizations, or for more information on student life activities, visit the Student Life website at studentlife.ucmerced.edu or e-mail: studentlife@ucmerced.edu.

CAMPUS AND STUDENT CONDUCT POLICIES

UC Merced strives to create an environment that fosters individual growth, freedom of expression and a sense of community. The viability of this community depends on a common understanding among its members regarding their rights and responsibilities.

The Student Handbook: *Policies Applying to Campus Activities, Organizations and Students* (studentlife.ucmerced.edu/what-we-do/student-judicial-affairs/resources) lays the foundation for that understanding and governs the conduct of all University of California, Merced students. It articulates the University's expectations regarding standards of conduct—in both academic and non-academic settings. In addition, the campus' Principles of Community, located toward the beginning of this catalog, further reinforce the expectations, obligations and privileges of participating as a member of the UC Merced community.

Student Housing

On-campus Housing

Living on campus helps you to make lifelong friends and become an active part of our growing campus. Student and full-time residential life staff live on campus providing the resources, programs and services essential to a safe and comfortable living environment. We have someone on call 24 hours a day.

Housing is guaranteed for fall term to incoming freshmen students who meet the contract submission deadlines. A second year guarantee is offered to those same freshmen who again meet their housing application deadline in their second consecutive year at UC Merced.

The Sierra Terraces was designed to accommodate first-year students in this interactive community. Students living here enjoy two bedrooms that share a private bathroom. The Summits, also for first year students, was designed with several very large bedrooms sharing a bath. Our Phase two of The Summits is scheduled to open in the fall of 2013.

Some new incoming students, along with a limited number of accepted transfer and continuing students will be assigned to UC Merced's first residential community, the Valley Terraces. Valley Terraces offers apartment-style suites located in nine, two-story buildings. Each suite has two or three bedrooms attached to a furnished living room. Bedrooms in all our communities have a bed, desk, drawer and closet space for each resident. A limited number of singles also are available with priority given to continuing students. Study, recreation, laundry, meeting rooms and mail facilities are located in both the Terrace Center and The Summits communities. All residence halls offer success workshops and events designed to build community with fellow residents and the campus at large.

If you are interested in residing with others with similar interests, apply to a themed community such as the Academic Excellence Hall or the Residential Management Program. Find out more about your choices of themed halls and how to apply at our housing website, housing.ucmerced.edu.

Room and board rates are posted on the UC Merced website at housing.ucmerced.edu. All new, incoming freshmen students and transfer students are strongly encouraged to consider on-campus housing. Nothing compares to the convenience and experience of living on campus.

> Make the most of your time here. We have some of the best networks and opportunities to make a change in the world at our fingertips and you should jump at the chance to be a part of it. You should open yourself to new adventures and journeys, as it will only help you to evolve into a well-rounded person in the long run.
>
> — Ashley Eagleson, Psychology

Dining at UC Merced

All resident contracts include a basic dining plan with a variety of healthy and satisfying cuisine available at the Yablokoff-Wallace Dining Center. If you are looking for a quick meal on the run, a light snack or a cup of coffee between classes, try the Lantern Café, located in the Kolligian library or The Market Place in The Summits. All facilities are open to the public. Find out more about our great dining options at the dining center website, dining.ucmerced.edu.

Off-campus Housing Opportunities

A variety of off-campus housing options are highlighted on the UC Merced Housing and Residence Life Office's website, where information about local apartment complexes in addition to an active property search database, och.ucmerced.edu, are available. The site includes valuable information that students should review before deciding to live off-campus. Please go to our website at housing.ucmerced.edu or contact the Housing and Residence Life Office for more information about living off campus.

For further information about housing, on- or off-campus, contact Housing and Residence Life at housing@ucmerced.edu or check our website at housing.ucmerced.edu.

The suite-style Valley Terraces are a very popular on-campus option for UC Merced students.

Services

When health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless, and intelligence cannot be applied.

—Herophilus

HEALTH PROMOTION at UC MERCED

HEALTH PROMOTION

The above quote illustrates the significant impact of health on many aspects of our lives. In higher education, students strive for academic excellence, and health directly influences such achievements. Health Promotion is comprised of a team of staff and peer volunteers who work together to encourage undergraduate and graduate students to make healthy choices that will enhance their academic performance. The mission of Health Promotion is to develop programs that:

- Provide students with accurate and current information on a variety of health topics;
- Encourage students to make informed decisions about their health;
- Connect students to resources such as medical providers, counselors, health educators, dietitians and peer organizations;
- Assist the campus in assessing and addressing health related issues through the use of surveys and evidence-based programs.

The department offers individual and group support for students with concerns about various health topics, including nutrition, physical activity, body image, sexual health, alcohol, tobacco, other drugs, depression, stress, relationships and sleep. Staff and peer volunteers are also available for campus presentations.

H. RAJENDER REDDY HEALTH CENTER UC MERCED

HEALTH SERVICES

The Health Center provides basic treatment and prevention services provided by board-certified physicians and certified nurse practitioners and physician assistants. Staff and peer health educators also provide information on alcohol, tobacco and other drugs, sexual health, stress management, nutrition, body image and smoking cessation. We encourage students to become active partners in promoting their own health and well-being.

Services include: consultation with medical service providers for injury, illness, or chronic health conditions; laboratory testing; medications, immunizations and injections; and health and wellness education. Most core services are covered by student services and health fees and are provided at no cost. There may be a cost for some laboratory work, radiology, pharmaceutical medication and immunizations.

Eligibility for Services

All registered graduate and undergraduate students may use Health Services and Health Promotion even if they opt out of the Student Health Insurance Plan. All services are confidential and offered at no charge to registered students. The H. Rajender Reddy Health Center houses Health Services, Health Promotion, and Counseling and Psychological Services in the Joseph Edward Gallo Recreation and Wellness Center.

Medical Insurance

All registered graduate and undergraduate students attending the UC are required to have major medical health insurance as a condition of enrollment. Unless a student shows proof of prior insurance coverage and requests a waiver, the student is automatically enrolled in UC Merced's Student Health Insurance Plan (SHIP) and billed through the student's account. SHIP offers comprehensive and affordable health insurance. It supplements the Health Center's medical services and provides for extended medical care, emergency services, hospitalization, specialty care and out-of-area care while you are traveling. The program fee covers the cost of the UC Merced group insurance plan and program administration.

A student who is covered by another health insurance may waive SHIP by demonstrating that the coverage is comparable to that provided under SHIP. The student must apply for a waiver of SHIP by the specified deadline. All registered students are eligible to utilize the campus health center even if SHIP is waived. For information on insurance, including the waiver process and deadline, refer to the health services web page at health.ucmerced.edu or contact insurance@ucmerced.edu.

Mandatory Hepatitis B and MMR Requirement and Optional Immunizations

The California State Health & Safety Code mandates that all students entering the University of California who are under the age of 19 years old must be immunized against or provide proof of immunity from the Hepatitis B virus prior to enrollment. In addition to the Hepatitis B requirement, UC Merced requires that all entering students have received the MMR (measles, mumps and rubella) vaccine. Students must provide Health Services with documentation demonstrating compliance with these immunization requirements prior to registration.

The Center for Disease Control's Advisory Committee on Immunization Practices (www.cdc.gov) and the American College Health Association (www.acha.org) recommend the following additional immunizations for college students. They are not required but are strongly recommended:

- Menactra vaccine (for meningitis). Recommended for high risk students and as a consideration for all college students.
- Tetanus (Td). Booster at age 11-12 years old and every 10 years.
- Varicella (chickenpox). Two doses one month apart for those who never had chickenpox or if a blood test does not show immunity.

For information regarding immunizations, visit the H. Rajender Reddy Health Center, call 209 CAT-CARE (209-228-2273) or review information at health.ucmerced.edu.

COUNSELING AND PSYCHOLOGICAL SERVICES

UC Merced's Counseling and Psychological Services (CAPS) promotes the academic and personal success of all students at UC Merced. CAPS has a diverse staff of doctoral level, licensed psychologists and supervised pre-doctoral interns and practicum students who have experience working with college students. Staff members reflect the diversity that is found on the UC Merced campus and strive to meet the needs of the campus community. All registered UC Merced students (undergraduate and graduate) may access CAPS services, which include confidential psychological assessment, group therapy, walk-in crisis counseling, and short-term individual counseling. In addition, CAPS staff delivers outreach presentations across campus throughout the academic year on topics such as developing effective coping skills, eating disorders, and partner/relational violence. Individual consultation is available to UC Merced students, faculty and staff who have concerns about a UC Merced student. Counseling and Psychological Services is located in the Joseph E Gallo Recreation and Wellness Center. To make an appointment call (209) 228-4266.

CAREER SERVICES

Career Services Center

The UC Merced Career Services Center, located in Kolligian Library, Suite 127, assists students with a wide range of career related programs and services, and connects students with on- and off-campus part time jobs, internships, research opportunities and career positions. The Career Services Center staff helps students to learn about their unique interests and abilities, explore career options, determine career goals and develop skills to conduct a successful job search. The Center also assists students interested in pursuing graduate or professional education following graduation from UC Merced. To schedule an appointment with one of the Career Services Center staff, please contact us at careerservices@ucmerced.edu.

Campus Student Employment

The Career Services Center coordinates all campus, part-time student employment. Students can view current listings and apply for campus positions online at the Career Services Center website at careerservices.ucmerced.edu: just click on "Jobs."

Internship Programs

Internship programs provide students with the opportunity to obtain career-related work experience in local, regional and national, profit and nonprofit organizations. Students may complete internships, some of which may be paid, during the academic year or during the summer. Employers from all fields are increasingly expecting students to have internship experience in addition to their academic preparation. To take advantage of internship opportunities related to any area of academic study, contact the Career Services Center at careerservices@ucmerced.edu.

UC Center Sacramento (UCCS)

The UCCS Academic Program gives undergraduate and graduate students a rare opportunity to learn about California's public policy and journalistic processes firsthand. The program includes rigorous coursework as well as professional experiences built while living, interning and conducting research in the State Capitol. Offered during academic and summer terms, students enroll in classes while working 24-40 hours per week in internship placements. For more information, please visit uccs.ucdavis.edu or e-mail careerservices@ucmerced.edu.

STUDENTS FIRST CENTER

What is the Students First Center?
UC Merced is one of the few schools in the country that offers the convenience of a "one stop shop" for student services. The Students First Center (SFC) is the gateway to the offices of Admissions, Financial Aid, and the Registrar. It should be your first stop for questions about admissions, financial aid, scholarships, student records, student billing and registration.

How Can I Access Students First Center Services?
You can reach the SFC by phone at (209) 228-7178 (CATS-1ST), by email at studentsfirst@ucmerced.edu, in person in Kolligian Library 122, or at our website studentsfirst.ucmerced.edu. Voicemail and email are responded to within 24 hours (unless it is a weekend or the campus is closed).

For your convenience the SFC website can answer almost all of your questions about being a student at UC Merced. Some of the topics featured on the SFC website include: campus services hours of operation, important announcements, upcoming dates and deadlines, FAQs for some of your more complex inquiries and a comprehensive UC Merced calendar of events.

Students come first at UC Merced and at the SFC. Stop by and see how easy it can be to get the assistance you need!

DISABILITY SERVICES

The Disability Services Office, located in the Kolligian Library, Suite 107, supports students with disabilities by providing them with opportunities to participate fully in the academic community at UC Merced. Students with varying types of disabilities, including (but not limited to) those with mobility, visual, hearing, learning, psychological and other medical conditions may be eligible for the provision of reasonable disability accommodations through this program.

Students must take the initiative and contact Disability Services (DS) for a student intake appointment to begin the DS registration process. It also is recommended that students be prepared to provide documentation of disability in support of their request for DS accommodation services. Guidelines for documentation can be found on the UC Merced website under Disability Services. Documentation provided to the office is confidential and is used

solely for purposes of determining the student's eligibility and the appropriate accommodations to be made. It is the responsibility of the student to provide this documentation and, if necessary, to pay for the cost of the documentation provided, including the cost for professional assessments for disabilities.

Academic accommodations are developed with the student and Disability Services as part of the interactive services planning process. Accommodation ensures that students have a fair and equal access to the academic learning environment. Accommodations are individualized and are determined on a case by case basis, based on the specific individual needs and recommendations included in each student's documentation. An appropriate accommodation does not provide an unfair advantage, but rather minimizes the barriers caused by the disability.

The most common types of accommodation services accessed by eligible students with disabilities may be one or a combination of alternative media services, communication services, mobility services, note taking services, proctoring and/or priority registration.

The provision or use of a disability accommodation does not guarantee or ensure a certain level of academic achievement for the students. Students with disabilities must meet the same standards as all other students. Depending on the type of academic accommodation requested by the student, the approval of the appropriate School Dean may be required.

Students with disabilities who need alternative media services, sign-language interpreting or CART should contact the Disability Services Office as soon as possible to make necessary arrangements for these services. It is the student's responsibility to see that such notification occurs in a timely fashion.

For further information, contact Disability Services by phone at (209) 228-6996, email: disabiltyservices@ucmerced.edu, TTY: (209) 228-TTY0 (8890) and/or fax: (209) 228-4542.

STUDENT ADVISING AND LEARNING CENTER (SALC)

UC Merced faculty and staff are committed to the academic success of every student. The Student Advising and Learning Center, located in Kolligian Library 172, is responsible for advising students who are undecided about their majors, students who are interested in pursuing law careers following graduation and any student who has questions about degree or University requirements. The advisors in the Schools and the Student Advising and Learning Center work closely with the academic programs to ensure that students receive accurate and timely advising. The Student Advising and Learning Center also assists students to acquire the skills they need to develop intellectually, become successful learners and achieve their academic goals. The Peer Academic Advisors work in collaboration with Residence Life and many other support services to help students make the best use of the resources on campus that promote their success.

Center staff members offer programs focusing on effective study skills, critical reading, and analytical writing that help all students, regardless of major. Mathematics, science, writing and many other classes often present difficulties for students. Group tutoring and study sessions, led by peer tutors, are available through the SALC free of charge to provide assistance to students of all levels of ability and preparation. Additional programs and workshops also help students adapt to the demands of college. It is common for college students to find that they need to explore new methods for reading, note-taking, time management and other skills in order to meet the demands and pace of college learning. The Student Advising and Learning Center, working closely with Career Services, Counseling and Psychological Services, Residence Life and many other areas, ensures that students receive the support they need to plan and succeed in their chosen course of study and beyond. Students with advanced skills in science, math or writing should speak to their professors or staff at the Center to find out how to become a trained, paid tutor on campus.

The SALC is headquarters for New Student Orientation, and this includes an orientation program offered to parents and family members of new students, as well. The Center also produces the Partners in Success parents' and families' newsletter each semester. Student Success is made possible by a combined, unified effort on the part of all who play a role in influencing students' lives, and therefore the SALC makes constant efforts to collaborate with as many constituencies as possible in promoting an effective learning environment.

The SALC also provides guidance to academically elite students interested in participating in prestigious academic competitions, and is headquarters for the Fiat Lux Scholars' Program for underrepresented students. Contact the Student Advising and Learning Center for more information or visit our website at learning.ucmerced.edu.

Office of International Affairs

The Office of International Affairs (OIA) supports UC Merced's vision of becoming a leading international institution. Through global initiatives, international partnerships, visa services and study abroad exchange, OIA aims to internationalize the campus and to position UC Merced to take a prominent place in global higher education and research.

OIA is comprised of four programmatic areas: visa support services; study abroad services; global initiatives and the International Center. For more information about OIA please view international.ucmerced.edu.

Study Abroad

OIA assists students with study abroad in programs through:

The UC Education Abroad Program

The International Opportunities Program

UC summer study through UCLA, UCI, UCD and UCSD

The University of California Education Abroad Program (UCEAP) offers international study programs in cooperation with about 140 host universities and colleges in 35 countries throughout the world. Participating students remain registered at UC Merced while studying abroad and receive full academic credit for their work. UC Merced students have access to all of the UCEAP options. These include yearlong, semester-length and summer programs. Students in every discipline are encouraged to consider fulfilling a portion of their degree requirements abroad, as every career path intersects with global issues in some way. Students may participate as early as the sophomore year, as late as the senior year, and even as graduate students. Transfer students may also begin the application process before enrolling in UC courses to participate during their second term at UC Merced.

The personal growth that students experience while living in a different country cannot be matched by any learning adventure that they engage in on their home campus. The curricula of most EAP countries are offered in English, and there are opportunities to take courses that fulfill general education requirements, major and minor requirements or electives.

Selection of UC undergraduate students requires the following: serious academic goals and a clear plan for integrating UCEAP studies into the student's UC degree program; maturity, flexibility, and the ability to succeed within the host culture; willingness to abide by program regulations; endorsement by the UC Merced Office of International Affairs; and completion of language or any other specific requirements. Language prerequisites and GPA requirements vary by program.

UCEAP opportunities are also open to qualified graduate students who have completed at least one full year of graduate work and have the support of their faculty advisor and graduate dean. A detailed statement of the projected program of study is required.

The cost of studying on UCEAP is comparable to the cost of studying at UC Merced. In some cases, EAP may cost less. Students who qualify for UC financial aid continue to receive grants, loans, and scholarships while abroad. Aid is based on the cost of studying at each EAP location and on individual need. Students who do not currently receive UC financial support may qualify for financial aid while on EAP.

In addition to UC financial aid, UCEAP provides support through various scholarships and grants. Students should contact the UC Merced Office of International Affairs and Office of Financial Aid and Scholarships for additional information.

UC Merced student Jose Palma in front of the London Tower Bridge.

Students may also study abroad through external study abroad providers and earn transfer credit for qualified programs. By taking an International Opportunities Program (IOP) Leave, students are able to maintain their UC student status and their UC e-mail addresses.

Please visit studyabroad.ucmerced.edu to learn about UCEAP and IOP study abroad opportunities, and contact study abroad staff in the International Center KL 101 or at (209) 228-4722 to find out about the application process. Applications may be due as early as 10 months in advance of the program, but students are encouraged to visit the Office of International Affairs and their academic advisor(s) even earlier to begin planning for study abroad.

International Student and Scholar Services

UC Merced enjoys a diverse international community on campus with international students, researchers, and professors who represent more than 60 nations throughout the world.

International Student and Scholar Services (ISS) staff members assist international students and academic staff with maintenance of their legal, non-immigrant status and assistance in understanding related government regulations. Students and scholars are encouraged to contact an ISS advisor for information about UC Merced-sponsored visas and immigration issues. ISS also acts as UC Merced's primary liaison with U.S. Departments of State, Homeland Security, Labor, and SEVIS.

International transfer students already enrolled in a university or school program within the United States should contact the ISS Office as soon as they're admitted to UC Merced to discuss their visa options. These students may be eligible for a transfer of their visa status or application for a change of visa status that will permit their enrollment in a UC Merced degree program.

ISS Office services to include the following:

- Advice for UC Merced international students, scholars and their dependents regarding compliance with U. S. immigration regulations;
- Support of UC Merced sponsored immigrant and non-immigrant petitions for students, scholars and dependents coming study or work as academic staff;

- Guidance, document preparation and authorization for employment and travel;
- Resources and programming to assist students and dependents with adjustment to life in the United States;
- Sponsorship certification, update and reporting of SEVIS records;
- Referrals to UC Merced campus and community resources;
- Walk-in office hours and one-on-one appointments.

For additional information about ISS services, please visit iss.ucmerced.edu. General information also can be requested by e-mail at international@ucmerced.edu. To make an appointment with an ISS advisor and for more detailed inquiries, please write to international@ucmerced.edu or call (209) 228-4722. International students and scholars are encouraged to visit the International Center in KL101.

Transportation and Parking Services (TAPS)

BICYCLES

Bicycles are welcomed and encouraged at UC Merced. With a flat terrain and mild climate, the city and county of Merced offer excellent conditions for bicycle riding. In addition, the city of Merced boasts over 12 miles of class one, grade-separated bike paths, which, along with the city's other bike lanes, connect to most of Merced's open-space park system. Special areas have been set aside near UC Merced's academic buildings for bicycle parking. Please do not bring bicycles into buildings or secure them to anything but a bike rack. If you plan to bring your bicycle to campus, you are encouraged to register it. The process is quick and simple, and the cost is $5.00 for a three year license. Bicycles may be registered between 8:00 a.m.-1200 Noon & 1:00 p.m.-4:00 p.m. in Merced at:

The City of Merced Police Department
611 West 22nd Street
Merced, CA 95340

PUBLIC TRANSIT

As parking is limited on campus, UC Merced encourages students, faculty and staff to use alternative public transit. Merced County boasts a full service, comprehensive transit system known as "THE BUS." UC Merced continues to work with the public transit authority to provide routes between the campus and various locations in Merced County and the surrounding areas. As part of the students' UCM transit fee, students can receive "THE BUS" passes at no additional charge to ride. Please visit www.mercedthebus.com and choose Bus Routes for information on all current "THE BUS" routes or you may call: (209) 384-3111 or (800) 345-3111. Please also visit our UCM Transportation and Parking Services website at taps.ucmerced.edu for further information on "THE BUS" or other alternative transit options.

CAMPUS TRANSIT

CatTracks

UC Merced offers a campus-based shuttle service called CatTracks, which provides transportation services to retail, entertainment and some apartment complexes in the local community. In addition, we offer a shuttle service called NiteCat, sponsored by Riggs Ambulance Service (RAS). The NiteCat shuttle provides safe rides to and from local entertainment centers between the hours of 10:00 p.m. and 2:00 a.m. on Friday and Saturday nights while school is in session.

You may view our current shuttle schedules by visiting our UCM Transportation and Parking Services website: taps.ucmerced.edu and selecting the CatTracks Shuttle option or by visiting www.cattracks.org.

Vehicle Parking

Parking, while limited, is available on campus. Traffic is restricted within the academic core of the main campus. All vehicles parking in designated parking lots on campus must display a valid regular or visitor UC Merced parking permit from 7 a.m. through 6 p.m. daily, Monday through Friday. Specific parking lots are reserved for students living on campus in the residence halls as well as for students commuting to campus. Resident and commuter students will have an opportunity to purchase parking permits prior to the start of classes. We encourage all students to complete the permit application and purchase parking permits through the e-Pay system at epay.ucmerced.edu. You may also complete your permit application and purchase your parking permit at the Cashier's Office located on the first floor of the Kolligian Library next to the Students First Center. Please note that carpool permits are also available and offer prime parking locations to carpool permit holders. To be eligible for a carpool permit, you must have two or more people in the vehicle driving to campus at least three days of the week. Information on permits, fees and campus parking regulations can be obtained from the TAPS website at taps.ucmerced.edu. Please be sure to read the parking regulations before you park on campus.

UC Merced - Transportation and Parking Services (TAPS)
Email: taps@ucmerced.edu
Helpdesk: (209) 228-8277 (Cat-TAPS)

CatTracks buses take students all over Merced: downtown, some apartment complexes, shopping and to the Amtrak station.

Release of Student Information

The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a Federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education.

In accordance with the Federal Family Educational Rights and Privacy Act of 1974 and campus procedures implementing the University of California Policies Applying to the Disclosure of Information from Student Records, students at the UC Merced campus of the University have the following rights:

1. The right to inspect and review their own student records within 45 days of the date the University receives a written request for access. Students should submit their requests in writing to the University registrar, dean, or other appropriate campus official for the office having custody of the requested records. The request must identify the record(s) they wish to inspect and review. The campus official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the official receiving the request, that official shall advise the student of the correct official and redirect the request.

2. The right to request the amendment of their own student records if a student believes the records are inaccurate or misleading. Students should submit a written request to amend a record that they believe is inaccurate or misleading to the campus official responsible for the record, clearly identifying the portion of the record they want changed, and specifying why it is believed to be inaccurate or misleading. If the University determines that the record should not be amended as requested by the student, the University will notify the student of the decision and advise him/her of the right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in their student records, except to the extent that law and policy authorize disclosure without consent.

One exception permitting disclosure without consent is disclosure to campus officials having a legitimate educational interest in the records. A campus official is any individual designated by the campus to perform an assigned function on behalf of the campus. Legitimate educational interest means a demonstrated need to know by officials who act in a student's educational interest. A campus official has a "legitimate educational interest" in a record if the official is performing a task:

(a) specified in his or her job description;

(b) specifically related to the official's participation in the student's education;

(c) specifically related to the discipline of a student; or

(d) specifically related to providing a service or benefit associated with a student or student's family, such as health care, counseling, job placement or financial aid.

Another exception permitting disclosure without consent is Directory (or public) Information, defined as information contained in a student record that would not generally be considered harmful or an invasion of privacy if disclosed, unless the student has notified the Office of the Registrar that such information is to be treated as confidential with respect to him/herself. UC Merced has designated as public the following categories of information regarding students, which may be released to those requesting it: the student's name, local address(es) and telephone number(s); UC Merced e-mail address; major field of study; dates of attendance; enrollment status (full-time, part-time); degrees and awards received; participation in officially recognized activities; and photographs. Parental/guardian information is confidential. It is used by the University only for notification of events, ceremonies, awards and development or in case of an emergency involving the student.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by UC Merced to comply with the requirements of the Federal Educational Rights and Privacy Act, addressed to the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW., Washington, D.C. 20202-4605.

Questions about these rights should be referred to the Registrar at UC Merced.

Students who desire to withhold all information (including address, phone number and UC Merced e-mail address) from the category of public information must file a form in the Office of the Registrar by the tenth day of instruction. If a student does not choose this option, this information may be released and the student's local address, phone number and UC Merced e-mail address will be included in the campus student directory.

Students availing themselves of this right should understand what the consequences of such action might be. For example, if all information is designated nonpublic information, the campus cannot make public any Honors received by the student and cannot include the student's name and degree earned in the campus commencement program without the student's written consent. Similarly, if all information is designated non-public information, the student's status as a student or any degrees earned cannot be verified for potential employers without the student's written consent.

A student's Social Security number is used to verify personal identity in the UC Merced student records system. Disclosure of Social Security number is mandatory. In compliance with state law, Social Security numbers are confidential and are not used as student identifiers.

Fees And Expenses

AVERAGE ANNUAL EXPENSES

The range of estimated nine-month expenses, including fees, for students attending UC Merced during the 2011-12 academic year is shown below. Cost-of-living expenses are adjusted annually and fees are subject to change. These figures are only a guide in computing average expenses, and your own living expenses may differ somewhat from these. If you will need funds beyond those that you and your family can provide, you should apply for financial aid well in advance of enrollment. Please see the appropriate Undergraduate or Graduate sections on Financial Aid and Scholarships for more information.

AVERAGE ANNUAL EXPENSES (ESTIMATES ONLY)

Student Status	Living Arrangement	9-Month Expenses
Undergraduate (CA resident*)	On-campus	$30,722.00
	Off-campus	$24,791.00
	At home	$22,369.00

Nonresident undergraduate students should add $22,878 and nonresident graduate students should add $15,102 for additional fees and nonresident supplemental tuition.

2011-12 FEE SCHEDULE

Note: Fees shown are per semester

Undergraduates	Residents	Nonresidents
Tuition	$5,076.00	$5,076.00
Student Services Fee	$486.00	$486.00
Health Services fee	$50.00	$50.00
Transportation fee	$87.50	$87.50
Student Life fee	$15.00	$15.00
Associated Students fee	$65.68	$65.68
Recreation fee	$146.00	$146.00
Intercollegiate Athletics Fee	$75.00	$75.00
Student Health Insurance*	*	*
Nonresident Supplemental Tuition	N/A	$11,439.00
TOTAL	**$6,001.18****	**$17,440.18****

Graduates	Residents	Nonresidents
Tuition	$5,076.00	$5,076.00
Student Services Fee	$486.00	$486.00
Health Services fee	$50.00	$50.00
Transportation fee	$87.50	$87.50
Student Life fee	$15.00	$15.00
Graduate Student Association fee	$10.00	$10.00
Recreation fee	$146.00	$146.00
Mandatory Health Insurance*	*	*
Nonresident Supplemental Tuition	N/A	$7,551.00
TOTAL	**$5,870.50****	**$13,421.50****

*As a non-academic condition of enrollment, undergraduate and graduate students must purchase the Student Health Insurance Plan (SHIP) or request a waiver of this fee. The Fall undergraduate health insurance fee provides coverage from August through December; the Spring fee provides coverage from January through August. The fall undergraduate health insurance fee is $540.86, and for graduate students the rate is $767.43. The spring undergraduate health insurance fee is $757.20, and for graduate students the rate is $1,074.40. Graduate students who wish to cover spouses, domestic partners or children should contact Health Services at health@ucmerced.edu for rates.

** Total does not include cost of health insurance, if purchased.

Fee Disclaimer

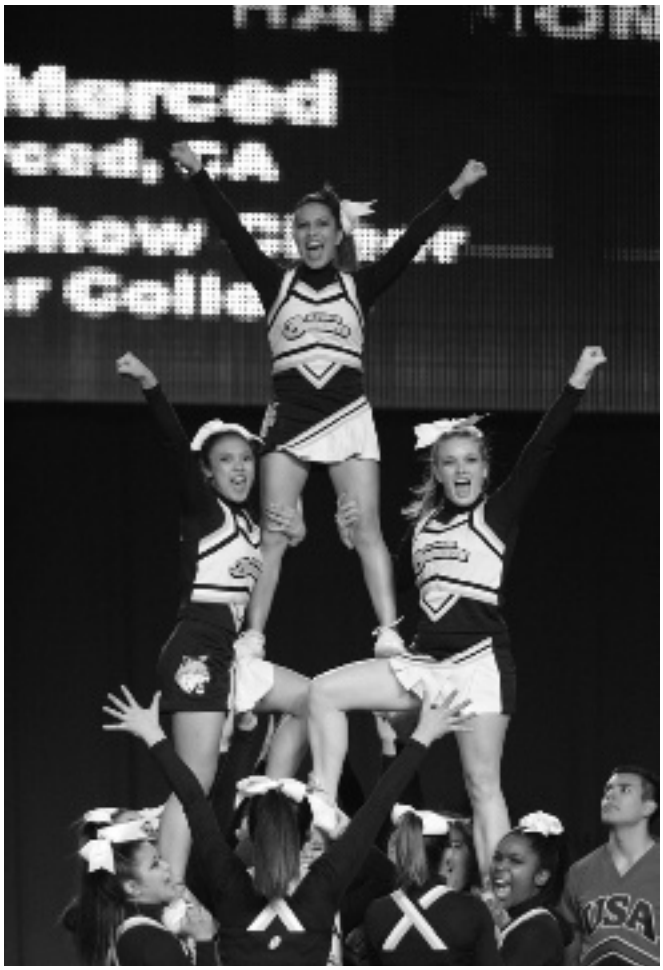
The amounts shown in this document represent fees as currently approved. However, all University fees are subject to change, and the fee amounts billed for this period may be adjusted at a future date. Detailed information regarding on campus room and board charges is available at housing.ucmerced.edu. Detailed information regarding parking fees, regulations and rules is available at taps.ucmerced.edu.

COURSE MATERIALS AND SERVICES FEES

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials and services fees may cover the cost of chemicals and glassware for a science laboratory or art supplies for a studio class. They also might cover film rentals, field trips or the purchase/rental of specific equipment.

UC EMPLOYEE-STUDENT FEES

Reduced fees are available to UC career employees who have completed their probationary period and certain UC retirees who are eligible for admission to the university. Once admitted as a regular session student, the employee-student must file a petition for the reduction in fees before each semester of enrollment. Employee students pay one-third of the full-time student services fee and one-third of the full-time tuition. Employee students may enroll for



up to nine (9) units or three (3) courses per semester, whichever is greater. Employee students may not be eligible for some services, such as those provided by the Student Health Center, Gymnasium, and Counseling Center. Contact the Office of Human Resources for further information.

PART-TIME STUDY

Students approved for enrollment on a part-time basis pay the same student services fees as full-time students, but pay only one-half of the tuition. Part-time, non-resident students pay full student services fees, one-half of the tuition and one-half of the nonresident supplemental tuition. Undergraduate students must file their petition for part-time study with the Office of the Registrar. Graduate students must file their petition with the Division of Graduate Studies. For more information on the eligibility requirements for part-time study, please see the Academic Policies section of this catalog.

PAYMENT OF FEES

Registration at UC Merced is a two-step process: (1) enrollment in classes and (2) payment of fees. You must enroll first so that your fees can be assessed. You can pay fees at any time after you enroll in classes, but a failure to pay fees in full will result in you being dropped from your courses for non-payment and officially withdrawn from the university. Your academic transcripts will not be released until satisfactory student account payment has been made that includes any Deferred Payment Plan (DPP) installment.

Note: the Student Health Insurance Plan (SHIP) fee is part of registration fees and is due and payable, unless waived, at the time registration fees are paid.

An electronic billing statement will be available to you after enrollment; however, if you wait to enroll just prior to the enrollment deadline, do not wait for a billing statement to pay your fees. Fees are due and payable by the published deadline whether or not a billing statement is available.

Your billing statement from the University will list charges and credits. Charges include registration fees, housing charges and any additional billable services. Credits include all payments, as well as financial aid disbursements. If you are a financial aid recipient, the aid will be applied to allowable charges on your account. Eligible financial aid, less allowable charges, will be refunded to you. You are responsible for the timely payment of any charges not covered by your financial aid.

METHODS OF PAYMENT

MyBill.ucmerced.edu

Monthly financial activity is displayed for the current month, as well as account activity for the prior semester(s) at MyBill.ucmerced.edu. Students may pay their account balance electronically using MasterCard, American Express, Discover or E-Check.

In-Person Payment

Students can also print a remittance document and mail in payments with a check or money order. Students may make payments in person at the Campus Cashiering Office located in Kolligian Library next to the Students First Center, 9 a.m. to 4 p.m., Monday through Thursday and Friday 9 a.m. to 2 p.m., except holidays.

Deferred Payment Plan (DPP)

The Deferred Payment Plan (DPP) offers students the option to pay their registration fees and student housing contract amount (if applicable) in three monthly installments per semester. Students receiving sufficient financial aid to cover their registration fees and room and board costs do not qualify for the plan. To qualify for the UC Merced DPP, you must have a semester account balance of $500.00 or greater, after any authorized financial aid has been posted to your student account. If eligible, your first installment payment amount will be 40% of the semester account balance. The second and third installments will be 30% each of the remainder.

There will be a non-refundable participation fee of $40.00 per semester, which will be billed to your student account upon enrollment in the DPP. If you enroll for the Fall semester, you will need to again enroll for the Spring semester.

Enrollment in the DPP is available on MyBill. To finalize enrollment in the DPP, students must make the first installment payment of 40% of the semester fees by the semester payment deadline. Students must remember to pay any previous account balance due along with the first installment payment. Eligible students who wish to enroll in the plan must do so no later than the semester payment deadline. The deadlines for DPP enrollment are:

Fall 2011:	Wednesday, August 17, 2011 by 4:00 PM
Spring 2012:	Wednesday, January 11, 2012 by 4:00 PM
Fall 2012:	Wednesday, August 15, 2012 by 4:00 PM
Spring 2013:	Wednesday, January 16, 2013 by 4:00 PM

Due dates for the installment payments are:

	Fall 2011 Semester	Spring 2012 Semester
First Installment	August 17, 2011	January 11, 2012
Second Installment	September 20, 2011	February 21, 2012
Third Installment	October 20, 2011	March 20, 2012

	Fall 2012 Semester	Spring 2013 Semester
First Installment	August 15, 2012	January 16, 2013
Second Installment	September 20, 2012	February 20, 2013
Third Installment	October 19, 2012	March 20, 2013

What if I am late with a DPP payment?
If installment payments are not credited to the account by the required due date, the following may result:

> BEING AT UC MERCED OPENED UP OPPORTUNITIES FOR ME THAT STUDENTS IN OTHER UNIVERSITIES CAN'T GET: MORE INTIMATE STUDENT-FACULTY COMMUNICATION/RELATIONSHIPS, UNDERGRADUATE RESEARCH OPPORTUNITIES, AND INITIATING AND FOUNDING CLUBS AND ORGANIZATIONS. ALSO, I HAVE THE PRIVILEGE OF BEING IN WHAT FEELS LIKE A PRIVATE UNIVERSITY, WITHOUT PAYING THE PRIVATE UNIVERSITY TUITION/COSTS!
>
> —Janice Cosio, alumnae

- A late fee of $50.00 will be charged for the late receipt of an installment payment;
- A hold may be placed on your registration for future semesters;
- You may be dropped from the rolls of the University, and your official transcript cannot be issued upon request;
- You may be ineligible for future DPP enrollment;
- Per section 15 of the Housing contract, the following administrative actions may result against the student's status in the University:
- A hold on records
- Initiation of termination of tenancy proceedings
- Eviction

For more information about the DPP, please visit the DPP page of the SBS website at sbs.ucmerced.edu.

DEADLINES AND PENALTY FINES

You must pay all prior delinquent debts prior to registering. An additional charge will be made for failure to pay required fees or deposits by the dates announced. If you enroll in courses after the enrollment deadline, you may be assessed a late enrollment fee and possibly, a late payment fee.

RETURNED CHECK POLICY

The campus cashiering services walk-up windows accept personal checks as well as cash payments, but no credit cards. There is a Returned Check Fee of $20.00. A cash-only policy is followed for Returned Check writers. Any person who has more than two unpaid checks returned to the University is placed on a cash-only basis for all future transactions (i.e. cash, cashier's check, money order, or payment via the web). A letter will be mailed to the current mailing/billing address on file, that no future personal checks will be accepted.

CANCELLATION, WITHDRAWAL AND FEE REFUNDS

To cancel registration before the first day of instruction or to withdraw from the University on or after the first day of instruction, you must complete a Cancellation/Withdrawal form and return the form to the Office of the Registrar. If you do not submit a Cancellation/Withdrawal form, you will be liable for fees according to University policy (below). It is very important that you contact the Office of the Registrar and initiate withdrawal/leave of absence procedures even if your fees are fully paid by financial aid or other programs. Failing to do so may result in you owing money to the University.

The effective date for determining a refund of fees is the date a completed Cancellation/Withdrawal form is received by the Office of the Registrar. It is presumed that no University services will be provided to the student after that date. If a student is enrolled in classes, he or she will be dropped from all courses automatically when the Cancellation/Withdrawal form is processed.

The percentage of fees that may be refunded is determined by the number of calendar days (not school days) elapsed, beginning with the first day of instruction of the semester. For students who paid fees and then canceled or withdrew by filing with the Office of the Registrar, fees may be refunded according to the Schedule of Refunds.

New undergraduate students: The $100 deposit paid with the Statement of Intent to Register (SIR) is not refundable. Because it is not refundable, it is not included in the balance when applying the Schedule of Refunds. Thus, before or on the first day of instruction, registration fees paid are refunded in full minus $100.

All continuing students, readmitted students and new graduate students: On or before the first day of instruction, registration fees are refunded in full for cancellation/withdrawal. After the first day of instruction, the Schedule of Refunds is applied to the total of fees assessed.

Failure to submit a Cancellation/Withdrawal form: If you are not a financial aid recipient and you fail to submit a Cancellation/Withdrawal form to the Office of the Registrar, you will be presumed to have left at the end of the semester and will not be eligible for a fee refund. If you are a financial aid recipient, you must contact the Office of Financial Aid and Scholarships for information on how this will affect your refund.

Schedule of Fee Refunds

The Schedule of Fee Refunds applies to all new students who do not receive federal financial aid and continuing and readmitted students. New students who receive federal financial aid and

UC Merced has been awesome for me. I could not have had these amazing experiences had I gone to another university.

—PJ Solomon, alumnae

My experience here at UC Merced has gone above and beyond all expectations. I have networked and become familiar with a variety of cultures. I have studied cutting-edge technology in state-of-the-art facilities. I have had internships and research opportunities as an undergraduate that most graduate students at other institutions have a hard time obtaining and a childhood dream of traveling the world came true this past summer when I spent five weeks in Europe studying renewable energy.

—Heather Marie Poiry, Mechanical Engineering and Applied Mechanics, graduate student

withdraw during their first academic term may be refunded fees according to the Modified Fee Refund Schedule listed below. The Schedule of Refunds refers to calendar days beginning with the first day of instruction of the semester. The number of days elapsed is determined from the date the completed Notice of Cancellation/ Withdrawal form is received in the Office of the Registrar. Percentages listed should be applied respectively to the University student services fee, tuition, nonresident supplemental tuition and other student fees.

UNIVERSITY STUDENT SERVICES FEE, TUITION, NONRESIDENT SUPPLEMENTAL TUITION, FEE FOR SELECTED PROFESSIONAL STUDENTS AND OTHER STUDENT FEES:

New Students Who Receive Title IV Federal Financial Assistance and Withdraw During their First Academic Term

CALENDAR DAYS ELAPSED	PERCENTAGE OF FEES REFUNDED
0-7 days	100% less any applicable fees
8-14 days	90%
15-28 days	80%
29-35 days	70%
36-49 days	60%
50-56 days	50%
57-63 days	40%
64 days or more	0%

All Continuing and Readmitted Students and New Students Who Do Not Receive Federal Financial Aid

CALENDAR DAYS ELAPSED	PERCENTAGE OF FEES REFUNDED
0-1 days	100% less any applicable fees
2-11 days	90%
12-27 days	50%
28-53 days	25%
54 days or more	0%

Federal regulations require UC Merced to calculate the amount of federal financial aid that has been "earned" for all students who are

receiving financial aid and withdraw from UC Merced during a semester. If the student withdraws prior to completing 60 percent of the semester, a pro rated portion of the aid must be returned to the federal government. Any portion of unearned aid that must be returned to federal aid programs by UC Merced will be deducted from the amount of the tuition and fee refund. If the amount UC Merced must return to federal aid programs exceeds the amount of the student's institutional refund, the student's account may be billed for the balance.

REFUND OF HEALTH INSURANCE FEE

Health insurance is mandatory for all students, both graduate and undergraduate, as a non-academic condition of enrollment. All students will be assessed the health insurance fee; however, students who already have adequate health insurance should request a waiver of this fee. If you have paid the health insurance fee and cancel your registration on or before the first day of instruction, you are entitled to a full refund of this fee. Insurance fees are not refundable after the first day of instruction and coverage remains in effect until the date specified by the insurance plan.

OTHER REFUNDS

Charges other than the student services fee, tuition, nonresident supplemental tuition and campus-based fees are refunded according to guidelines and schedules published by the appropriate department.

Undergraduate Admissions

UNDERGRADUATE ADMISSION

Prospective students interested in attending the University of California, Merced are encouraged to contact the Office of Admissions well in advance of their intended entrance. The office provides information and advice for prospective students as they prepare for university work. Future UC Merced students planning to enroll as freshmen or transfer students can get assistance in planning their pre-university coursework and with the application process. If you are interested in enrolling at UC Merced, Admissions staff members are available to assist you via e-mail, telephone or in person.

OFFICE OF ADMISSIONS

5200 N. Lake Road
Merced, CA 95343-5603
(209) 228-4682
Website: admissions.ucmerced.edu
E-mail: admissions@ucmerced.edu
E-mail: transfer@ucmerced.edu

- Admissions presentations
- Pre-application advising
- Transfer advising
- Transfer Admission Guarantees (TAG)

FINANCIAL AID AND SCHOLARSHIPS

See the Financial Aid section of this catalog.

Financial Aid code for UC Merced: 041271

UNIVERSITY OF CALIFORNIA ONLINE RESOURCES

Admissions information:
www.universityofcalifornia.edu/admissions/

Examination and Subject requirements:
www.universityofcalifornia.edu/admissions/freshman/requirements/examination-requirement/

Online application:
www.universityofcalifornia.edu/apply

Approved high school courses:
doorways.ucop.edu/list

Transferable California Community College courses:
www.assist.org

Financial Aid information:
www.universityofcalifornia.edu/admissions/paying.html

REGISTRATION INFORMATION FOR REQUIRED EXAMINATIONS:

www.act.org
ACT code for UC Merced: 0450

www.collegeboard.com
College Board code for UC Merced: 4129

I think the key to making the most of one's time at UC Merced is to acknowledge all of the available resources such as all the clubs and societies that are established on campus, and the tutoring and career services.

— Albert Shih, Bioengineering

UC Merced's student tour guides share their knowledge of academic and student life with thousands of visitors each year.

Application Process

HOW TO APPLY

The University of California Undergraduate Application for Admission & Scholarships is available online at www.universityofcalifornia.edu/apply. Students may apply to UC Merced and any number of the additional eight general campuses of the University of California with one application. The San Francisco campus, which is devoted to the health sciences, has its own application and filing procedures. Students who cannot apply online at their home, school or local library may contact the Office of Admissions for assistance.

When To Apply

To ensure that applicants are considered for admission, the completed application and the application fee should be electronically filed or postmarked during the priority filing period shown below.

Semester of Attendance	Priority Filing Period
Fall	November 1 – 30
Spring	July 1 – 31

The online application center opens for fall applications prior to November 1, usually during early October, and in July for spring applications. Students can begin the application, save their information on the secure site and continue filling out the application at their convenience up to the filing deadline. Applicants must meet the deadline (last day of the application filing month). Students who miss the November 30 deadline for fall or the July 31 deadline for spring should contact the Office of Admissions for assistance. Applications for spring terms are subject to enrollment space availability.

University of California Entry-level Writing Requirement/Analytical Writing Placement Exam:

Every undergraduate is required to demonstrate an acceptable level of ability in English composition. For further details on the UC Entry-Level Writing Requirement (ELWR) and Analytical Writing Placement Exam, see the General Education section of this catalog.

NOTIFICATION AND ENROLLMENT

On-time applicants for admission to a fall semester will be notified of their admission decision between March 1 and 31 (freshman applicants) and March 15 through April 30 (transfer applicants). To reserve your space after being admitted to the entering class, you must submit the Statement of Intent to Register (SIR) along with a non-refundable $100 deposit by May 1 for freshmen and June 1 for transfer students. If you cannot afford the $100 deposit, contact the Office of Admissions immediately. When the campus is open for spring term applications, they will be notified of their admission decision between September 1 and October 15. The SIR deadline for spring semester is typically November 1.

Admission is specific to a particular semester. If you have questions about deferring your admission to a future term, contact us for assistance at (209) 228-6994 or e-mail admissions@ucmerced.edu. If you plan to attend another college or university before enrolling at UC Merced, you must apply again for admission to the term in which you will enroll.

APPLICATION ADVICE: PROVISIONAL ADMISSION

All applicants are asked to provide self-reported academic records on the application. Obtain copies of your grades and test scores prior to completing the application. Do not rely on memory. Your admission to UC Merced is provisional, based on verification of the information you provide. If admitted, you will be asked to submit final, official transcripts from all schools and colleges attended and official test score reports for the purpose of verifying the information you provided on your application.

APPLICATION ACKNOWLEDGMENT

After you submit your application for admission, you should make note of your UC application ID number, e-mail address submitted and password. You should be notified that your application was sent to UC Merced within six weeks of submitting it. The Office of Admissions will communicate with you approximately 45 days after the open filing period ends, notifying you that we received your application. If you have not heard from UC Merced within eight weeks of receiving the confirmation it was sent to our campus, contact the Office of Admissions immediately by calling (209) 228-4682 or send an e-mail message to admissions@ucmerced.edu.

APPLICATION FEES / FEE WAIVER

Students applying to UC Merced must submit the application fee following the submission of the online application or along with the paper application. If you apply to more than one campus, a per-campus fee must be submitted. Application fees are not refundable.

If you cannot afford the application fee and you are a U.S. citizen or permanent resident, you may request a fee waiver in advance or at the time of submitting the online application. If your family income and the number of dependents in your household meet specifications of the University of California fee waiver guidelines, the fee will be waived for a limited number of campus choices. Students who qualify for fee waivers and who wish to apply to additional campuses must pay a fee for each additional campus choice.

How to Obtain a Fee Waiver

UC Merced's newest housing complex, The Summits, has become a "home away from home" for our new students.

High school students may use the College Board fee waiver, available from your school counselor, or may obtain a fee waiver authorization from any UC campus Admissions and Relations with Schools or Educational Opportunity Program office. California community college students enrolled in Extended Opportunity Programs and Service (EOPS) can obtain a fee waiver authorization from the EOPS office. All students: If you cannot afford the application fee, simply request a fee waiver when you submit the online application. Be prepared to answer questions about your gross family income and family size.

CATEGORIES OF APPLICANTS

Undergraduate or regular status applicants are students who wish to enroll in an established curriculum at UC Merced for the purpose of completing the Bachelor of Arts or Bachelor of Science degree.

Freshman applicants are students who are currently enrolled in high school at the time of application, or students who have graduated from high school but have not enrolled in a college or university since the summer after leaving high school. Students who have completed a California Certificate of Proficiency or an equivalent proficiency examination from another state or the General Education Development (GED) certificate also may be freshman applicants if they have not enrolled in a college or university since completion of their high-school equivalency. All college or university work must be reported.

Transfer applicants are students who have enrolled in a regular term at a college or university after leaving high school. Students who meet this definition cannot disregard their college record and apply as freshmen. All college or university work must be reported.

Nonresident applicants are students whose legal permanent residence (as determined by the University) is outside the State of California. Nonresident applicants are generally required to pay nonresident fees and must also present a higher grade point average than is required of California residents.

International applicants are students who hold or expect to hold student, exchange, visitor or diplomatic visas. International applicants are required to pay nonresident supplemental tuition and must also present a higher grade point average than is required of California residents. Prospective international students are encouraged to review requirements for admission of nonresident applicants prior to filing an application.

International students are expected to complete the examination requirement. International students whose native language is not English must demonstrate language proficiency by one of the following methods:

- Take the Test of English as a Foreign Language (TOEFL) and earn a minimum score of 220 (computer-based TOEFL), 83 (internet-based TOEFL) or 550 (paper-based TOEFL). Information about the TOEFL is available at www.toefl.org.
- Take the International English Language Testing System exam (IELTS) and earn a minimum score of 7. Information about IELTS is available at www.ielts.org.

Second baccalaureate applicants are college or university graduates whose educational objective has changed substantially after receiving the bachelor's degree. Applicants for the second bachelor's degree must be fully eligible for admission to UC Merced and have strong promise of academic success in the new major. All such admissions are subject to the approval of the dean of the UC Merced School in which the second degree will be earned. Candidates for a second bachelor's degree are subject to the general requirements for the bachelor's degree and to the particular requirements of the School in which they are enrolled.

Limited status applicants are students whose special attainments qualify them to take certain courses in the university toward a definite and limited objective. To apply for limited status admission, students must either have a bachelor's degree but not be a candidate for an advanced degree, or have completed a substantial amount of college work with a satisfactory grade point average. Prospective students must submit an undergraduate application with fees, as well as a limited status petition and official transcripts from all schools attended. Limited status students are expected to maintain a certain scholarship average during a predetermined time of enrollment. Admission requires the approval of the dean of the School in which the student intends to study.

NOTE: Students returning to UC Merced after a voluntary absence or academic disqualification are required to apply for readmission through the Office of the Registrar. See below.

Readmission To UC Merced

Students who were formally admitted, registered and enrolled at UC Merced, then interrupted their studies for any length of time other than summer, must apply for readmission to the campus. The Readmission Policy and Process can be found on the Office of the Registrar's website (registrar.ucmerced.edu).

IMPORTANT DEADLINES RELATED TO ADMISSION

November 30	Application priority filing deadline for admission to fall semester.
March 2	Financial aid priority deadline: FAFSA and CAL Grant GPA verification. Check the Financial Aid section of the UC Merced catalog for more information and deadlines.
May 1	Statement of Intent to Register (SIR) fall semester priority filing deadline: freshmen.
June 1	Statement of Intent to Register (SIR) fall semester priority filing deadline: transfer students.
July 15	Final, official transcripts/documents and test scores are due in the Office of Admissions (fall semester applicants).
July 31	Application priority filing deadline for admission to spring semester.
November 1	Statement of Intent to Register (SIR) spring semester priority filing deadline.
January 6	Final, official transcripts/documents and test scores are due in the Office of Admissions (spring semester applicants).

PREPARING FOR UNIVERSITY WORK

As a prospective UC Merced undergraduate, you are encouraged to give careful thought to preparing yourself adequately in reading, writing, mathematics and other subject areas relevant to your intended major. Many undergraduate majors require preparation in mathematics beyond the three years required for admission to the University. The more comprehensive and challenging your high school or college program is, the better prepared you will be for your course work at UC Merced. Honors-level, Advanced Placement and college courses are good preparation for UC Merced. These challenging courses will help you develop the good study habits and skills you will need at UC Merced. Give priority to completing the high school or college course patterns required for admission and for your interest area. Check the UC Merced Admissions website at admissions.ucmerced.edu for the most current information.

Freshman Admission

I LOVE SEEING HOW THE DIFFERENT CLUBS AND ORGANIZATIONS STARTED AND CONTINUE TO CONTRIBUTE TO THE VITALITY OF THE CAMPUS.

—Samuel Kim, student

Students interested in entering UC Merced as freshmen must demonstrate their readiness to be successful in the University by completing a prescribed set of college preparatory courses during their four years of high school, achieving at least a 3.00 average in those courses taken during tenth and eleventh grades. All applicants will be reviewed for admission consideration on the basis of their academic achievement within the context of their school and social environment.

California Residents

California residents are assured a place at UC Merced if they achieve Eligibility in the Local Context by being ranked in the top 9% of their graduating class at a participating California high school, assuming they complete subject and examination requirements. California residents who meet subject requirements and demonstrate their ranking in the top 9% of California graduating seniors by meeting the admissions index are also assured a place at UC Merced. Eligibility begins with the subject requirements, known as the "a-g" subject requirements.

A-G SUBJECT REQUIREMENT

You must complete, with grades of C or better, the 15 units of high school course work listed in the following subject pattern, known as the "a-g" subjects or requirements. A one-year course is equivalent to one unit and a one semester course is equal to one-half unit. Courses certified to meet the "a-g"subject requirements are identified for each California high school on the UC-certified course list available online at doorways.ucop.edu/list. Courses from schools and colleges outside California must provide the same rigor and level of instruction to meet the "a-g" subject requirements.

A-G Subject Requirements

a. History/Social Science: 2 years required. Two years of history/social science, including one year of world history, cultures and geography; and one year of U.S. history or one-half year of U.S. history and one half year of civics or American government.

b. English: 4 years required. Four years of college-preparatory English that include frequent and regular writing, and reading of classic and modern literature. No more than one year of approved ESL-type courses can be used to meet the requirement.

c. Mathematics: 3 years required; 4 years recommended. Three years of college preparatory mathematics which include the topics covered in elementary and advanced algebra and two- and three-dimensional geometry. Approved integrated math courses may be used to fulfill part or all of the requirement, as may other Mathematics courses taken in the seventh and eighth grades that your high school accepts as equivalent to its own math courses.

d. Laboratory Science: 2 years required; 3 years recommended. Two years of laboratory science providing fundamental knowledge in at least two of these three disciplines: biology, chemistry and physics. Advanced laboratory science courses that have biology, chemistry or physics as prerequisites and offer substantial additional material may be used to fulfill this requirement. The final two years of an approved, three-year integrated science program may be used to fulfill this requirement.

e. Language other than English: 2 years required; 3 years recommended. Two years of the same language other than English. Courses should emphasize speaking and understanding, and include instruction in grammar, vocabulary, reading and composition. Courses in a language other than English taken in the seventh and eighth grades may be used to fulfill part of this requirement if your high school accepts them as equivalent to its own courses.

f. Visual and Performing Arts (VPA): 1 year required. One year-long, approved arts course from a single VPA discipline: dance, drama/ theater, music or visual art.

g. College-Preparatory Electives: 1 year required. One year (two semesters), in addition to those required in "a-f" above, chosen from the following areas: visual and performing arts (non-introductory level courses), history, social science, English, advanced mathematics, laboratory science and language other than English (a third year in the language used for the "e" requirement or two years of another language).

HOW TO CALCULATE YOUR GRADE POINT AVERAGE

The grade point average (GPA) used in the University's admissions process is calculated by using grades earned in all college preparatory courses ("a-g"subjects), taken between the summer after ninth grade through the summer before twelfth grade.

To calculate your admissions GPA, first convert the grades you earned in your courses to a four point scale as follows: A=4 points, B=3 points, C=2 points, D=1 point and F=0 points. Only the

UC Merced's soccer teams (mens and womens) compete with college and universities throughout the region.

grades you earn in "a-g"subjects taken after ninth grade and before twelfth grade will be used to calculate your preliminary GPA for admissions. Courses you take in ninth grade can be used to meet the subject requirements if you earned grades of C or better, but they will be excluded from the calculation of your admissions GPA. Add all your grade points and divide by the number of "a-g" courses. The result is your preliminary admissions GPA. It is important for you to earn good grades in the "a-g" courses you list on the application for your senior year. The admissions offer may be withdrawn if you drop courses or earn grades of D or F during your twelfth grade.

Honors courses: The University assigns extra points for up to 4 units of certified honors-level and Advanced Placement courses

taken in grades 10 – 12 and passed with grades of C or above: A=5 points, B=4 points and C=3 points. No more than 2 units of certified honors-level courses taken in grade 10 may be assigned extra points. Grades of D are not assigned extra points. The courses must be in the following "a-g" subjects: history, English, advanced mathematics, laboratory science and visual and performing arts. In these fields, as well as in the fields of computer science and social science, courses that are designed to prepare students for Advanced Placement Examinations, the International Baccalaureate Higher Level Examination and college courses that are transferable to the University are acceptable honors-level courses.

D or F and Repeated Grades: Students who receive D and F grades in "a-g" courses must repeat those courses with grades of C or better. In the subject areas of mathematics and foreign language, however, a D or F grade can be "validated" by earning a C grade or better in the second semester or more advanced level in the same subject. Consult the Office of Admissions or your counselor to determine how D or F grades can be improved and how the University will use them in evaluating your scholarship record. Grades will not be used for repeated courses in which you initially received a C or better.

Examination Requirement

Students applying for admission must meet the examination requirement by taking one of the following examinations by December of the twelfth grade:

- ACT Assessment Plus Writing test or
- SAT Reasoning Test

SAT Subject Tests are optional. Students can demonstrate their knowledge and mastery of specific subjects by taking the tests, by December of the twelfth grade. The University will use the highest test scores you earn in computing your eligibility for admission, and there is no penalty for taking the examinations more than once. The UC strongly recommends that you submit scores from all tests taken. For more information about taking the tests to fulfill the examination requirement, visit the website: www.universityofcalifornia.edu/admissions, talk to your school counselor or contact the appropriate testing organization.

Information for the ACT is available at www.actstudent.org and for the SAT at www.collegeboard.com.

Statewide Path: The Admissions Index

California residents can demonstrate their ranking in the top 9% of statewide high school graduates by earning test scores that match or exceed the UC Scores indicated for their "a-g" admissions GPA. You can see how to calculate your UC Score and determine your status on the admissions index at www.universityofcalifornia.edu/admissions/freshman/california-residents/admissions-index/.

Local Path:

The Eligibility in the Local Context (ELC) program determines the ranking of students at each participating California high school. To be considered for ELC, a student must complete 11 specific units of the "a-g" subject requirements by the summer at the end of their junior year. With the assistance of each participating high school, the University will identify the top 9 percent of students on the basis of GPA in the required course work. The 11 units include: 1 unit of history/social science, 2 units of English, 2 units of mathematics, 1 unit of laboratory science, 1 unit of language other than English and 4 yearlong courses chosen from among the other subject requirements listed above or from the college preparatory electives approved by the University. The University will

notify ELC students of their status at the beginning of their senior year. If you are designated UC-eligible through ELC, you must submit the University's undergraduate application for admission during the November filing period and complete remaining eligibility requirements—including the subject and examination requirements—to be eligible to enroll.

Eligibility by Examination Alone

You may be able to qualify for admission to the University by examination alone through achieving high scores on the ACT Assessment plus Writing or SAT Reasoning Test and two SAT Subject Tests (excluding Mathematics Level 1).

To be considered for admission to the University by examination alone, you must achieve a minimum UC Score Total of 410 (425 for nonresidents). In addition, you must earn a minimum UC Score of 63 on each component of the ACT or SAT Reasoning Test and on each SAT Subject Test. You may not use a SAT Subject Test to meet these requirements if you have completed a transferable college course in that subject with a grade of C or better. See www.universityofcalifornia.edu/admissions/freshman/requirements/examination/ for more information about this path to admission.

Nonresident and International Freshman Applicants

Nonresidents and international freshman applicants must meet subject and examination requirements as described above; however, your grade point average in the "a-g" subjects must be 3.4 or higher.

Selection of Freshman Applicants

All applicants will be considered for admission on the basis of their academic achievements within the context of their school and home or social environments. The following factors may be considered in a comprehensive review of applicants for admission to UC Merced as freshmen:

- Academic grade point average in all required "a-g" courses, including additional points for completion of University-certified honors courses.
- Scores on the ACT plus Writing or SAT Reasoning Test, and any scores earned in SAT Subject Tests. SAT Subject Tests are not required but can be considered if submitted.

- Number, content of and performance in academic courses beyond the minimum "a-g" requirements.
- Number of and performance in University-approved honors courses and Advanced Placement, International Baccalaureate and transferable college courses.
- Identification as being ranked in the top nine percent of your high school class at the end of your junior year ("eligible in the local context").
- Quality of your senior-year program, as measured by the type and number of academic courses in progress or planned.
- Quality of your academic performance relative to the educational opportunities available in your secondary school.
- Outstanding performance in one or more academic subject areas.
- Outstanding work in one or more special projects in any academic field of study.
- Recent, marked improvement in academic performance, as demonstrated by your academic GPA and the quality of course work completed or in progress.
- Special talents, achievements and awards in a particular field, such as visual and performing arts, communication or athletic endeavors; special skills, such as demonstrated written and oral proficiency in other languages; special interests, such as intensive study and exploration of other cultures; experiences that demonstrate unusual promise for leadership, such as significant community service or significant participation in student government; or other significant experiences or achievements that demonstrate your promise for contributing to the intellectual vitality of the campus.
- Completion of special projects undertaken either in the context of your high school curriculum or in conjunction with special school events, projects or programs.
- Academic accomplishments in light of your life experiences and special circumstances.

Transfer Admission

If you enrolled in a regular session of college or university-level course work after leaving high school, you are considered to be a transfer student and cannot ignore your college records to apply as a freshman. UC Merced is firmly committed to enrolling well-prepared transfer students. Following California's Master Plan for Higher Education, UC Merced gives highest priority to students transferring from California's community colleges, who have completed at least 60 UC- transferable semester units (90 quarter units). While preparing to transfer at the junior level, you must complete a pattern of courses that will prepare you for upper division work in your chosen field of study. It is helpful if you identify an intended major early in your college course work and take courses for that major. Students planning to major in engineering or the sciences must complete the minimum course sequences identified below for majors in those fields. Information about UC Merced majors and transfer preparation is available at transfers.ucmerced.edu.

> I came to UC Merced from Boston University and Santa Monica College because of the opportunity to stand out and be known. Then I met the faculty and I found out that the smaller student population really allows them to be accessible. Even at the larger universities with small faculty to student ratios you can't get the same attention. Trust me, I've experienced it.
>
> —Drew E. Glaser, graduate student

The Importance of Preparing for Your Major

Transfer students who complete sophomore level courses for their intended majors before they transfer enjoy a smooth transition to UC Merced and complete their degrees in a timely manner. UC Merced encourages you to determine what major you will pursue as early as possible and then complete all or most of the lower division course work in your major. See the academic school sections of this catalog for information about degree requirements.

Completion of science and mathematics course sequences listed as lower division requirements for majors in those fields is critically important for admission. Students applying for majors in the Schools of Engineering and Natural Sciences at UC Merced are, in particular, strongly advised to complete the majority of required course sequences prior to transfer.

Transferable College Units and Grade Point Average (GPA)

The University awards transfer credit for courses that are determined by the Office of Admissions to be essentially the same as those offered for the undergraduate degree at any UC campus, and taken at a regionally accredited institution of higher education. Transferable courses offered by California Community Colleges are listed on the UC Transferable Courses section of the California public institution articulation database, found on the website: www.assist.org.

Grade points for all UC-transferable courses attempted on a letter grade basis will be computed into the grade point average (GPA) used to determine admission. Units for courses in which you earned grades of W, Pass or Credit, and No Pass or No Credit, are excluded from the computation of your grade point average. Honors courses taken in college are not weighted when computing the transferable GPA for admission.

If you have attended only community colleges or two-year postsecondary institutions, all of your UC-transferable college courses will be accepted in transfer for subject credit and your GPA for admission is computed using all UC-transferable college courses attempted. When you transfer, however, the total number of units is limited to a maximum total of 70 semester units (105 quarter units).

A member of the Bobcat Band plays during a campus event.

Excess Units

Students transferring to UC Merced from a regionally accredited four-year college or university may have up to 80 transferable semester (120 quarter) units and still be eligible to transfer. It is important to note, however, that UC Merced considers students who have completed more than 80 semester units to have excess units and will not admit those students without special approval. A student who completes 80 or fewer units at a four-year institution, then transfers to a community college to complete course work that is necessary for admission, will not have excess units and can be considered for admission to UC Merced.

ADMISSION ELIGIBILITY FOR TRANSFER STUDENTS

California Residents

There are three ways for you to meet the University of California's minimum eligibility requirements for transfer admission. Meeting the eligibility requirements does not guarantee admission.

1. Eligible for admission upon high school graduation: High school graduates who enrolled in college course work can be admitted as lower division transfers if the high school record shows that you meet all requirements for admission as a freshman. Lower division transfers must have, at minimum, C grades or better in all college level courses attempted.

2. Lacking only subject requirements upon high school graduation: If you satisfied the admission requirements for freshman admission, except you did not satisfy all of the "a-g: subject requirements, you can take transferable college courses in the subjects you are missing, earn a grade of C or better in each of these required courses and be considered for admission if you earned, at minimum, C grades or better in all college level courses attempted.

3. If you are not eligible for admission to the University based on your high school records, you must complete all of the following in (a) and (b) below.

Any student planning to enter UC Merced as a junior-level transfer student may complete the following requirements in place of (1) or (2) above.

(a) 60 semester units (90 quarter units) of UC-transferable college course work with a grade point average of at least 2.4. No more than 14 semester units (21 quarter units) may be taken Pass/Not Pass; and

(b) The transfer course pattern requirement to include:

- Two transferable college courses (3 semester or 4-5 quarter units each) in English composition, and
- One transferable college course (3 semester or 4-5 quarter units) in mathematical concepts and quantitative reasoning, and
- Four transferable college courses (3 semester or 4-5 quarter units each) chosen from at least two of the following subject areas:
    - Arts and humanities
    - Behavioral and social sciences
    - Physical and biological sciences

Students who have completed courses listed on the Intersegmental General Education Transfer Curriculum (IGETC) at www.assist.org before they transfer to the University will have satisfied the transfer course pattern requirement.

Transfer Requirements for International and Nonresident Students

Transfer students who are not residents of California must meet the same requirements as California residents and have a grade point average (GPA) of 2.8 or better in all transferable college work. Please note: Students with a GPA of 2.4 or better who are enrolled in at least 12 units at a California Community College prior to transfer may be eligible to be considered as a California resident for admissions purposes.

Eligibility vs. Selection: Transfer Applicants

If the number of transfer applicants exceeds the number of transfer enrollment spaces available, UC Merced may use supplemental criteria to select from among the qualified transfer applicants. Highest-priority consideration at the transfer level is given to students transferring from a California Community College who meet the University's definition of a California Community College student.

Definition of a California Community College student: A California Community College student applying for admission to the University of California in advanced standing will be given priority admission over all other applicants if: 1) he/she was enrolled at one or more California Community College(s) for at least two terms (excluding summer sessions); 2) the last college he/she attended before admission to a UC campus was a California Community College (excluding summer sessions); and 3) he/she has completed at least 30 semester (45 quarter) UC transferable units at one or more California Community Colleges.

Selection Criteria for Transfer Applicants:

- Completion of a specified pattern or number of courses that meet breadth or general education requirements.

- Completion of a specified pattern or number of courses that provide continuity with upper division courses in your major.
- Your grade point average in all transferable courses.
- Participation in academically selective honors courses or programs.
- Special talents, achievements and awards in a particular field, such as visual and performing arts, communication or athletic endeavors; special skills, such as demonstrated written and oral proficiency in other languages; special interests, such as intensive study and exploration of other cultures; experiences that demonstrate unusual promise for leadership, such as significant community service or significant participation in student government; or other significant experiences or achievements that demonstrate your promise for contributing to the intellectual vitality of the campus.
- Completion of special projects undertaken in the context of your college curriculum or in conjunction with special school events, projects or programs.
- Academic accomplishments in light of your life experiences and special circumstances.

Notes for California Community College Transfers

If you plan to transfer from a California Community College, you can know the required and recommended courses for your intended major by viewing articulation agreements in ASSIST.org. Transfer Admission Guarantee agreements assure high achieving students of admission to a specific major and term. Information about TAGs is available at transfers.ucmerced.edu/tag.

Students planning to major in social sciences or humanities are strongly encouraged to complete the Intersegmental General Education Transfer Curriculum (IGETC) prior to transfer. Lower division general education requirements for graduation at UC Merced will be waived. Official certification of your completed IGETC must be sent to the Office of Admissions at UC Merced, along with your final, official transcript from the last community college you attended.

Transfer Admission Guarantee (TAG)

UC Merced offers Transfer Admission Guarantee (TAG) contracts for California Community College students throughout California. TAG contracts specify the courses to be completed and grade point averages students must earn at the community college to be guaranteed admission to their major. If you are interested in receiving a TAG contract, call the Office of Admissions at (209) 228-4682 or (866) 270-7301 (toll-free in California).

Don't be afraid of becoming a part of campus life. If you're having trouble at first, there are people here to help you pave the way to your success.

—Daniel Titcher, Psychology

International Students

Courses comparable to those offered for undergraduate degree credit in the University of California and completed in post-secondary institutions outside the United States will transfer to UC Merced if taken at institutions recognized by the Ministry of Education in the institution's home country. International students with previous college attendance cannot disregard their academic records and apply as freshmen.

International students whose native language is not English must demonstrate language proficiency by one of the following methods:

- Take the Test of English as a Foreign Language (TOEFL) and earn a minimum score of 220 (computer-based TOEFL), 83 (internet-based TOEFL) or 550 (paper-based TOEFL). Information about the TOEFL is available at www.toefl.org.
- Take the International English Language Testing System exam (IELTS) and earn a minimum score of 7. Information about IELTS is available at www.ielts.org.
- Earn grades of B or better in two UC-transferable English composition courses taken at any regionally accredited post-secondary institution in the United States. Prospective international students are strongly encouraged to contact the Admissions office to discuss their academic background, English proficiency and visa status prior to application.

COST OF ATTENDANCE AND FINANCIAL AID

See the Financial Aid section of this catalog for detailed information about the estimated cost of attendance and information regarding financing your education.

VERIFICATION OF SELF-REPORTED ACADEMIC RECORDS

All admission offers are provisional and subject to cancellation if official documents to verify self-reported academic information are not received in the Office of Admissions by the deadline pertaining to the term of entrance. Required documents include official test scores and final, official transcripts from high schools and colleges attended. Students admitted to fall semesters must be sure their official documents arrive five business days prior to their scheduled New Student Orientation session or by July 15, whichever date comes first. Students admitted to spring semesters must be sure their official documents are received by January 6.

ORIENTATION FOR ADMITTED STUDENTS

All admitted students are required to attend New Student Orientation during summer for fall semester and during January for spring semester. At Orientation, students meet with an academic advisor, plan their program of study and enroll in classes. Final, official transcripts and official test scores must arrive in the Office of Admissions by July 15 or at least five business days prior to their scheduled New Student Orientation session (whichever is earlier) or registration for courses will be delayed.

CALIFORNIA RESIDENCY STATUS

The manner in which legal residence is defined for tuition purposes is different from that for admission purposes. If you have questions about your residency status for tuition purposes, contact the Office of the University Registrar (see the Registrar section of this catalog).

ADVANCED PLACEMENT (AP) AND INTERNATIONAL BACCALAUREATE (IB) EXAMINATIONS

The University awards credit for successful completion of the College Board Advanced Placement (AP) and the International Baccalaureate Higher Level Examinations (IB). Students must have official test score reports sent directly from the testing service to UC Merced to receive credit. Students will meet with advising staff during New Student Orientation to discuss which courses or requirements they may have satisfied based on transfer credit for scores in these examinations.

CREDIT FOR AP EXAMS

UC Merced grants elective credit for all College Board AP examinations on which a student scores 3 or higher. Some examinations passed with scores of 3 or higher may award exemptions for degree requirements. The number of elective units awarded for each examination can be viewed on the chart in this section.

CREDIT FOR IB EXAMS

The International Baccalaureate Organization (IBO) awards either a diploma or awards a certificate for individual IB exams. Students completing the IB diploma with a score of 30 or above will receive a total of 20 semester units of elective credit toward their UC Merced undergraduate degree. To complete the IB diploma, students are required to take one subject from each of the six subject groups and complete an extended essay. At least three of the six subjects must be taken at the Higher Level. The University grants 5.3 semester units to students who receive IB certificates for each individual Higher Level Exam on which the student scores 5, 6, or 7. The University does not grant credit for Subsidiary level examinations. The number of units awarded for each examination can be viewed on the chart in this section.

POTENTIAL DUPLICATION OF CREDIT FOR AP AND IB EXAMS

Credit will be granted for either the AP or IB examinations in any one subject area. College courses taken prior to or after enrolling at the university may duplicate the content of AP or IB examinations. In these cases, the university may not award credit for both the course and the AP or IB examination credit.

The following chart provides guidelines used for awarding units (elective credit) and exemptions for degree requirements. Credit will be granted for either the IB or AP Exams in any one subject area. Students who choose to take a course at UC Merced from which they are otherwise exempt will receive credit for the UCM course but not the units for the exam.

SUBJECT EXAM	UNITS	COURSE EXEMPTIONS AND GENERAL EDUCATION
IBH Visual Arts:	5.3	One (1) course in ARTS.
AP Art (Studio)		
Drawing	5.3	Score 4 or 5 on Drawing exempts one (1) course in ARTS.
2-D Design	5.3	Score 4 or 5 on 2-D Design exempts one (1) course in ARTS.
3-D Design	5.3	Score 4 or 5 on 3-D Design exempts one (1) course in ARTS.
		Unit credit limit for all three AP exams: 5.3.
AP Art History	5.3	Score 4 or 5 exempts one (1) course in Arts.
IBH Biology	5.3	No course exemption.
AP Biology	5.3	Score 4 or 5 exempts BIO 001 and BIO 001L.
IBH Chemistry	5.3	Course exemption to be determined.
AP Chemistry	5.3	Score 3 or above exempts Chemistry Placement Exam.
		Score 4 or 5 exempts CHEM 002.
IBH Computer Science	5.3	No course exemption.
AP Computer Science		
Comp Science A	1.3	No course exemptions.
Comp Science AB	2.7	Unit credit limit for both AP exams: 2.7
IBH Economics	5.3	Score 6 or 7 exempts ECON 001.
AP Economics:		
Macroeconomics	2.7	Score 4 or 5 on both Microeconomics AND Macroeconomics exempts ECON 001.
Microeconomics	2.7	
IBH English Language AI	5.3	Score 5 or above satisfies WRI 001 and Entry Level Writing Requirement, Score 6 or 7 exempts WRI 010.
AP English:		
Language/Composition	5.3	Score 3 or above on either AP exam satisfies WRI 001 and Entry Level Writing Requirement.
Literature/Composition	5.3	Score 4 or 5 Lang/Comp exempts WRI 010.
		Score 4 or 5 Lit/Comp exempts one sequence from: LIT 020-021, 030-031, 040-041
		Unit credit limit for both AP exams: 5.3.
AP Environmental Science	2.7	Score 4 or 5 exempts ESS 001.
AP Government and Politics:		
United States	2.7	Score 4 or 5 exempts POLI 001.
Comparative	2.7	Score 4 or 5 exempts POLI 003.
IBH History	5.3	Score 6 or 7 exempts one (1) lower division history sequence.
AP History:		
US History	5.3	Score 4 or 5 exempts HIST 016-017.
European History	5.3	Score 4 or 5 exempts HIST 030-031.
World History	5.3	Score 4 or 5 exempts HIST 010-011.
IBH Geography	5.3	No course exemptions.
AP Human Geography:	2.7	

SUBJECT EXAM	UNITS	COURSE EXEMPTIONS AND GENERAL EDUCATION
IBH Language A2 or B		
Chinese	5.3	Score 6 or 7 on Chinese exempts CHN 004. Score 5 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
French	5.3	Score 6 or 7 on French exempts FREN 004. Score 5 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
German	5.3	Score 5 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
Italian	5.3	Course exemptions to be determined.
Japanese	5.3	Score 6 or 7 on JPN 004. Score 5 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
Portuguese	5.3	Course exemptions to be determined.
Spanish	5.3	Score 6 or 7 exempts SPAN 004 and fulfills Spanish language requirement for those majoring in Literatures and Cultures with the concentration "Literatures of the Spanish Speaking World". Score 5 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
AP Language Other Than English:		
Chinese	5.3	Score 5 on Chinese language exam exempts CHN 004. Score 3 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
French Language	5.3	Score 5 on French language exempts FREN 004. Score 3 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
French Literature	5.3	Score 3 or higher on French literature fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
German Language	5.3	Score 3 or higher on German language fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
German Literature	5.3	Score 3 or higher on German literature fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with the concentration "Literatures of the English Speaking World."
Italian Language and Culture	5.3	Score 3 or higher on Italian language and culture fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
Japanese Language and Culture	5.3	Score 5 on Japanese language and culture exempts JPN 004. Score 3 or higher fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
Spanish Language	5.3	Score 5 on Spanish language exempts SPAN 004/011. Score 5 fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World."
Spanish Literature	5.3	Score 4 or 5 on Spanish literature exempts LIT 050-051. Score 5 fulfills the foreign language requirement for those majoring in History or Literatures and Cultures with a concentration in "Literatures of the English Speaking World." Score 4 or 5 fulfills Spanish language requirement for those majoring in Literatures and Cultures with the concentration "Literatures of the Spanish Speaking World."
IBH Classical Languages:		
Latin	5.3	No course exemptions.
Classical Greek	5.3	
AP Latin:		
Latin Literature	2.7	No course exemptions.
Latin Vergil	2.7	
IBH Mathematics	5.3	Course exemption to be determined.
AP Mathematics		Score 3 or higher exempts Math Placement Exam and SSHA's Quantitative Reasoning Requirement.
Calculus AB	2.7	Score 4 or 5 exempts MATH 011/021
Calculus BC	5.3	Score of 3 or higher exempts Math Placement Exam and SSHA's Quantitative Reasoning Requirement Score 4 or 5 exempts MATH 011/021 and MATH 012/022
Calculus BC Subscore AB	2.7	Score 3 exempts Math Readiness Exam and MATH 011/021; Score 4 or 5 exempts MATH 011/021 and MATH 012/022. Score 4 or 5 exempts MATH 011/021. Unit credit limit on all three AP exams: 5.3
IBH Music	5.3	Score 6 or 7 exempts one (1) GE course in ARTS.
AP Music Theory	5.3	No course exemption.
IBH Physics	5.3	Course exemption to be determined.
AP Physics:		
Physics B	5.3	No course exemption.
Physics C Mechanics	2.7	Score 5 exempts PHYS 008/018.
Physics C Electricity and Magnetism	2.7	No course exemption. Unit credit limit for all three AP exams: 5.3
IBH Psychology	5.3	Score 6 or 7 exempts PSY 001.
AP Psychology	2.7	Score 4 or 5 exempts PSY 001.
IBH Social and Cultural Anthropology	5.3	Score 6 or 7 or above exempts ANTH 001.
AP Statistics	2.7	Score 4 exempts MATH 018; SSHA quantitative reasoning requirement (PSY 010). Score 5 exempts ECON 010 or POLI 010.
IBH Theatre Arts	5.3	Score 5 or above exempts one (1) GE Course in Arts.

Financial Aid and Scholarships

The Office of Financial Aid and Scholarships strives to make a college education affordable for all students regardless of their families' financial situations. While students are expected to contribute a certain amount toward their education, UC Merced offers a number of financial aid and scholarship resources to assist students in meeting their educational expenses. (Exceptions: The Office of Financial Aid and Scholarships does not have funds available to offer assistance to students on special or limited status or students enrolled in University Extension.)

All students, regardless of family income, are encouraged to apply for financial aid. In 2009-10, 79 percent of UC Merced undergraduate students received some form of financial assistance. Financial aid is intended both to remove financial barriers for families who cannot afford the cost of a higher education and to fill in the gap for families who can afford only part of the cost. A number of factors in addition to family income are considered in determining your financial eligibility, including the size of your family and the number of family members in college. Although most grant awards are based on financial need, some loans and scholarships are available regardless of need.

The Office of Financial Aid and Scholarships is dedicated to helping students and their parents understand the financial aid opportunities available as well as the criteria used in determining eligibility for the various financial aid programs available at UC Merced. The Office of Financial Aid and Scholarships welcomes your questions and is here to provide services and guidance that will contribute to your educational experiences at UC Merced. If you have questions or need additional information, please do not hesitate to contact us.

OFFICE OF FINANCIAL AID AND SCHOLARSHIPS:

Website:	financialaid.ucmerced.edu
E-mail:	finaid@ucmerced.edu
Phone:	(209) 228-4243
Address:	Office of Financial Aid and Scholarships 5200 N. Lake Road Merced, CA 95343
UCM School Code:	041271

OTHER IMPORTANT WEB ADDRESSES:

Website:	FAFSA: www.fafsa.ed.gov
Website:	CSAC: www.csac.ca.gov

HOW TO APPLY

Students applying for financial aid from UC Merced, the Federal Government and/or the state of California must complete the Free Application for Federal Student Aid (FAFSA).

For faster and more accurate filing, students can apply for financial aid online at www.fafsa.ed.gov. The FAFSA as well as the Cal Grant GPA Verification form should be completed and submitted as soon as possible after January 1 and no later than March 2nd. If the March 2nd deadline has already passed, some funding may still be available. Apply as soon as possible! We receive and process financial aid applications throughout the year and students will be considered for Federal Grants and Loans at all times. A financial aid advisor is available to assist students and parents with the financial aid application and award process, and can review special circumstances that may affect eligibility. Please contact the Office of Financial Aid and Scholarships for assistance.

Applying for Financial Aid is as easy as 1, 2, 3!

New Students

1. Complete and submit the University of California Application for Admissions & Scholarships by November 30th.
2. Complete and submit the Free Application for Federal Student Aid (FAFSA) and a GPA Verification form by March 2nd.
3. Complete and return any additional documents requested by the Office of Financial Aid and Scholarships by June 1st.

Continuing Students

1. Complete and submit the Free Application for Federal Student Aid (FAFSA) by March 2nd.
2. Complete and submit a Continuing Student Scholarship Application by March 2nd.
3. Complete and return any additional documents requested by the Office of Financial Aid and Scholarships by June 1st.

TYPES OF FINANCIAL AID

Students who receive financial aid may receive funds from one or more of the following sources: scholarships, grants, loans and work-study.

Scholarships

The University of California, Merced administers a number of scholarship funds designed to benefit students. These scholarships are provided through the generosity of UC alumni; friends of UC Merced; corporations, businesses, professional associations; and the University itself. We have a variety of scholarships with a vast range of criteria available. There are merit-based and need-based scholarships for new and continuing students at all class levels.

New students are automatically considered for all merit-only scholarships as well as need-based scholarships simply by completing a Free Application for Federal Student Aid (FAFSA). Continuing students need to submit a Continuing Student Scholarship Application by March 2nd of each year.

Following is a partial list of scholarships that are available or will be available in the future for UC Merced students:

- AT&T Foundation Scholarship
- Bank of America Management Scholarship
- Beverlee Sieghold Antoine Endowed Scholarship Fund
- Carol Tomlinson-Keasey Spirit of Leadership Award
- Caroline L. Adams Endowed Scholarship
- Calvin E. Bright Engineering Scholarship
- F.J. Cayting Friend of Education Scholarship and Fellowship
- Chancellor's Scholarship
- Comcast Research Week Scholarship
- Dan David Solar Endowment Fund
- Earle C. Anthony Fellowship
- Ernest S. and Bettine Kuh Scholarship
- Fletcher Jones Foundation Fellowship

Floyd Family Foundation Scholarship
Foster Poultry Farms Scholarship
Frances M. Benton Scholarship
Golden Bobcat Scholarship
Great Valley Center Book Scholarship
Grossman Family Endowed Scholarship
Hildebrand Scholarship
Jefferson Jennings Doolittle Endowed Scholarship
Joe and Margo Josephine Scholarship
John C. "Jack" Pjerrou Endowed Scholarship
Karen Merrit Writing Program Award
Ken and Midge Riggs Endowed Scholarship
Kruszelnicki Memorial Scholarship
Kris-Tangella Academic Excellence Endowed Scholarship
Leon O. and Diana Chua Scholarship
Leroy C. Shobe Scholarship
Louis P. Gonella Scholarship
Lucia R. Myers Endowed Scholarship
Merced County Association of Realtors Scholarship
Merced Mall Regional Shopping Center Scholarship
Merced School Employees Federal Credit Union Endowed Scholarship
Michael and Arline Colvin Endowed Scholarship
Miguel Velez Scholarship
Nina Wack Special Education Fellowship
Pamela Ann Stahl Scholarship
Professor Roland Winston Endowed Scholarship
Ray and Joan Dezember Scholarship
Renewable Energy Scholarship/Fellowship
Ruth Solomon Hoffman Scholarship
Southern California Edison Fellowship/Scholarship
Speck Family Scholarship
Stephanie Rae Tomford Endowed Scholarship
Stephen D. Peterson Endowed Scholarship
Stewart A. Resnick-Paramount Farms Scholarship
Steve and Mia Kang Endowed Scholarship
Theodore and Doris Koerner Scholarship
UC Merced Donor Scholarship
UC Merced Employees' Scholarship
UC Regents' Scholarship
University Friends Circle Endowed Scholarship
Wally Coats Scholarship
Wells Fargo Scholarship for High School Students
Wells Fargo Scholarship for Transfer Students
Wendy Leone Olson Endowed Scholarship
Westly Foundation Alumni Scholarship
Willer/BUR Scholarship
Wishek Family Scholarship
Yosemite Internship Scholarship/Edward and Marion Doherty Fund

Please note: All new students must have at least a 3.25 GPA and all continuing students must have at least a 3.0 GPA to be considered for scholarships.

GRANTS

Grants are awarded on the basis of financial need and do not have to be repaid. The Federal Government provides funds for Federal Pell Grants and Federal Supplemental Education Opportunity Grants. The State of California also offers grants to qualified undergraduate students (Cal Grants A and B). In addition, grant funds are provided by the University of California.

Federal Pell Grants

To be eligible for a Federal Pell Grant, applicants must be U.S. citizens or eligible non-citizens, be enrolled as undergraduates, have not previously received a bachelor's degree and demonstrate financial need. The amount you receive depends on your financial need as determined by completing the FAFSA.

Federal Supplemental Education Opportunity Grants

These are need-based grants provided to low-income undergraduate students to promote access to postsecondary education. Priority is given to students with exceptional financial need.

Cal Grants

To be eligible for a Cal Grant award, applicants must be California residents, demonstrate financial need and meet appropriate deadlines. The California Student Aid Commission (CSAC) administers the Cal Grant program. Go to the CSAC website at www.csac.ca.gov for more information.

Cal Grant A awards are based on financial need and academic achievement. This grant pays the majority of University fees.

Cal Grant B awards are based on financial need and are for entering undergraduate students, primarily from low-income backgrounds. Cal Grant B pays a stipend each semester for living expenses for first-year students, and the majority of University fees plus a stipend

each semester for living expenses for students in their second through fourth years. It is UC Merced's policy to apply the stipend portion of your Cal Grant B award to fees first. If you would like the stipend to instead be refunded to you, please contact our office.

University Grants

The University of California returns a portion of all tuition revenue to financial aid programs. UC Merced uses this funding to provide a need-based institutional grant and scholarship program (Bobcat Grants and Scholarships) to eligible students. The grant and scholarship program strives to ensure that all students who are eligible to attend the University of California, Merced, have the financial resources to do so.

LOANS

Loans are financial aid awards that require repayment. They offer the opportunity to defer the cost of your educational expenses by borrowing now and repaying later. While some loan programs are based on financial need, there are loan programs available to all students regardless of income. Loan programs available through UC Merced are federally funded, providing long-term, low-interest loans.

Direct Student Loans

Federal Stafford Loans are guaranteed, low-interest loans for students. UC Merced participates in the Direct Loan program meaning that the Department of Education provides the funding for this federal loan program.

Direct Subsidized Student Loan: The federal government pays the interest on the loan while the student is in school and for six months after the student graduates or ceases to enroll at least half-time working toward a degree.

Direct Unsubsidized Student Loan: The student is responsible for paying interest while in school, but can defer any interest payment until after graduation or ceasing to be enrolled at least half-time working towards a degree.

Direct Parent Loan for Undergraduate Students (PLUS)

A Federal PLUS Loan is a low-interest loan for biological or adoptive parents to borrow to help pay the educational expenses for their dependent student. The parent must be a U.S. citizen or eligible non-citizen with a good credit history. The dependent student must also be eligible to receive federal financial assistance. Like the Federal Stafford Loan, the Department of Education provides funds for the Federal PLUS program.

The parent may borrow up to the school's cost of attendance, minus any aid the student received. Different repayment options are provided by the Department of Education and are designed to provide flexibility in meeting repayment obligations.

PLUS Loans for Graduate and Professional Degree Students

Graduate and professional degree students are eligible to borrow under the PLUS Loan Program up to their cost of attendance minus other estimated financial assistance in. The terms and conditions applicable to Parent PLUS Loans also apply to Graduate/Professional PLUS loans. These requirements include a determination that the applicant does not have an adverse credit history, repayment beginning on the date of the last disbursement of the loan. Applicants for these loans are required to complete the

Free Application for Federal Student Aid (FAFSA). They also must have applied for their annual loan maximum eligibility under the Federal Subsidized and Unsubsidized Stafford Loan Program before applying for a Graduate/Professional PLUS loan.

FEDERAL WORK-STUDY

Students who are awarded a Federal Work-Study award are given the opportunity to earn money by working part-time. The Federal Work-Study award is NOT a guarantee of employment. Students will need to apply for and be hired into a Federal Work-Study position.

Similar to a regular job, students are paid twice a month for the hours they work. This money may be used for any educationally related expenses that occur throughout the year. Students may only earn up to the amount they were awarded. Students are not obligated to accept their Federal Work-Study award. A student may choose to participate in the program by accepting or declining the work-study award on-line at: my.ucmerced.edu.

The Career Services Office is available to assist students in finding a Federal Work-Study position.

UC Merced students have unparalleled opportunities to intern and work in nearby Yosemite National Park.

GENERAL ELIGIBILITY REQUIREMENTS

Federal financial aid programs are subject to regulations that define the criteria students must meet to qualify and maintain eligibility for those programs. The regulations state that a student must:

(1) be a U.S. citizen or an eligible non-citizen of the U.S.;

(2) be accepted for admission to the University;

(3) be enrolled in good standing at the University (units taken through University Extension are not counted toward half- or full-time enrollment);

(4) demonstrate financial need (except for Federal Unsubsidized Loans and Federal PLUS Loans);

(5) maintain satisfactory academic progress for financial aid, as outlined below;

(6) be registered for the selective service if the student is a male at least 18 years old, born after December 31, 1960, and not on active duty with the armed forces; and

(7) not owe a refund on a federal grant or be in default on a federal educational loan.

Please note: Financial need is the difference between the reasonable, approved expenses of attending UC Merced and all available resources, including the expected contribution from parents, the student and any outside aid.

Full-time Enrollment

Students not enrolled in an approved part-time program are expected to enroll full time at the university. Students not enrolled full time by the 15th day of instruction each semester may have to pay back some of their financial aid.

Satisfactory Academic Progress

Financial Aid Programs require that a recipient maintain Satisfactory Academic Progress (SAP). This policy pertains to federal and state and institutional funds. Note: Some funds have higher academic and/or enrollment requirements.

Due to recent regulatory changes the Financial Aid SAP policy is not available. We anticipate this policy will be available in the online version of the 2011-13 catalog and on the Financial Aid and Scholarships website by July 1, 2011. The changes will go into effect beginning with the 2011-12 academic year.

EFFECTS OF WITHDRAWING ON FINANCIAL AID

An undergraduate student withdrawing from UC Merced during a semester or for a future semester must file an Official Notice of University Cancellation/Withdrawal Form with the University Registrar. When a student withdraws from UC Merced, the withdrawal date used in determining the amount of financial aid that needs to be returned is the earliest of the following: 1) the date when student files the Official Notice of University Cancellation/ Withdrawal Form with the University Registrar, or 2) the date when the student officially notifies the Registrar's Office of his/ her intent to withdraw; or 3) UC Merced determines what most accurately reflects the last date of an academically related activity of the student. Students who will be on a Planned Education Leave are subject to the same guidelines as those listed above for students who withdraw from UC Merced.

If the student leaves without beginning UC Merced's official withdrawal process or otherwise providing official notification of his/her intent to withdraw, the withdrawal date for the return of federal funds will be the 50% point in the term. In this instance, UC Merced could determine an earlier withdrawal date if circumstances beyond the student's control (e.g., illness) prevented him/her from beginning the official withdrawal process. UC Merced could also determine the last date of an academically related activity of the student.

The date used to determine the return of federal funds may be different than the date used by UC Merced to determine institutional refunds.

For additional detailed information about Return to Title IV Funds at UC Merced, please see the "Return to Title IV Aid" guide available at the Office of Financial Aid and Scholarships.

IMPORTANT WARNING: Your semesters of financial aid eligibility are limited. When you withdraw you use up one semester of eligibility!

DISBURSEMENT OF FINANCIAL AID

Generally, financial aid is offered for two semesters each academic year and an equal amount is made available each semester to eligible students. The Office of Student Business Services is responsible for the disbursement and delivery of financial aid.

If all necessary requirements are complete, Financial Aid proceeds are distributed to the student's account no sooner than 10 days prior to the first day of classes. This money will be applied towards institutional charges first. The remaining amount will be applied toward the authorized charges on the student's account or will be refunded to the student or parent as appropriate.

FOR ADDITIONAL INFORMATION: Please refer to our website financial aid. ucmerced.edu.

UC Merced faculty and administrators are among the most approachable, accessible people in the entire UC system. UC Merced students can perform independent research, join university committees and design new curriculum. Because UC Merced is in its relative infancy, opportunities for student leadership and academic curricular development are abundant. For the inspired student, the chance to effect change on generations of future students is worth more than the money you pay for tuition.

—Yang Li, Psychology and Management

Academic Policies And Procedures

THE ACADEMIC YEAR

The Semester System

The University of California, Merced is on the semester system. The academic year is divided into two semesters, and summer sessions during the summer term. Quarter units earned previously at another institution are converted to semester units by dividing the quarter units earned for each course by 1.5; for example, 4 quarter units equals 2.667 semester units.

Summer Session

Every summer, students can earn units, expand their knowledge, take special study courses, fulfill prerequisites and complete general education or major requirements by enrolling in summer courses.

UC Merced offers multiple summer session options. A wide variety of courses are offered each summer in subjects that are transferable to most campuses. Enrollment in summer session courses is open to UC Merced students and other UC students, as well as students from other colleges and universities, adults and high school juniors and seniors. For additional information about summer courses, visit summersession.ucmerced.edu.

OFFICE OF THE REGISTRAR

Website: registrar.ucmerced.edu
E-mail: registrar@ucmerced.edu
Phone: (209) 228-2734
Address: 5200 N. Lake Road
Merced, CA 95343

Enrollment

ENROLLING IN COURSES

UC Merced students register each semester using the online registration system, MyRegistration (accessible via the MyUCMerced portal at my.ucmerced.edu). The registration process includes enrolling in classes, paying fees and other financial obligations, filing a current address with the Office of the Registrar, and completing and filing other information forms. MyRegistration allows the student to enroll in classes via the Internet. With UC Merced's Internet registration, students will always receive the most up-to-date information regarding their registration and class enrollment. Pre-assigned appointments that are spread throughout the registration period regulate access to the registration system. For security purposes, students are assigned a unique login user code and password/PIN that must be entered to access MyRegistration. Students may make changes to their course schedule through the adjustment period. Courses may be added online through the first week of instruction and may be dropped online through the fourth week of instruction. A new or readmitted student must also:

- Obtain a student ID card ("CatCard"), and
- If required, complete the online Statement of Legal Residence form on the Office of the Registrar's website (registrar.ucmerced.edu) under the California Residency and Fees section.

Registration Priority

Access to registration (via MyRegistration) is by priority groups. The groups are established according to student class level as determined by the number of units completed, with the seniors registering first, juniors second, etc.

The number of semester units a student has completed determines undergraduate classification:

Class Level	Units
Freshman	0.0–29.9
Sophomore	30.0–59.9
Junior	60.0–89.9
Senior	90.0 or more

Late Enrollment/Registration

Students who have not registered prior to the first day of instruction are considered late enrollments. Students may be assessed a $50 late enrollment fee. Contact the Registrar's office at the Students First Center if you wish to enroll in classes after the semester begins.

ADDING AND DROPPING COURSES

Adding a Course

During the first week of instruction, students may add a course or courses if space is available. During the second and third weeks of instruction, a student may add courses only with the permission of the instructor. After the third week of instruction, students may add a course only with the permission of both the instructor and the dean of the School with which the student is affiliated. A fee will be assessed for adding a course after the third week.

- First week: Students may add if space available
- Second and third weeks: Students may add only with instructor's approval
- After third week: Students may add through petition only (see below); fee assessed

Graduate student Heather Orrell with her research poster during the campus' annual Research Week.

Dropping a Course

During the first four weeks of instruction, students may drop a course or courses without paying a fee and without further approval.

Withdrawing from a Course

After the fourth week of instruction and until the end of the tenth week of instruction, a student may withdraw from a course for emergency reasons or for good cause with the signed approval of the instructor of record and confirmed by the dean of the School with which the student is affiliated, provided:

(1) The student is not on special probation (i.e. students who have successfully appealed disqualification),

(2) Dropping the course would be to the educational benefit of the student (in the judgment of the instructor and dean) and

(3) The student is not being investigated for academic dishonesty in that course.

Withdrawing from a course between the 5th and 10th weeks will be approved only provided the student submits a petition including a written description of the special circumstances warranting this action; therefore, students should continue to attend the course until their drop request is approved. Any request to withdraw beginning in the eleventh week of instruction will only be considered under exceptional circumstances (illness or injury substantiated by a doctor's note, recent death in the immediate family or other circumstances of equal gravity), and will only be considered following both signed approval of the instructor of record and submission of a petition that is approved by the dean of the School with which the student is affiliated. All withdrawals must be received by the Office of the Registrar by the deadlines specified. For students withdrawing after the fourth week of instruction, a fee will be assessed and a "W" notation will be assigned by the Office of the Registrar and appear in place of a grade on the student's permanent transcript. Courses in which a "W" has been entered on a student's record carry no grade points, are not calculated in the grade point average, and will not be considered as courses attempted in assessing the student's progress to degree. Nevertheless, it is a marker used to indicate that the student was enrolled in the class beyond the fourth week of instruction. It does not indicate whether the student was passing or failing.

Auditing a Course

With the consent of the instructor, registered students and interested individuals are permitted to audit classes. Arrangements are made directly with the faculty member under any rules the faculty member may establish, and those auditing ordinarily do not participate in exams or written papers. Priority for course resources such as classroom space and laboratory supplies is given to students who are fully enrolled in the course. Audited classes are not recorded on the student's class schedule or on academic transcript.

PETITION OF ACADEMIC POLICY

A petition process exists for students who seek an exception to stated academic policies, procedures, and regulations. Approval for petitions will be granted by a University committee only in cases where extenuating circumstances are evident and can be substantiated. See registrar.ucmerced.edu/policies/petition-academic-policy for additional information.

COURSE SUBSTITUTIONS

Students may petition the appropriate dean to substitute a suitable course in place of a required course. Petition forms are available at the appropriate School sites: School of Engineering, School of Natural Sciences, School of Social Sciences, Humanities, and Arts.

REPETITION OF COURSES

An undergraduate student may repeat only those courses in which a grade of D+, D, D-, F, U, or Not Passed was received. Undergraduate courses in which a grade of D+, D, D-, or F has been earned may not be repeated on a passed/not passed basis. Similarly, a graduate course in which a grade below a B, or a grade of U, was received may be repeated only once (and may not be repeated on a S/U basis). Repetition of a course more than once requires approval by the appropriate dean in all instances. Degree credit for a course will be given only once, but the grade assigned at each enrollment shall be permanently recorded.

Only the most recently earned grade and grade points shall be used for the first 16 University of California units that undergraduate students repeat. For graduate students, only the most recently earned grades will be used in computing the student grade point average for the first 8 units of repeated course work. In the case of further repetitions, the grade point average shall be based on all grades assigned and total units attempted.

ENROLLMENT STATUS

Certification of Full-Time Status: Undergraduate students must carry a study load of at least 15 units each semester in order to maintain normal progress toward their degree. At least 12 units are required for undergraduates to be certified as full-time students for financial aid purposes and to meet minimum progress requirements. Graduate students must carry a study load of at least 8 units each semester in order to be certified as full-time students. A graduate student must be enrolled in 12 units to qualify for university employment or to receive a university fellowship.

Part-Time Student Status: If, for reasons of occupation, family responsibility, health or graduating senior status (one semester only), a student is unable to attend the university on a full-time basis, he/she may qualify for enrollment in part-time status. The student must file for part-time status each semester. To be considered eligible during the specific semester, undergraduate students must be registered for 10 units or fewer by the 10th day of instruction and graduate students must be registered in 6 units or fewer by the end of the second week of instruction. Minimum progress requirements are waived for approved part-time students. Undergraduate request for part-time status forms are available on the Office of the Registrar's website at registrar.ucmerced.edu/go/forms, and for graduate students at the Graduate Studies website at graduatedivision.ucmerced.edu. Students approved for enrollment on a part-time basis pay the same student services fee and campus based fees as full-time students, but pay only one-half of the tuition. Part-time Nonresidents pay one-half of the Nonresident Supplemental Tuition. Undergraduates file their part-time request with the Office of the Registrar; graduate students file their request with the Graduate Studies Division.

EDUCATIONAL LEAVE PROGRAM

The Educational Leave Program allows students to suspend academic work at UC Merced, leave the campus and later resume studies at UC Merced with a minimum of procedural difficulties. Any registered student on the UC Merced campus, undergraduate or graduate, is eligible to enroll in the Educational Leave Program, although restrictions may be imposed on the number of times a student can participate in the program. International students are not eligible. The maximum Educational Leave is one full academic

year. Applications should be filed no later than the tenth day of instruction, although exceptions can be made for medical or emergency reasons. For information regarding how the leave status will affect financial aid eligibility, please see the financial aid section of the catalog.

A $40 application fee must be paid prior to the student's enrollment in the program. Approved applications submitted after the first day of instruction will entitle the student to only a partial refund of fees paid, in accordance with the Schedule of Refunds. The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The effective date for determining a refund of fees is the date the completed and approved form is returned to the Office of the Registrar.

While students may receive academic credit at other institutions and transfer this credit to UC Merced (subject to rules concerning transfer credit and School approval), participants are reminded that the intent of the program is to "suspend academic work." Therefore, students should consult with their academic advisors and carefully evaluate the desirability of taking academic work while away from the campus during leave. Students enrolled in program are not eligible to enroll in concurrent courses at the UC Merced campus or to earn academic credit at UC Merced during the leave.

Readmission for Educational Leaves initiated prior to the first day of the semester are guaranteed. For students who seek a leave after the tenth day of the semester, readmission conditions are determined as part of the leave approval. Students also must satisfy any holds that may have been placed on their registration, and pay registration fees by the established deadlines for the semester specified for return on the approved application. Students who do not return by the specified semester will be automatically withdrawn from the University.

Students will not be eligible to receive normal university services during the leave. Certain limited services, however, such as career services and advising are available. Students on leave are not eligible to apply for on-campus or off-campus jobs except during the summer prior to their return for the fall semester. Students on leave may elect to purchase the Student Health Insurance Plan for one term, but are not eligible to use the Student Health Center. UCM Library borrowing privileges may be retained by purchasing a library card.

UC Merced's Campus Store sells books, UC Merced clothing, computers and supplies.

INTERNATIONAL OPPORTUNITIES PROGRAMS (IOP) LEAVE

If you are planning to study abroad with a non-UC program, you may take an IOP Leave. This leave option is specifically designed to enable students to participate in a program external to UC while still maintaining their student status. You may request approval for this leave at the International Center in Room KL 101. The leave may allow financial aid to transfer, includes pre-approval of transfer credit and retains your UC Merced email address.

The Senior Residence Requirement may be waived if you study abroad through the Education Abroad Program. However if you study abroad with an external program you must comply with the senior Residency Requirement that states that 24 of your last 36 units must be completed on the UC Merced campus. Your last two semesters before graduation cannot be spent studying on a non-UC program.

NORMAL PROGRESS TO DEGREE

UC Merced undergraduate degree programs are designed to be completed in eight semesters or four academic years. To meet the normal progress requirement, undergraduate students are expected to enroll in and pass an average of 15 units per semester, completing the 120 units necessary for graduation in four years. An extension of enrollment beyond nine semesters requires the approval of the student's School.

PLANNING FOR A MAJOR

The decision on the choice of a major is a very important one and should be made on the basis of a student's interests and abilities as well as his or her career goals. Students should look carefully into the programs available by using this catalog and visiting Schools in which they are interested.

Students are encouraged to declare a major as soon as possible and should begin thinking about possible majors in their first year at UC Merced. Some major requirements demand a full four years to complete. Since students are expected to declare into a major by the time they have completed 60 units, the lower division major requirements should be planned into the student's program for the first two years.

DECLARATION AND CHANGE OF MAJOR

In order to declare or change a major a student must fill out a Change of Major/Minor request and have it approved by the dean or other authorized person in the School to which he/she is declaring or transferring and submit it to the Students First Center. This form is available on the Office of the Registrar's website at registrar.ucmerced.edu/go/forms. Current students are only permitted to change their major until the end of the third week of the semester and throughout the summer. Admission into a major program may be denied or deferred if the student is in academic difficulty or has a grade point average (GPA) of less than 2.0 in courses required for the selected major.

Except under unusual circumstances, no change of major or minor will be permitted after a student has attained senior standing (90 units). It is not possible to change or declare a major or minor after the student has declared their candidacy with the Office of the Registrar.

MULTIPLE MAJORS

A student in good academic standing who wishes to declare more than one major must petition the undergraduate School(s)

responsible for the majors and receive School Dean's (Deans') approval. A School Dean may deny the petition for the additional major(s) if it is determined by the School(s) that there is too much overlap in the proposed coursework to justify allowing the student to receive the additional major(s).

No more than 12 upper-division units (excluding units required for School and university-level general education) may be used to satisfy requirements for all majors simultaneously, whether these units are explicitly required by the majors or count as electives toward the majors.

Students must satisfy all requirements for each major, including general education requirements across Schools, if applicable. Coursework for the majors must be completed in 165 semester units or 11 semesters, whichever is greater, from the onset of college work, including AP and transfer credit.

Majors earned will be noted on the student's transcript and diploma. If the majors lead to different degrees (B.A. and B.S.), that fact will be noted on the transcript and the two-degree designations will appear on the diploma. A student who has declared multiple majors may choose to graduate with fewer majors, but if so may not continue at the University to complete any remaining major(s).

MINORS

In order to declare or change a minor, a student must fill out a Change of Major/Minor request and have it approved by the dean or other authorized person in the School to which he/she is declaring and submit it to the Students First Center.

Except under unusual circumstances, no change of minor or minor will be permitted after a student has attained senior standing (90 units). It is not possible to change or declare a minor after the student has declared their candidacy with the Office of the Registrar.

Veteran Services

The UC Merced Veteran Services staff acts as a liaison between students and the United States Department of Veterans Affairs. This includes providing educational certifications for veterans, reservists, active duty military and dependents of veterans.

UC Merced accepts the California Department of Veterans Affairs college fee-waiver program, which benefits the spouse and children of U.S. Veterans. Students meeting the eligibility criteria may have their Student Services Fee and Education Fees waived. The students are still responsible for Campus Based Fees, which are not covered by the waiver.

Students may apply for the California Veteran Fee Waiver through their local county Veterans Services Office. Once an approval letter is received by UC Merced, the Veterans Services staff will process the paperwork associated with administering the program and reducing the fees. More information on the documentation required to initiate Veterans benefits may be found at the UC Merced Veterans Services web site located at veteranservices.ucmerced.edu.

Students who are veterans or dependents of veterans should contact the UC Merced Veteran Services staff if they have any questions or as soon as they receive notification of admission to UC Merced. Veterans Services is located in the Students First Center in Kolligian Library 122. An appointment may be arranged by calling (209) 228-2734 or by e-mail at veteranservices@ucmerced.edu.

ADDITIONAL ENROLLMENT OPPORTUNITIES

Leadership Excellence through Advanced Degrees (UC LEADS)

The goal of the University of California's Leadership Excellence through Advanced Degrees (UC LEADS) program is to educate California's future leaders by preparing promising students for advanced education in science, technology, mathematics and engineering (STEM). The program is designed to identify upper division undergraduate students with the potential to succeed in these disciplines, but who have experienced situations or conditions that have adversely impacted their advancement in their field of study. Participants receive benefits such as research funding and summer room and board.

Once chosen as UC LEADS Scholars, students embark upon a two-year program of scientific research and graduate school preparation guided by individual faculty mentors. Scholars are provided with an excellent opportunity to explore their discipline, experience a research environment, and improve their opportunities for future study in their chosen field. The Scholar gains valuable educational experience, the University a better prepared and more diverse graduate applicant pool, and the State, well-educated future leaders. Each Scholar is mentored by a member of UC the faculty, who assists the student in designing a plan of research and enrichment activities fitted to the individual interests and academic goals of the Scholar. This "Action Plan" includes:

- academic year research
- paid summer research experience
- participation in the University-wide UC LEADS Symposium
- attendance at professional or scientific society meetings
- travel to another UC campus
- academic enrichment activities, including preparation for the Graduate Record Examination (GRE)

For further information, contact the Graduate Division.

McNair Scholars Program

McNair Scholars are ambitious students from underrepresented groups in the professoriate, who aspire to earn a Ph.D. in any academic discipline. Participants receive summer research funding, as well as access to faculty mentoring, networking opportunities, workshops and field trips, and various other activities that help them to build the confidence that they will need to succeed in graduate school and beyond. This program is open to students of junior standing and higher. The aim of this program is to diversify the professoriate. This program honors the memory of Dr. Ronald McNair, who lost his life in the Space Shuttle Challenger explosion after overcoming the hardships of life in a segregated, impoverished community, and then reaching the heights of a Ph.D. in physics from the University of Maryland. For further information, contact the Vice Provost for Undergraduate Education.

The University of California Washington Center (UCDC)

UCDC is an academic program created in 1997 for the purpose of providing students the opportunity to continue their studies while interning in Washington, D.C. Moreover, the availability of a credit-based research seminar that satisfies upper-division course requirements for a number of majors affords students the opportunity to reflect on their intern experiences in an academic exercise. UCDC is also a residential program with apartments at the centrally-located UC Washington Center. Not only does this

At UC Merced there's a special spirit and community within the classroom and across campus. It's exciting to both witness and participate in the growth of such a dynamic institution.

—Professor Kathleen Hull, Anthropology

facilitate relocating temporarily in the nation's capital, the Center offers students a rich exposure to the Washington community through tours and an evening speaker series. For further information, contact Professor Nathan Monroe.

UC Center at Sacramento (UCCS)

The UCCS Academic Program gives undergraduate and graduate students a rare opportunity to learn about California's public policy and journalistic processes firsthand. The program includes rigorous coursework as well as professional experiences while living, interning and conducting research in the State Capitol. Offered during academic semesters and summer, students enroll in classes while working 24-40 hours per week in internship placements. The UC Center at Sacramento nurtures the ongoing dialogue between the UC and Capitol Communities, promoting excellence in public policy through academics, research and public service. For further information, please visit uccs.ucdavis.edu or email careerservices@ucmerced.edu.

Intercampus Visitor (ICV)

The ICV Program allows qualified undergraduate students at UCM to take advantage of educational opportunities at other UC campuses. This program allows students who are currently in good standing, have completed at least one year in residence on their home campus and have maintained a grade point average of at least 2.0 for work completed, and obtained approval from the Dean of their school to take courses that are not available at their home campus, participate in special programs, or study with a distinguished faculty member at another campus for one term. Students who meet the above requirements should complete an application available at the Students First Center (or see registrar.ucmerced.edu/go/forms.

Note: The host campus pays the visiting student's financial aid. If you are a financial aid recipient, you must have a copy of your Free Application for Federal Student Aid (FAFSA) sent to the home campus. Use your Student Aid Report (SAR) to make this change.

Simultaneous Enrollment

UC undergraduate students may enroll, without formal admission and without payment of additional University fees, in courses at another UC campus on a space available basis at the discretion of the appropriate campus authorities on both campuses. Students qualify for this program when they have completed a minimum of 12 units as a matriculated student at the home campus (this requirement can be waived at the discretion of the dean of the appropriate School); are enrolled at both campuses in the current term with a minimum of 12 units as a matriculated student at the home campus; are in good academic standing; and are certified by their home campus as to eligibility, residence, fee, financial aid and health status. To participate in this program, please contact the Students First Center to obtain the application that must be filled out by appropriate authorities on both campuses and to ensure that the application of a non-home UC course will or will not satisfy degree, graduation, major, General Education or other specific requirements (other than unit credit). Failure to ensure the applicability of the non-home UC course to UC Merced requirements could result in a refusal to allow the course to satisfy any specific requirements (other than unit requirements).

Intercampus Exchange Program for Graduate Students

A graduate student registered on the UC Merced campus may become an intercampus exchange student for a full term at any of the other UC campuses with the approval of the graduate advisor, the director of the graduate group and the deans of Graduate Studies on both the home and host campuses. To be eligible, the graduate student must have attended UC Merced for a minimum of one semester before participating in the intercampus exchange program. Students are limited to a maximum of two consecutive semester-based terms or three quarter-based terms on intercampus exchange. Permission for exchange is done on a semester-by-semester basis. Application forms may be obtained from the Office of Graduate Studies and should be submitted four weeks in advance of the semester in which you wish to participate.

Intercampus exchange students register at both campuses and pay fees on their home campus; however, they have access to student services available on the host campus. Students should make arrangements with the Office of the Registrar to follow the enrollment procedure of the host campus so that the grades students obtain in courses taken on the host campus will be transferred to records on their home campus. Grades from courses completed on the host campus will be transferred to the home campus and become part of the student's official graduate transcript. Exchange students are considered graduate students in residence on the home campus and are not formally admitted to the host graduate school and department. For further information, contact Graduate Studies and the Office of the Registrar.

UC Merced and Merced College Intersegmental Cross-Enrollment Program

UC Merced and Merced College have created an Intersegmental Cross-Enrollment agreement that allows approved full-time undergraduate students from either institution to cross-enroll in one course per term (fall or spring). For eligibility requirements and approval guidelines, please see information available on the Office of the Registrar website at registrar.ucmerced.edu/services/special-programs.

Concurrent Credit from Another Institution

With the exception of currently registered students participating in the UC/CSU/Community College Intersegmental Cross-Enrollment Program or the UC Merced and Merced College Intersegmental Cross-Enrollment Program, a student may not obtain transfer credit for courses at a non-University of California campus in a term during which the student is registered as a full-time student at UC Merced. An exception can be obtained only by petitioning the appropriate School dean well in advance of the desired registration, and the student must still be enrolled in at least 12 units at UC Merced during the term in which the exception applies.

Examinations

MIDTERM EXAMINATIONS

The number of midterm examinations varies at the discretion of the instructor. In undergraduate courses for which a midterm examination is required, each student has the right to take the midterm (or submit the take-home examination as required by the instructor) during one of the regularly scheduled class meetings. Dates and times for mid-terms scheduled outside of regularly scheduled class meeting times must be listed in the Schedule of Classes prior to registration. If an out-of-class exam is not listed in the Schedule of Classes, the scheduling of a midterm examination at a time other than a regularly scheduled class meeting requires mutual consent of the instructor and each student registered in the course. A student who does not consent in writing to the different time must be permitted to take the examination (or submit the take-home examination) at the officially scheduled time. A student who consents in writing to the change of examination time waives the right to take the midterm at the officially scheduled time.

FINAL EXAMINATIONS

The Schedule of Classes lists the times that final examinations are to be held. This information is available online or in the Schedule of Classes each semester so that students can avoid final examination conflicts. A student who has multiple exams on the same day may discuss the situation with the instructors of the course. An instructor has the option to agree to provide the student the exam on a different day, but is not required to do so.

Scheduling

Final exams are scheduled according to the day-and-hour periods in which the classes are given during the semester. Once instruction begins, if a change to the time of a scheduled final exam is necessary, all students in the class must agree to the schedule change in writing. Schools offering multiple sections of the same courses may elect to schedule a common exam. Check with your instructor to determine if your class is scheduled for one of the common examination times.

Disabilities

Students with documented disabilities may be entitled to in-class accommodations. The student must provide the instructor with a letter from the Disability Services Office recommending those academic accommodations that the instructor is responsible for providing. Students must request accommodation as soon as possible to allow the university reasonable time to evaluate the request and offer necessary adjustments. No accommodations shall alter the nature of the academic demands made of the student nor decrease the standards and types of academic performance, nor require facilities or personnel that cannot reasonably be provided. The instructor should consult with the student and the Disability Services Center with any questions or concerns.

Religious Observances

UC Merced seeks to accommodate any student who, in observance of a religious creed, encounters an unavoidable conflict with an examination schedule. In order to request accommodation, the student is responsible for providing, in writing and at the beginning of the semester, notification of a potential conflict to the individual responsible for administering the examination. Instructors will consider such requests on a case-by-case basis and determine whether such conflicts can be resolved without imposing on the instructor or the other students in the class an undue hardship that cannot be reasonably avoided. If so, the instructor will determine, in consultation with the student, a time during which the student can take the examination without incurring a penalty or violation of the student's religious creed.

CREDIT BY EXAMINATION

Students currently registered in any regular semester and in good academic standing who by reason of advance preparation believe themselves to be adequately grounded in the materials and principles of a given course may request credit by examination for any course offered at UC Merced without formally enrolling in that course. Students may obtain a form and a copy of the prescribed conditions from the Office of the Registrar's website at registrar.ucmerced.edu.

The petition is subject to the approval of the instructor giving the examination and the dean of the School involved. Once the request has the signed approvals of the appropriate dean, it should be submitted to the Students First Center, accompanied by the mandatory fee.

Owing to special features of the instruction, such as extensive laboratory work, certain courses may not be considered appropriate for obtaining credit by examination. In addition, credit by examination will not be approved in the following circumstances:

(1) for a student who has had prior instruction in the topic,

(2) for the purpose of repeating a course,

(3) for courses in subjects in which the student has completed more advanced work,

(4) for elementary and intermediate courses in a student's native language or

(5) for granting credit for a course which the student has attended and audited.

To earn credit through the credit by examination process, the examination must be given by a UC Merced instructor and be for a course listed in the current Catalog. The final results will be reported to the Office of the Registrar, who will record the appropriate grade (P/NP). Since failure to pass the examination will be recorded as an NP, students are encouraged to prepare fully for such an examination before attempting it.

Grades, Progress To Degree And Dismissal

GRADES

The work of all students on the UC Merced campus is reported in terms of the following grades:

A+	(excellent)
A	(excellent)
A-	(excellent)
B+	(good)
B	(good)
B-	(good)
C+	(fair)
C	(fair)
C-	(fair)
D+	(barely passing)
D	(barely passing)
D-	(barely passing)
F	(not passing)
P	(passed at a minimum level of C- or better by an undergraduate student)
S	(satisfactory - passed at a minimum level of B or better by a graduate student)
NP	(not passed)
U	(unsatisfactory)
I	(incomplete)
IP	(in progress)
NR	(no report, when an instructor fails to report a grade for a student)

Credit Toward Degree Requirements

A course in which the grade A, B, C, D, P or S is received is counted toward undergraduate degree requirements. A course in which the grade F, NP or U is received is not counted toward degree requirements. Grades of I or IP are not counted until they are replaced by grades A, B, C, D, P or S. Course minimum grade requirements may differ depending on the program. Students should check with their academic advisor to confirm.

Grade Points

Grade points are assigned as follows: A+ = 4.0, A =4.0, A-= 3.7, B+ = 3.3, B = 3.0, B- = 2.7, C+ = 2.3, C = 2.0, C- =1.7, D+ = 1.3, D = 1.0, D-= 0.7, F = 0.0. The grades P, S, NP, U, I and IP carry no grade points and the units in courses so graded are excluded in determination of the grade point average.

Grade Point Average

A student's grade point average is computed on courses undertaken in the University of California, with the exception of courses undertaken in University Extension. Grades A, B, C, D and F are used in determining the grade point average; grades I, IP, P, S, NP and U carry no grade points and are excluded from all grade point computations. Grade point average is calculated by dividing the accumulated number of grade points earned by the accumulated number of units undertaken.

Change of Grade

All grades except Incomplete and In Progress are considered final when assigned by an instructor at the end of a term. An instructor may request a change of grade when a computational or procedural error has occurred in the original assignment of a grade, but a grade

may not be changed as a result of re-evaluation of a student's work. No final grade may be revised as a result of re-examination or the submission of additional work after the close of the semester.

Grade changes for "clerical" errors (such as incorrect addition of points), upon documentation, are automatically granted. Requests to interchange P, NP, S or U grades with normal letter grades based upon student need (such as to allow graduation or to meet entrance requirements for professional school) do not involve clerical or procedural errors and are automatically denied. Thus, students should exercise the Passed/Not Passed or Satisfactory/Unsatisfactory grading options with caution.

Students are reminded of their responsibility to be aware of the procedures and regulations contained in this catalog and the Schedule of Classes, to verify their class schedule and to familiarize themselves with the expectations of their instructors. No changes, except completion of an I grade as noted above, can be made to the student's record once he or she has graduated.

Grade I (Incomplete)

The grade of I may be assigned when the instructor determines that a student's work is of passing quality and represents a significant portion of the requirements for a final grade, but is incomplete for a good cause (good cause may include current illness, serious personal problems, an accident, a recent death in the immediate family, a large and necessary increase in working hours or other situations of equal gravity). It is the student's responsibility to obtain written permission from the instructor to receive an I grade as opposed to a non-passing grade. An Incomplete form is available from the Office of the Registrar's website and must be filed prior to the end of the final examination period. If, however, extenuating circumstances exist where submission of the I grade form is not possible before the end of the final examination period, an instructor may submit an I grade; however, the form, including student and instructor signatures, must be submitted to the Office of the Registrar before the first day of instruction of the next semester (which would include the summer sessions). If the form is not received by the Office of the Registrar before the first day of instruction of the next semester, then the I grade will revert to an F, NP, or U.

If an I grade is assigned, students may receive unit credit and grade points by satisfactorily completing the coursework as specified by the instructor. Students cannot re-enroll in the course to complete an I grade. Doing so would result in the course being recorded twice on the transcript.

I grades are not counted in computing the grade point average. An I grade received in the fall term must be replaced by the first day of instruction in the following fall term. An I grade received in the spring or summer terms must be replaced by the first day of instruction in the following spring term.

Except as noted below, any I grade that has not been replaced within the deadlines will revert to an F, NP, or U. The grade will retroactively be counted in computing a student's grade point average.

Filing a Declaration of Candidacy with an outstanding Incomplete grade on your record or with outstanding transfer work may prevent degree conferral, and you will be required to re-file for a later term.

Exception: If a degree is conferred before the end of the deadlines above following the assignment of an I grade, the grade will not be converted to an F, NP, or U. However, the student still has the option of removing the I grade within the deadlines above. Students with 15 or more units of I on their record may not register without permission of the appropriate dean.

Grade IP (In Progress)

For a course extending over more than one semester where the evaluation of the student's performance is deferred until the end of the final semester, provisional grades of In Progress (IP) shall be assigned in the intervening terms. The provisional grades shall be replaced by the final grade if the student completes the full sequence. The grade IP is not included in the grade point average. If the full sequence of courses is not completed, the IP will be replaced by a grade of Incomplete. Further changes in the student's record will be subject to the rules pertaining to I grades.

Grade Passed/Not Passed (P/NP)

Undergraduate students in good standing who are enrolled in at least 12 units may take certain courses on a passed/not passed (P/NP) basis. Students may enroll in one course each term on a P/NP basis (two courses if they have not elected the P/NP in the preceding term), not including Freshman Seminars which are always P/NP courses.

Changes to and from the P/NP option must be made during the enrollment period. No changes can be made after the first two weeks of classes without the approval of the appropriate dean. A student may not repeat on a P/NP basis a course that was previously taken on a letter-graded basis.

The grade P is assigned for a letter grade of C- or better. If the student earns a grade of D+ or below, the grade will be recorded as NP. In both cases, the student's grade will not be computed into the grade point average.

Best part of being at UC Merced: Being on the ground floor of an upstart startup campus!

—Professor Emeritus Gregg Herken, History

Credit for courses taken on a P/NP basis is limited to one-third of the total units taken and passed on the UC Merced campus at the time the degree is awarded.

A course that is required or a prerequisite for a student's major may be taken on a P/NP basis only upon approval of the faculty. Schools may designate some courses as passed/not passed only. Students do not have the option of taking these courses for a letter grade.

Grade Satisfactory/Unsatisfactory (S/U)

The grade of S is awarded to graduate students for work in graduate courses that otherwise would receive a grade of B or better.

Graduate students, under certain circumstances, may be assigned grades of S or U, but units earned in this way will not be counted in calculating the grade point average. Forms to elect S/U grading are available from the Graduate Division's website at gradstudies.ucmerced.edu and must be signed by the student's graduate advisor. Graduate students may request to take no more than one course per term on an S/U grading basis. A graduate course in which a C, D or F grade is received may not be repeated with the S/U option.

In specific approved courses, instructors will assign only Satisfactory or Unsatisfactory grades. Such courses count toward the maximum number of units graded S allowable toward the degree, as specified by each degree program.

Grading Options

Unless otherwise stated in the course description, each course is letter graded with a P/NP or S/U option (unless required for your major or graduate program), not including Freshman Seminars which are always P/NP courses.

Students have until the end of the second week of each semester to change the grade option on a course via MyRegistration, accessible through MyUCMerced. After the second week of each semester and up until the last day of instruction for that semester, a student may only change the grade option on a course with the approval of their School dean using the Petition of Academic Policy form at registrar.ucmerced.edu/go/forms. Students in good standing who are changing a grade option for a course from a letter grade to a P/NP option must conform to the rules guiding the taking of courses on a P/NP basis (see section on Passed/Not Passed).

Mid-Semester Grades

Mid-semester grades provide students in lower division courses with early feedback (both positive and negative) about their academic performance. Mid-semester grades provide an opportunity for students to receive positive reinforcement and motivation if they are doing well, and to identify those who are struggling. Mid-semester grades allow faculty, advisors, and services on campus to intervene with students who are in academic difficulty, while there is still time in the semester. Mid-semester grades for all lower division courses only are reported at the end of the eighth week of the semester, and all grades are submitted as letter grades for letter-graded courses (regardless of whether the student has elected to take the course as P/NP). If a course is P/NP only, all grades will be submitted as P/NP. Mid-semester grades are notational grades which are used to help ensure the academic success of UC Merced students in lower division courses. These grades are not recorded in any permanent record or on a student's academic transcript.

All mid-semester grades of D+, D, D- or F on any course requires freshmen-only students to attend a one-hour Academic Success Workshop. Attendance is mandatory and a hold for future semester course registration will be placed for non-participation in the one-hour workshop. Sophomores with a D+, D, D- or F grade are encouraged to attend an Academic Success Workshop, however, they can have the hold for future semester course registration released by meeting with their academic advisor.

Final Grades

After grades are recorded for a semester or summer session, they are available online via MyStudentRecord (accessible via MyUCMerced). With the availability of online grade reporting, students can print their grade reports from the Internet.

DEAN'S HONOR LIST

Undergraduate students will be eligible for the Dean's Honor List if they have earned in any one semester a minimum of 12 graded units with a 3.5 grade point average or better with no grade of I or NP. Dean's Honors are listed on student transcripts. Any student who has been found to violate the academic integrity policies during an academic year will not be eligible for the Dean's Honor List during that academic year.

CHANCELLOR'S HONOR LIST

Undergraduate students who are placed on the Dean's Honor List for both semesters in a single academic year (fall and spring) will be placed on the Chancellor's Honor List for that academic year.

PROBATION, DISMISSAL, AND MINIMUM PROGRESS

A. Academic Probation

An undergraduate student is placed on academic probation if one of the following occurs:

(1) The student's semester grade point average is less than 2.0, or

(2) The student's cumulative University of California grade point average is less than 2.0.

Probation Status: Academic review occurs at the end of each academic semester. When a student is placed on academic probation, the university notifies the student, and the student's official transcript states "Academic Probation" for the affected semester. While on academic probation, the student is under the supervision of his/her School or advising unit.

Removal from Declared Major: A student on probation may be removed from a declared major or changed to Undeclared due to failure to meet the particular standards or fulfill specific requirements that the student's School may impose. If the student is removed from a declared major or changed to Undeclared, the student may apply to be reinstated to a School as follows:

Lower Division Students (fewer than 60 units earned at the end of the semester in which the student applies) must meet these requirements:

- Cumulative University of California grade point average of at least 2.0
- Current semester grade point average of at least 2.0

- Major grade point average of 2.0-2.5 (minimum varies by School)
- Completion of all lower division major courses with grades of C- or higher

Upper Division Students (greater than 60 units earned at the end of the semester in which the student applies) must meet the requirements listed above for Lower Division students and must also complete 8-16 units (minimum varies by School) of upper division major requirements.

Return to Good Standing: Once a student has met grade point average standards listed above, the student's academic status returns to regular academic standing.

B. Academic Dismissal

An undergraduate student is subject to academic dismissal from the university if one of the following occurs:

(1) The student has been on academic probation for two or more semesters and the student's cumulative grade point average is less than 2.0, or

(2) The student's semester grade point average is less than 1.5 and the student's cumulative grade point average is less than 2.0.

Academic Dismissal Appeals: A student not previously on probation who earns a semester grade point average below 1.5 is offered the opportunity to appeal dismissal. The student who is subject to academic dismissal and does not complete the appeal process as prescribed is automatically dismissed. The student whose appeal is approved returns on probation and is under the supervision of the appropriate School or advising unit.

Dismissal Status: When a student is academically dismissed, the university notifies the student, and the student's official transcript states "Academic Dismissal" for the affected semester.

Note: A student who is academically dismissed may return after fulfilling readmission requirements (see the Readmission policy on the Office of the Registrar website at registrar.ucmerced.edu).

C. Minimum Progress

An undergraduate student is subject to administrative probation if the student does not complete a minimum of 24 University of California units during an academic year, including summer.

Return to Good Standing: Once the student has completed 24 units during a subsequent academic year, the student's minimum progress status returns to good standing.

Note: Minimum unit completion does not apply to part-time students or to students who have a Dean's approval to carry fewer units than the minimum progress load (reasons may include medical disability, employment, a serious personal problem, a recent death in the immediate family, the primary responsibility for the care of a family, or a serious accident involving the student).

READMISSION

Readmission is the act of restoring active-student status to former students who have withdrawn from the University, had their student matriculation interrupted by a lapse of their student status (for failure to pay fees, failure to satisfy the entry level writing requirement, failure to enroll in future semesters, or failure to graduate), or who left the University in academic difficulty (academic probation, special probation, subject to disqualification, or academically dismissed). Undergraduate students who wish to return to the University of California, Merced must file an application for readmission with the Office of the Registrar by the deadlines listed below.

Readmission Deadlines:

Fall Semester – May 1

Spring Semester – November 1

Students should begin the process of readmission at least six weeks before the deadline. Submitting the application, along with the nonrefundable application fee of $60.00 as early as possible will provide enough time to review the application and have a readmitted student register before new incoming students are scheduled to register for classes. Students who do not enroll in the semester to which they are readmitted must file a new readmission application and pay the application fee to return in a future semester. For more information, see registrar.ucmerced.edu/policies/readmission.

Transfer with Scholastic Deficiencies

To transfer from one campus of the University to another, or from one School to another on the same campus, a student who has been academically disqualified or is on academic probation must obtain the approval of the dean to whose jurisdiction the student seeks to transfer.

TRANSCRIPTS AND RECORDS

Transcripts may be ordered via the National Clearing House website (for routine request) or the Office of the Registrar (for rush request

and overnight delivery). See the Office of the Registrar's website at registrar.ucmerced.edu/go/transcripts for further information. At times other than the end of the semester, the normal period required for processing and issuing transcripts for both registered and former students is 7 to 10 working days after receipt of the student's request (plus mailing time). There is a $7 charge for each routine transcript request and $14 charge for each rush transcript request. There is an additional $15 dollar per address charge for overnight delivery. The student's financial account must be paid in full prior to the processing of the transcript request, and the transcript fees must be either paid online through the National Clearing House, at mybill.ucmerced.edu, or accompany the application. Students who urgently need a transcript that would normally take 7 to 10 days to issue can expect processing within 2 days for the rush transcript request (plus mailing time).

Access to Records

Students are entitled by law and University policy to examine and challenge most of the records that the University maintains on them. These records are confidential and in most circumstances may be released to third parties only with the student's prior consent. See information about the Family Educational Rights and Privacy act at registrar.ucmerced.edu/go/ferpa. Transcripts and other documents submitted from other institutions and agencies are the property of UC Merced and will not be reissued to applicants, students, alumni or other parties.

CHANGE OF NAME AND ADDRESS

Students may request to change their name on official University records. The form can be downloaded from the Office of the Registrar's website at registrar.ucmerced.edu/go/forms. Legally recognized proof of the change of name will be required before the petition is accepted and processed. (Students planning to graduate should file this request no later than the fifth week of the semester in which they intend to graduate.) Students may also update their address(es) using MyStudentRecord or submit a Change of Address form downloaded from Office of the Registrar's website.

LEAVING UC MERCED

Students who find that they cannot attend the University for a semester in which they have enrolled may cancel their registration only if instruction for that semester has not yet begun. To do so, they must formally request a cancellation or withdrawal of their registration from the Office of the Registrar after obtaining all appropriate signatures.

If instruction has already begun and students find it necessary to stop attending all classes, they must formally request withdrawal from the University. When a completed withdrawal form is approved by the dean of the School with which the student is affiliated (after the fourth week of instruction), a W notation will be assigned for each course in which the student has been enrolled. Students will not be eligible to re-enroll until they have been readmitted. Before considering a complete withdrawal, students must consult an academic advisor and the Office of Financial Aid and Scholarships, if appropriate, to consider the full implications of this action.

Please see the refund policies for specific details on refund rules. Students who fail to submit the required paperwork for cancellation/withdrawal will receive F, NP or U grades, as appropriate, for all courses in which they are enrolled for that semester.

Graduation

Residency Requirement

Each candidate for the bachelor's degree must complete 24 of the last 36 units in residence in the school of the University of California in which the degree is to be earned. Under certain circumstances, the appropriate dean or Vice Provost for Undergraduate Education may grant exceptions, such as when a student attends classes at another UC campus as an approved visitor or participates in one of the following: UC Education Abroad, UC Washington Center Program or UC Sacramento Center.

Scholarship Requirement

To receive a bachelor's degree, a candidate must have a cumulative 2.0 grade point average.

I came to UC Merced to get a UC-level education close to home.

—Katie Heaton

UNDERGRADUATE STUDENTS

Declaration of Candidacy

Students expecting to complete work for their degree by the end of a semester must declare their intent to graduate by submitting a form, accompanied by the appropriate fee, to the Students First Center prior to the semester in which they plan to receive the degree. Students have until December 1 of each year to file to graduate in the following Spring or Summer terms, or until April 1 of each year to file to graduate in the following fall semester. For more information, see registrar.ucmerced.edu/policies/graduation.

Degree Check

The Office of the Registrar will check all pertinent records to ensure that the student has completed a minimum of 120 units and appropriate institutional requirements. The student's School will check for the fulfillment of major and School requirements.

MyAudit

UC Merced students can check their degree progress at any time using MyAudit online through my.ucmerced.edu. MyAudit analyzes degree requirements for a major, concentration, and minor according to the catalog year when a student enters UC

Merced. The audit gives a complete picture regarding what degree requirements have been met, are in progress, and are remaining. It is a quick tool that can be used to check progress in toward any degree program. Although MyAudit provides a comprehensive description of program requirements, it is unofficial and not intended to supplement the role of the School advisor, who help students with course selection and assist in making informed decisions. See registrar.ucmerced.edu/myaudit for more information.

Honors at Graduation

To be eligible for honors at graduation, a student must have completed a minimum of 50 semester units at the University of California, of which a minimum of 43 units must have been taken for a letter grade and a minimum of 30 units must have been completed at UC Merced. The grade point average achieved must rank in the top 2 percent of the student's School for highest honors, the next 4 percent for high honors, and the next 10 percent for honors at graduation. The number of recipients eligible under these percentages shall be rounded up to the next higher integer.

GRADUATE STUDENTS

Before a graduate degree can be conferred, candidates must have been advanced to candidacy and completed the master's thesis (if required) or doctoral dissertation and any required comprehensive or oral examinations. For assistance, go to the Graduate Division office.

COMMENCEMENT

UC Merced conducts its annual Commencement ceremony following the spring semester. Graduating students are strongly encouraged to participate with their classmates. Commencement celebrates the academic achievements of our undergraduate and graduate students and the impact they will have as they transition from the University to the world beyond.

Each student may participate in only one Commencement ceremony as an undergraduate. Graduate students may participate in two ceremonies if master's and doctoral degrees are conferred in separate years. Undergraduates may choose to participate in the Commencement ceremony if they completed their degree requirements the prior fall, or if they anticipate completing their degree requirements in spring, summer or the next fall semester.

Students who complete their degree requirements in a fall semester may elect to participate in Commencement the spring prior to their completion date or they may cross the stage the following spring.

Participating in Commencement does not indicate confirmation that degree requirements have been fulfilled. Diplomas are not distributed at Commencement and degrees are not awarded until all requirements are completed.

DIPLOMAS

Diplomas are not distributed at Commencement, but are available several months afterward. The Office of the Registrar emails students when diplomas are mailed and will retain diplomas for five years only.

General Education And College One

Education is what remains after one has forgotten everything...learned in school.

—Albert Einstein, Recipient of Nobel Prize In Physics and Professor of Theoretical Physics, Princeton University

GENERAL EDUCATION

What is general education? All universities aspire to educate the whole student. General education provides you with the practical skills and diverse knowledge base that you will need to become an informed citizen and a good problem solver after graduation. You will be entering the workplace in an era of rapid change; your future career may ultimately be in a field that doesn't exist today. Through general education, you will craft for yourself the tools that will let you continue to grow in a world that demands lifelong learning for success.

General education at UC Merced will help you grow intellectually by:

- Strengthening your abilities in quantitative reasoning and written, oral and other communication skills; and
- Introducing and teaching you to integrate broad domains of knowledge: arts and humanities, social and cognitive sciences, natural sciences, and technologies and engineering methods.

Throughout your undergraduate years, UC Merced's general education program will assist you to fine-tune your ability to communicate through words, numbers, images, and actions, and will enable you to discover the many ways in which knowledge is created and put to good use.

General education at UC Merced places a high premium on demonstrating the ways in which different disciplines can make connections with each other. There also will be an emphasis on practicing and applying what you are learning in the classroom—an educational value also reflected in the undergraduate majors at UC Merced.

The faculty has created a set of principles that embody the kinds of learning to be achieved through general education at UC Merced. You will encounter these principles in action through CORE 001, a unique opportunity for all UC Merced first-year students to share a common exploration of the issues that will affect your future.

Guiding Principles for General Education at UC Merced

UC Merced's educational experiences are designed to prepare well educated people of the 21st century for the workplace, for advanced education and for a leadership role within their communities. UC Merced graduates will be exceptionally well prepared to navigate and succeed in a complex world. The principles guiding the design and implementation of our academic program are envisioned within a continuum that ranges from preparatory and advanced curricula in general education and in the majors, through a variety of educational activities inside and outside the classroom.

All UC Merced graduates will reflect these principles, which provide the foundation for their education:

- Scientific Literacy: To have a functional understanding of scientific, technological and quantitative information, and to know both how to interpret scientific information and effectively apply quantitative tools;
- Decision Making: To appreciate the various and diverse factors bearing on decisions and the know-how to assemble, evaluate, interpret and use information effectively for critical analysis and problem solving;
- Communication: To convey information to and communicate and interact effectively with multiple audiences, using advanced skills in written and other modes of communication;
- Self and Society: To understand and value diverse

perspectives in both the global and community contexts of modern society in order to work knowledgeably and effectively in an ethnically and culturally rich setting;

- Ethics and Responsibility: To follow ethical practices in their professions and communities, and care for future generations through sustainable living and environmental and societal responsibility;
- Leadership and Teamwork: To work effectively in both leadership and team roles, capably making connections and integrating their expertise with the expertise of others;
- Aesthetic Understanding and Creativity: To appreciate and be knowledgeable about human creative expression, including literature and the arts; and
- Development of Personal Potential: To be responsible for achieving the full promise of their abilities, including psychological and physical well-being.

GENERAL EDUCATION REQUIREMENTS

The UC Merced general education program consists of courses that are informed by the Guiding Principles and that meet the following graduation requirements:

- University requirements,
- Campus requirements, and
- School requirements.

In consultation with faculty, with advisors in the Student Advising and Learning Center and with advisors in your School, you should keep track of your progress in fulfilling university, campus and school requirements for general education.

A. UNIVERSITY REQUIREMENTS

- University of California Entry Level Writing Requirement
- American History and Institutions

University of California Entry Level Writing Requirement (ELWR)/Analytical Writing Placement Exam

To succeed at UC Merced, you must be able to understand and to respond adequately to written material typical of reading assignments in freshman courses, including being able to structure and develop an essay that uses written English effectively. Any student who has not yet satisfied this requirement through one of the alternatives listed below will be required to complete it by the end of the second semester of enrollment at UC Merced. Failure to complete this requirement in the time allowed will result in a hold on a student's registration. After you enroll as a degree-seeking student at UC Merced, transfer work will not be accepted to meet the ELWR except by an appropriate course within UC approved by the Merritt Writing Program office. Students who leave UC Merced without satisfying ELWR and who return must complete the ELWR requirement at UC Merced.

Students may satisfy the University of California Entry Level Writing Requirement in any of the following ways:

- Score 3 or higher on the College Board Advanced Placement Examination in English (Language or Literature);
- Score 30 or higher on the ACT combined English/Writing Test;
- Score 680 or higher on the College Board SAT Reasoning Test, Writing Section;
- Score 5 or higher on the International Baccalaureate Higher Level English A1 exam;
- Score 6 or higher on the International Baccalaureate Standard Level Examination English A1 exam;
- Prior to enrolling in the University, complete with a grade of C or better a transferable college course in English composition worth four quarter or three semester units;
- Achieve a passing score on the University's writing proficiency examination, called the University of California Analytical Writing Placement Exam; or
- Complete an acceptable writing course at UC Merced (WRI 001 or other acceptable course).

The University offers the University of California Analytical Writing Placement Exam each spring on the second Saturday in May at test centers throughout the state for students who plan to enroll in the University the following fall. California residents who will enter the University as freshmen must take the exam if they have not otherwise satisfied the requirement (by one of the methods listed above). Students must pay a nonrefundable fee to cover test administration costs. Students who received admission application fee waivers will automatically have this fee waived. Admitted freshmen will receive detailed information about the exam in April. Students who are not from California may take an equivalent exam in the fall after enrolling at the University.

Comprehensive information about the University of California Entry Level Writing Requirement and Analytical Writing Placement Exam is available at www.ucop.edu/elwr/index.html.

American History and Institutions Requirement

As a candidate for an undergraduate degree at UC Merced, you need to demonstrate knowledge of American history and of the principles of American institutions under the federal and state constitutions.

You may meet the requirement by completing specific courses or earning a certain score on an examination. Transfer students are urged to complete the requirement before they enroll.

You may satisfy both the American History and American Institutions requirements in the following ways:

- Complete in high school one year of United States history with grades of C or better, or one semester of United States history and one semester of United States government with grades of C or better;
- Achieve a score of 3, 4 or 5 on the College Board Advanced Placement Examination in U.S. History;
- Achieve a score of 550 or better on the SAT II: U.S. History test;
- Complete acceptable course work at a community college or other accredited institution; or
- Complete acceptable course work at UC Merced (both HIST 016 and HIST 017).

B. CAMPUS REQUIREMENTS

- One-semester CORE Course
- Lower division writing course
- College-level mathematics/quantitative reasoning course

The World at Home—Planning for the Future in a Complex World

The CORE Course is future-oriented, striving to help students gain the intellectual tools, knowledge and insights they will need as informed citizens devising future solutions to real-life problems. The UC Merced CORE Course aims to understand the world at large as it is reflected in the world at home—California. By examining, for example, the local evidence of global problems, you will begin to grapple with the issues that will affect you personally and professionally.

CORE 001 will pose a set of questions as they are framed by the various domains of human knowledge known as the disciplines. In CORE 001, UC Merced faculty will introduce you to how their disciplines define the challenges faced by informed citizens of this new century.

For example:

- Can advances in technology mitigate the effects of burgeoning populations and resource depletion?
- How will a changing climate affect the future migration of human populations?
- How do citizens decide among conflicting ethical choices, each with a compelling claim?

Faculty from all three Schools will join together to show how such complex questions might best be probed through connecting the insights of their disciplines.

In the CORE Course, you will:

- work together in groups on joint projects or problems to build your leadership and teamwork abilities;
- learn to think analytically and communicate effectively in the context of problems affecting your lives and futures; and
- use quantitative methods as well as ethical judgment to make decisions and defend those decisions to your peers;

CORE Friday!

The CORE Course is College One's unique way to introduce you to how the disciplines understand problems and devise tools to grapple with them. Faculty from all three schools—Natural Sciences, Engineering, and Social Sciences, Humanities and Arts—challenge freshmen to think about ways that academic disciplines connect or debate with one another. CORE Friday is part of what makes CORE 001 unique. CORE Friday events round out the week's lectures and discussions with a film, documentary, panel discussion, theatrical production or distinguished speaker. CORE Friday programming illuminates ideas presented during the CORE 001 lectures for the week, as well as alternative views.

Lower Division Writing Course

Analytical writing is a means for understanding better what you are learning and conveying your ideas to different audiences: your instructors, your fellow students and people outside the university. The lower division writing requirement will start you on a path of writing development that will continue through your four years at UC Merced.

WRI 010: College Reading and Composition

This course is designed to help you develop your college-level skills in effective use of language, analysis and argumentation, organization, and strategies for creation, revision and editing. It must be completed during your freshman or sophomore year.

Mathematics/Quantitative Reasoning

All students will take a college-level mathematics/quantitative reasoning course. For some of you, mathematics and statistics will be an essential tool for mastering a field in depth. For others, you will build your ability to understand how quantitative methods are applied in society to support arguments and solve problems. A variety of courses will be available to meet this requirement, based on your field of interest. Check the requirements of the major that interests you, in the School section of the catalog, for information on courses that satisfy Mathematics/Quantitative Reasoning.

C. SCHOOL REQUIREMENTS

The Schools of Engineering, Natural Sciences, and Social Sciences, Humanities and Arts each have a set of general education requirements to be completed if you choose a major offered by that School. School requirements include courses to help you build the collateral knowledge and skills you will need in order to succeed in your major. School requirements also include courses to help you understand the broad domains of knowledge. Check the School section of this catalog for specific requirements.

FOR TRANSFER STUDENTS: SATISFYING GENERAL EDUCATION

In addition to meeting the transfer admissions requirements described in the Undergraduate Admissions section of this Catalog, transfer students should complete an acceptable general education course pattern and preparatory courses for the intended major, prior to transfer. Successful completion of general education and major preparation will assure that you do not need to take any additional lower division courses at UC Merced. For detailed information on how transfer students can satisfy lower division general education and major preparation requirements, see the Catalog section on the School which offers your intended major.

Please note the following: California Community College transfer students who complete the Intersegmental General Education Transfer Curriculum (IGETC) satisfy all lower division general education requirements at UC Merced. For further details, see the Catalog section on the School which offers your intended major. Transfer students from other University of California campuses who have completed lower division general education requirements at the UC campus have satisfied lower division general education requirements at UC Merced.

School of Engineering

The mission of the School of Engineering is to provide an exceptional technical and professional education that instills in our students advanced problem-solving skills, effective leadership qualities, and the ability to recognize and build on individual strengths throughout one's career.

THE SCHOOL OF ENGINEERING OFFERS THE FOLLOWING MAJORS:

- Bioengineering (BIOE)
- Computer Science and Engineering (CSE)
- Environmental Engineering (ENVE)
- Materials Science and Engineering (MSE)
- Mechanical Engineering (ME)

What Is Engineering?

Engineering is about problem solving, innovation, and the creation of devices, systems, processes, and structures for human use. Engineers create new ideas and then transform those ideas into products and services that improve people's lives. Engineers apply mathematics and the principles of science—particularly chemistry and physics—to solve problems and meet the needs of society. Engineering spans the very small to the very large, from micro-sensors that can continuously monitor human health, to space stations that can support the exploration of new worlds. It also touches our everyday lives.

Engineering has provided our shelter, our transportation, our entertainment, our medical supplies and technologies, our water supplies, the food we eat, the movies we watch, the appliances that make our lives easier, and the protection of our environment. Engineering careers are among the highest in demand in the United States, and as a result, provide great personal and professional satisfaction and quality of life. Engineering is a "people-serving profession" and a pathway to financial security. In short, engineering makes the world work!

LETTER OF WELCOME FROM THE DEAN

Dear Future Engineer:

It is wonderful that you are interested in studying engineering at UC Merced. Our engineering profession is at the epicenter of ways for improving lives in both the developing and developed worlds. You will have the opportunity to learn with us about how engineering and appropriate technology helps people. From the time you enter our program you will be exposed to new technologies that will become the tools that you will use in solving problems and delivering exciting new products and services to society. Your experiences both inside and outside of the classroom will provide a solid foundation for a career of leadership and responsibility.

You have embarked on an exciting journey. Your engineering education at UC Merced will be both challenging and satisfying, and will give you the chance to meet some extraordinary people: world-class faculty, committed fellow students, dedicated staff, and partners from the local community and around the world. The global social network you will develop in engineering and beyond during your time at UC Merced will last throughout your career.

Your education in Engineering is a launching pad. Some of you will go on to pursue careers in engineering design, others will become engineering managers, and still others will pursue graduate education in engineering or perhaps go into international development or other professions such as medicine or law. Once you master the methods of engineering problem-solving, you will have the skills and flexibility to chart your own course, and to adapt to whatever your future holds.

Congratulations on your vision and initiative. I look forward to welcoming you into our program and watching you develop into a technical leader for tomorrow.

E. Daniel Hirleman
Dean, School of Engineering

SCHOOL OF ENGINEERING REQUIREMENTS

All Engineering students, regardless of major, are expected to meet the minimum requirements for the B.S. degree. First-year Engineering students have a freshman year that lays the foundation for further study in the majors. Students have the opportunity to explore the different UC Merced majors during that year through freshman seminars, service learning, research experiences and informal contact with faculty and graduate students.

One general education course is common for all UC Merced students, CORE 1, The World at Home. It provides a framework for the skills and ideals articulated in the UC Merced Guiding Principles for General Education (see General Education section of this catalog), including decision-making, communication, ethics, responsibility, leadership, teamwork, aesthetic understanding, creativity and an appreciation of diverse perspectives in both the global and community contexts.

All students in the School of Engineering, regardless of major, are required to complete all requirements for all majors with a C- or better effective Fall 2009 for entering or readmitted students.

Students in the School of Engineering must repeat a required course after receiving a grades of D+, D, D-, F, U, or Not Passed for previous attempts, and may do so no more than twice beyond the initial enrollment in the class.

GENERAL EDUCATION REQUIREMENTS [AT LEAST 46 UNITS]

School of Engineering students are required to complete the following list of general education courses:

Lower Division General Education Requirements:

The World at Home (CORE 001) . . . . . 4 units
College Reading and Composition (WRI 010) . . . . . 4 units
MATH 021 . . . . . 4 units
PHYS 008 (or PHYS 018) . . . . . 4 units
Contemporary Biology (BIO 001) . . . . . 4 units
Introduction to Computing I and II (CSE 020 and CSE 021 or equivalent) . . . . . 4 units
Probability and Statistics (MATH 032) . . . . . 4 units

Additional General Education Requirements:

General Education Electives (selected from a list of acceptable courses):

Humanities or Arts . . . . . 4 units
Social Sciences . . . . . 4 units
Either 3 upper division Service Learning units, or 3 additional upper division Humanities or Arts or Social Sciences units . . . . . 3 units
Either 3 additional Service Learning units, or 3 additional Humanities or Arts or Social Sciences units; these units can be upper division or lower division . . . . . 3 units

Service Learning

Under the advisement of a faculty mentor, students have the opportunity to form service-learning teams that work with an approved community not-for-profit organization—or client—to solve practical engineering problems. For example, a team composed of both upper and lower division students might work together to design, develop, implement and test an information system to serve the needs of a local non-profit service organization. Students electing to enroll in the UC Merced Service Learning initiative may earn up to two credits per semester for participation, depending on their leadership position within the team for that semester.

Major Preparation [32 Units]

Engineering students are required to complete the following major preparation courses.

General Chemistry (CHEM 002) . . . . . 4 units
Physics II (PHYS 009 or PHYS 019) . . . . . 4 units
Calculus of a Single Variable II (MATH 022) . . . . . 4 units
Multi-Variable Calculus (MATH 023) . . . . . 4 units
Introduction to Linear Algebra and Differential Equations (MATH 024) . . . . . 4 units
Probability and Statistics (MATH 032) . . . . . 4 units
Introduction to Computing I and II (CSE 020 and CSE 021 or equivalent) . . . . . 4 units
Contemporary Biology (BIO 001) . . . . . 4 units

Engineering Fundamentals

Engineering Fundamentals courses are determined by specific majors. See specific majors or talk to your advisor to find out which fundamentals courses are required for you.

Major Area Upper Division Courses

Major Area Upper Division Courses include major core courses, major technical electives and other specified requirements. See specific majors for the list of courses.

Professional Seminar (1 unit, ENGR 191). Must be taken during the senior year.

TRANSFER REQUIREMENTS

Major Preparation and Acceptance to the Major

Articulation agreements between California Community Colleges and majors in the School of Engineering at UC Merced are found on assist.org. Applicants are strongly encouraged to take as many courses that are equivalent to the major preparation required of their planned major at UC Merced. For School of Engineering majors, the completion of calculus, vector calculus, linear algebra, differential equations, a year of calculus based physics, one semester of general chemistry and two programming courses are strongly recommended. Applicants for admission will be approved, conditionally approved, or denied. Only students who have completed most or all of the foundation courses will be approved or conditionally approved for acceptance to the major.

Students who are conditionally approved must complete the remaining required foundation courses for their major in their first academic year at UC Merced. These students will be monitored for successful completion of these courses. Conditionally approved majors should be prepared to declare an alternative major outside of the School of Engineering if they are unable to successfully complete the terms of their conditional admission. More information on transfer preparation and admission can be found on assist.org and the School of Engineering Student Advising website.

General Education

Transfer students with 45 or fewer transferable units default to the School of Engineering general education pattern. Students with more than 45 transferable units are required to complete the following general education pattern before graduation:

- Two English Composition courses (equivalents to Writing 1 and 10)
- Three arts/humanities course with at least one each in arts and humanities
- Three social sciences courses in at least two disciplines

At least one course from arts, humanities or social sciences is required for UC eligibility.

IGETC is strongly discouraged but certification will fulfill lower division Writing, Arts/Humanities and Social Science requirements.

Since Engineering is a rapidly developing profession, curricular changes are made by the Faculty from year to year. Changes made to the School of Engineering curriculum will be made available on the School of Engineering website at eng.ucmerced.edu.

Engineering Majors

■ Bioengineering Major

Bioengineering is a highly interdisciplinary field in which the techniques, devices, materials and resourcefulness of engineers are used to address problems in biology and healthcare; lessons from biology are used to inspire design and inform progress in engineering. During the past 40 years, this synergy between biology and engineering has led to a wide range of implantable materials, diagnostic devices, sensors and molecular characterization techniques, and it has produced tools that greatly expedited the sequencing of the human genome. Along with these practical innovations has come a rapidly increasing need for personnel with the necessary hybrid skills, and undergraduate bioengineering programs have proliferated alongside the continued growth of bioengineering research.

The undergraduate major in Bioengineering is designed to provide students with both breadth and depth, and the possibility of a focus on nanobionegineering, tissue engineering, or physiological engineering.

It is suitable preparation for individuals seeking a career in research or industry, or pursuing advanced degrees such as Ph.D. or M.D.

Bioengineering Learning Outcomes

Upon graduation, our graduates demonstrate:

a) An understanding of biology and physiology;

b) The capability to apply advanced mathematics (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology;

c) The ability to make measurements on, and interpret data from, living systems;

d) The ability to address problems associated with the interaction between living and non-living materials and systems;

e) Professional and ethical responsibility.

REQUIREMENTS FOR THE BIOENGINEERING (BIOE) MAJOR

The additional requirements that must be met to receive the B.S. in Bioengineering at UC Merced:

Engineering Fundamentals [20 Units]

Dynamics (ENGR 057) . . . . . 4 units
Introduction to Materials (ENGR 045) . . . . . 4 units
Thermodynamics (ENGR 130) . . . . . 3 units
Engineering Economic Analysis (ENGR 155). . . . . 3 units
Circuit Theory (ENGR 065) . . . . . 3 units
Analog and Digital Electronics (ENGR 166) . . . . . 3 units

Bioengineering Core [24 Units]

The bioengineering core consists of 6 courses (1 lower division and 5 upper division) designed to give all students a common foundation of core knowledge specific to the discipline.

Lower Division Courses

Introduction to Bioengineering (BIOE 030) . . . . . 4 units

Upper Division Courses

Introduction to Molecular Biology (BIO 002) . . . . . 5 units
Physiology for Engineers (BIOE 100) . . . . . 4 units
Biotransport (BIOE 104). . . . . 4 units
The Cell (BIO 110). . . . . 4 units
Bioengineering Design (BIOE 150 . . . . . 3 units

Additional Degree Requirements (13 Units)

Principles of Organic Chemistry (CHEM 008). . . . . 4 units
Principles of Physical Chemistry (CHEM 010) . . . . . 4 units
Organic Synthesis and Mechanism (CHEM 100 . . . . . 4 units
Professional Seminar (ENGR 191) . . . . . .1 unit

Technical Electives

At least one technical elective should be selected from the following list.

Tissue Engineering (BIOE 114). . . . . 3 units
Electron Microscopy (ENGR 170 and 170L) . . . . . 3-4 units
Biosensors (BIOE 103) . . . . . 4 units
Advanced Molecular Biology (BIO 102) . . . . . 4 units
Biophysics (BIO 104) . . . . . 4 units
Genetics (BIO 140) . . . . . 4 units
Embryos, Genes, and Development (BIO 150) . . . . . 4 units
Molecular Immunology (BIO 151) . . . . . 4 units
Genome Biology (BIO 142) . . . . . 4 units
Biostatistics (BIO 175) . . . . . 4 units

Computational Biology (BIO 181) . . . . . 4 units
Bioinformatics (BIO 182) . . . . . 4 units
Material Structure & Characterization (MSE 113). . . . . 3 units
Polymeric Materials (MSE 114) . . . . . 4 units
Introduction to Nanotech & Nanoscience (MSE 118) . . . . . 3 units
Numerical Analysis (Math 133) . . . . . 4 units
Research credit (BIOE 195) . . . . . 3 units

■ Computer Science And Engineering Major

The undergraduate major in Computer Science and Engineering is designed to provide students with both breadth and depth in the exciting and rapidly expanding fields of:

- Computer science—the study of computation, including algorithms and data structures, and
- Computer engineering—including hardware, software and network architecture.

A degree in Computer Science and Engineering from UC Merced prepares students to assume leadership roles in designing, building and implementing a vast array of powerful new technologies that will continue to advance humankind. As the foundation for innovation in areas ranging from robotics and automation, computer networks, graphics and visualization and computer vision to informatics, machine learning and artificial intelligence careers in computer science and engineering are among the most satisfying and rewarding of any.

Computer Science and Engineering students work with the top computer scientists and engineers in the world. Our faculty has developed a program of study that combines practical exposure to the most modern technologies available, with a theoretical foundation that empowers students to master future changes and innovation as technologies continue to evolve at an astonishing pace. Our graduates will thus have both tools and insights to propel them into positions of responsibility and leadership across virtually any occupation.

Computer science and engineering constitutes one of the strongest industrial sectors in the state and the nation, offering a broad spectrum of career opportunities. Education at UC Merced provides the opportunity to participate in innovative classroom learning experiences, to become involved in laboratory research, to participate with fellow students in team activities and projects, and to interact directly with our remarkable faculty. From introductory programming courses through architecture design experiences, and research and team project activities, our students gain insights that allow them to excel throughout their chosen career path.

COMPUTER SCIENCE AND ENGINEERING LEARNING OUTCOMES

Upon graduation, our graduates demonstrate:

a) An ability to apply knowledge of computing and mathematics appropriate to the discipline;

b) An ability to analyze a problem and identify the computing requirements appropriate for its solution;

c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs;

d) An ability to function effectively as a member of a team in order to accomplish a common goal;

e) An understanding of professional, ethical, legal, security, and social issues and responsibilities;

f) An ability to communicate effectively with a range of audiences;

g) An ability to analyze the local and global impact of computing on individuals, organizations, and society;

h) Recognition of the need for and an ability to engage in continuing professional development;

i) An ability to use current techniques, skills, and tools necessary for computing practice;

j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;

k) An ability to apply design and development principles in the construction of software systems of varying complexity.

Engineering Service Learning Team hard at work.

REQUIREMENTS FOR THE COMPUTER SCIENCE AND ENGINEERING (CSE) MAJOR

The additional requirements that must be met to receive the B.S. in Computer Science and Engineering at UC Merced include:

Engineering Fundamentals [15 Units]

Students may chose from the following Engineering Fundamentals:

Introduction to Materials (ENGR 045)
Dynamics (ENGR 057)
Circuit Theory (ENGR 065)
Thermodynamics (ENGR 130)
Fluid Mechanics (ENGR 120)
Object Oriented Programming (ENGR 140)
Engineering Economics (ENGR 155)
Discrete Mathematics (ENGR 160)
Strength of Materials (ENGR 151)
Spatial Analysis and Modeling (ENGR 180)

(Students may petition to substitute other courses depending on individual broader interests.)

Computer Science And Engineering Core [24 Units]

The computer science and engineering core consists of 6 courses (2 lower division and 4 upper division) designed to provide students a common foundation of core knowledge specific to the discipline.

Lower Division Core Courses

Introduction to Computer Science and Engineering I (CSE 030). . . . . 4 units
Introduction to Computer Science and Engineering II (CSE 031) . . . . . 4 units

Upper Division Core Courses

Algorithm Design and Analysis (CSE 100) . . . . . 4 units
Database Systems (CSE 111) . . . . . 4 units
Discrete Mathematics (CSE 115) . . . . . 4 units
Software Engineering (CSE 120) . . . . . 4 units
Computer Architecture (CSE 140) . . . . . 4 units
Operating Systems (CSE 150) . . . . . 4 units
Computer Networks (CSE 160) . . . . . 4 units

Technical Electives

A total of 16 units of CSE technical electives are required. CSE technical electives are all upper division courses (CSE IXX). Upper division core courses taken in excess of the core requirements may be counted as technical electives. Other upper division courses outside your major area of study can be selected with approval.

Additional Degree Requirements

Professional Seminar (ENGR 191) . . . . . .1 unit

■ Environmental Engineering Major

The undergraduate major in Environmental Engineering prepares students for careers in both industry and government agencies concerned with managing water, energy, public health and the environment. The program is also a good foundation for further study in Earth science, engineering, business, management, law and public health. The curriculum provides students with a quantitative understanding of the physical, chemical and biological principles that control air, water and habitat quality and sustainability on Earth, along with expertise in the design, development, implementation and assessment of engineering solutions to environmental problems.

Environmental engineers are distinguished from other environmental professionals through their focus on problem solving, design and implementation of technological or management systems. Environmental engineers search for creative and economical ways to use resources efficiently, limit the release of residuals into the environment, develop sensitive techniques to track pollutants once released and find effective methods to remediate spoiled resources. They serve as the vital link between scientific discovery, technological development and the societal need for protecting human health and ecological integrity. In the coming decades, environmental engineers will increasingly be called upon to address broader issues of environmental sustainability by minimizing the release of residuals through altered production processes and choice of materials; by capturing the resource value of wastes through recovery, recycling and reuse; and by managing natural resources to meet competing societal objectives.

UC Merced emphasizes a highly interdisciplinary approach to environmental engineering, combining a strong theoretical foundation with field studies, laboratory experiments and computations. Core courses within the major provide students with a firm foundation in the physical and life sciences and the ways that they apply to energy, hydrology, air and water quality issues. Emphasis areas allow students the flexibility to study in more depth by following tracks developed in consultation with their academic advisor(s). The main areas of emphasis for Environmental Engineering at UC Merced are hydrology, water quality and air pollution and sustainable energy.

Hydrology: focuses on the sources, balance and use of water in both natural and managed environments, including precipitation, mountain snowpack, river runoff, vegetation, water use and groundwater. Both the physical and chemical aspects of the water cycle are included.

Water quality: focuses on engineering solutions to water and waste issues, including measurement technology, water quality assessments, treatment systems and remediation of contaminated waters. Physical, chemical and biological aspects are included.

Air pollution and sustainable energy: focuses on engineering solutions to air quality and energy problems, both regionally and globally. The sources, fate, effects of air pollutants, as well as the planning and design of solar and other renewable energy systems are included.

Engineers need to understand not only the technical but also the social and political contexts of their work. They must be able to communicate, and to plan, finance and market their products and ideas. Social sciences, business, humanities and arts courses are an important part of the curriculum. The result is a major that is hands-on and creative, engaging and adaptable.

ENVIRONMENTAL ENGINEERING LEARNING OUTCOMES

The ENVE program has six learning outcomes which characterize an ENVE graduate and what he/she will be enabled to accomplish following graduation:

1. ENVE graduates will have gained a strong foundation in basic mathematics, science, social science, humanities and arts, along with engineering principles, enabling active engagement as citizens in their communities;

2. ENVE graduates will be adept at applying critical thinking, problem solving, engineering principles and reasoning, the scientific method, and teamwork to solve environmental resource problems and to restore and sustain the global environment;

3. ENVE graduates will be prepared for advanced studies and research and/or employment advancement in a broad spectrum of industries and government agencies;

4. ENVE graduates will communicate effectively in written, spoken, and visual formats with technical, professional, and broader communities;

5. ENVE graduates will practice engineering according to the highest professional standards, demonstrating respect for social, ethical, cultural, environmental, economic, and regulatory concerns;

6. ENVE graduates will be instilled with a desire to pursue life-long learning opportunities including continued education, professional licensure, challenging professional experiences and active participation in professional organizations.

REQUIREMENTS FOR THE ENVIRONMENTAL ENGINEERING (ENVE) MAJOR

The additional requirements that must be met to receive the B.S. in Environmental Engineering at UC Merced are: General Chemistry II (CHEM 010, 4 units), Engineering Fundamentals (19 units), Environmental Engineering Core (20 units), and Technical electives (15 units, including at least one Field Methods Course).

Engineering Fundamentals [19 Units; 3 Units Specified]

The following fundamentals course is required:

Engineering Economic Analysis (ENGR 155). . . . . 3 units

The following fundamentals course sequence (designated by *) is strongly recommended for environmental engineering students preparing for the Fundamentals of Engineering (FE) examination. The additional courses listed may be substituted depending on each student's broader interests. Students may petition to substitute other courses.

Dynamics (ENGR 057)* . . . . . 4 units
Fluid Mechanics (ENGR 120)* . . . . . 4 units
Thermodynamics (ENGR 130)* . . . . . 3 units
Circuit Theory (ENGR 065)* . . . . . 3 units
Introduction to Materials (ENGR 045) . . . . . 4 units
Strength of Materials (ENGR 151) . . . . . 4 units
Spatial Analysis and Modeling (ENGR 180) . . . . . 4 units

Environmental Engineering Core [20 Units]

The environmental engineering core consists of 5 courses designed to give all students a common foundation of core knowledge specific to the discipline:

Lower Division Courses

Introduction to Environmental Science and Technology (ENVE 020) . . . . . 4 units

Upper Division Courses

Environmental Chemistry (ENVE 100) . . . . . 4 units
Hydrology and Climate (ENVE 110) . . . . . 4 units
Meteorology and Air Pollution (ENVE 130) . . . . . 4 units
Sustainable Energy (ENVE 160) . . . . . 4 units

Additional Degree Requirements [5 Units]

The following courses are required:

General Chemistry II (CHEM 010) . . . . . 4 units
Professional Seminar (ENGR 191) . . . . . 1 unit

Technical Electives [15 Units]

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor. Check carefully for current offerings as some of the courses are offered only in alternate years. Courses should be selected from the following list of approved technical electives, or students can petition to include other upper division courses outside their major. At least one field methods course is required.

A maximum of 4 Service Learning (ENGR 097/197) and/ or Undergraduate Research (ENGR 095/195) units may be used as technical elective units.

Spatial Analysis and Modeling (ENGR 180) . . . . . 4 units
Environmental Data Analysis (ENVE 105) . . . . . 3 units
Subsurface Hydrology (ENVE 112) . . . . . 4 units
Mountain Hydrology of the Western States (ENVE 114) . . . . . 4 units
Applied Climatology (ENVE 116) . . . . . 3 units
Global Change (ENVE 118) ... . 4 units
Environmental Microbiology (ENVE 121) . . . . . 4 units
Water Resources and Management (ENVE 140) . . . . . 3 units
Remote Sensing of the Environment (ENVE 152) . . . . . 4 units
Decision Analysis in Management (ENVE 155) . . . . . 4 units
Sustainable Energy (ENVE 160) . . . . . 4 units
Modeling and Design of Energy Systems (ENVE 162) . . . . . 3 units
Energy Policy and Planning Modeling (ENVE 164) . . . . . 4 units
Contaminant Fate and Transport (ENVE 170) . . . . . 3 units
Environmental Organic Chemistry (ENVE 171) . . . . . 3 units
Water and Wastewater Treatment (ENVE 176) . . . . . 3 units
Field Methods in Snow Hydrology (ENVE 181) . . . . . 1-3 units
Field Methods in Surface Hydrology (ENVE 182) . . . . . 1-3 units
Field Methods in Subsurface Hydrology (ENVE 183) . . . . . 1-3 units
Field Methods in Environmental Chemistry (ENVE 184) . . . . . 1-3 units
Watershed Biogeochemistry (ESS 105) . . . . . 3 units
Air Pollution Control (ENVE 132) . . . . . 3 units

LIST OF COURSES FOR EMPHASIS TRACKS

Hydrology

Subsurface Hydrology (ENVE 112) . . . . . 4 units
Mountain Hydrology of the Western US (ENVE 114) . . . . . 4 units
Applied Climatology . . . . . 3 units
Remote Sensing of the Environment (ENVE 152) . . . . . 4 units
Watershed Biogeochemistry (ESS 105) . . . . . 3 units
Decision Analysis in Management (ENVE 155) . . . . . 4 units
Environmental Data Analysis (ENVE 105) . . . . . 3 units
Field Methods in Snow Hydrology (ENVE 181) . . . . . 1-3 units
Field Methods in Surface Hydrology (ENVE 182) . . . . . 1-3 units
Field Methods in Subsurface Hydrology (ENVE 183) . . . . . 1-3 units

Water Quality

Subsurface Hydrology (ENVE 112 . . . . . 4 units
Environmental Microbiology (ENVE 121) . . . . . 4 units
Decision Analysis in Management (ENVE 155) . . . . . 4 units
Environmental Data Analysis (ENVE 105 . . . . . 3 units
Water Resources and Management (ENVE 140) . . . . . 3 units
Contaminant Fate and Transport (ENVE 170) . . . . . 3 units
Environmental Organic Chemistry (ENVE 171) . . . . . 3 units
Water and Wastewater Treatment (ENVE 176) . . . . . 3 units
Field Methods in Surface Hydrology (ENVE 182) . . . . . 1-3 units
Field Methods in Subsurface Hydrology (ENVE 183) . . . . . 1-3 units
Field Methods in Environmental Chemistry (ENVE 184) . . . . . 1-3 units

Air Pollution and Sustainable Energy

Decision Analysis in Management (ENVE 155) . . . . . 4 units
Remote Sensing of the Environment (ENVE 152) . . . . . 4 units
Air Pollution Control (ENVE 132) . . . . . 3 units
Applied Climatology (ENVE 116) . . . . . 3 units
Modeling and Design of Energy Systems (ENVE 162) . . . . . 3 units
Energy Policy and Planning Modeling (ENVE 164) . . . . . 4 units
Heat Transfer (ENGR 135) . . . . . 3 units

■ Materials Science And Engineering Major

UC Merced students majoring in Materials Science and Engineering (MSE) will be equipped for leadership in a field that dictates the pace of technological progress. Since the beginnings of civilization, technological progress has always relied on the materials that people were able to acquire from nature or through trade or by innovation. Wood, stone, bronze, iron, steel, aluminum, cements, plastics, semiconductors, liquid crystals, nanomaterials and quantum dots all have unique properties that enable—but also limit—what humans can make and do. Nations continue to go to war over access to particular raw materials. The construction of safe dwellings, the conveniences of rapid travel, the efficiency of telecommunications, the calculating and archiving power of computers, the life-prolonging gift of surgical implants and the dazzling performances of athletes all require dependable materials. Future technological progress, of any kind, will always be driven by the available materials.

Materials Science and Engineering (MSE) applies fundamental principles of physics and chemistry to designing materials with desired combinations of mechanical, optical, electrical, magnetic, electrochemical and other properties. Increasingly, innovative materials are being developed with the benefit of lessons that have been learned from nature. Examples include armor based on the structure of abalone shells and rats' teeth, optical materials that owe a debt to sea urchin spines and peacock feathers, high-performance ballistic fibers modeled on spider silk, self-cleaning surfaces copied from lotus leaves, and strong, reusable adhesives that emulate the behavior of gecko feet. Also encompassed in MSE are the methods by which particular atomic and molecular arrangements (nanostructures and microstructures) are achieved, the overall cost of the ingredients and processes used to produce particular materials, the effects of the environment on materials, the effects of materials and materials processing on the environment, and characterization of materials structure and properties. Because MSE embraces skills from physics, chemistry, mathematics and biology, it is especially appealing to anyone who enjoys interdisciplinary studies and who seeks to apply such knowledge to solving practical engineering problems.

MSE graduates are in demand in a great variety of fields that include manufacturing, energy, utilities, patent law, the financial sector, construction, transportation, aerospace, computer industries, sport, consulting, public policy, education and research. Employers appreciate the ability of MSE graduates to relate to colleagues across a broad spectrum of expertise.

Recent surveys of employment prospects nationally point to a steady growth in the overall MSE job market over the next decade at least. It is expected that the growth will be focused in areas related to the development of new materials, including materials for nanotechnology and biotechnology, rather than traditional areas of materials manufacturing. The MSE major at UC Merced reflects this expectation, with an emphasis on materials issues that will ensure the long-term relevance of our MSE degree.

MATERIALS SCIENCE AND ENGINEERING LEARNING OUTCOMES

Upon graduation, our graduates demonstrate the following:

a) Ability to apply advanced science (such as chemistry and physics) and engineering principles to materials systems;

b) Integrated understanding of the scientific and engineering principles that underlie the four major elements of the field: structure, properties, processing, and performance related to materials systems appropriate to the field;

c) Ability to apply and integrate knowledge from each of the above four elements of the field to solve materials selection and design problems;

d) Ability to utilize experimental, statistical and computational methods in the context of materials systems;

e) Professional and ethical responsibility.

REQUIREMENTS FOR THE MATERIALS SCIENCE AND ENGINEERING (MSE) MAJOR

The additional requirements that must be met to receive the B.S. in Materials Science and Engineering at UC Merced are: Engineering Fundamentals (18 units), MSE Core (22 units), and Technical electives (at least 12 units).

Engineering Fundamentals [18 Units Specified]

The following fundamentals courses are required:

Dynamics (ENGR 057) . . . . . 4 units
Strength of Materials (ENGR 151) . . . . . 4 units
Fluid Mechanics (ENGR 120) . . . . . 4 units
Thermodynamics (ENGR 130) . . . . . 3 units
Engineering Economic Analysis (ENGR 155) . . . . . 3 units

Materials Science And Engineering Core [22 Units; Specified]

The MSE core consists of courses designed to give all students a common foundation of core knowledge and skills specific to the discipline:

Lower Division Courses

Introduction to Materials (ENGR 045) . . . . . 4 units

Upper Division Courses

Solid State Materials Properties (MSE 110)* . . . . . 4 units
Materials Processing (MSE 111) . . . . . 4 units
Materials Selection and Performance (MSE 112) . . . . . 3 units
Materials Characterization (MSE 113) . . . . . 4 units
Materials Capstone Design (MSE 120) . . . . . 3 units

* Can substitute with PHYS141 Condensed Matter Physics, subject to applicable pre-requisites being met.

Additional Degree Requirements

Professional Seminar (ENGR 191) . . . . . .1 unit

Additional Degree Recommendations:

Six Service Learning units, at least three of which should be upper division (up to 2 credits could be freshman seminars).

Service Learning (ENGR 097 or ENGR 197) . . . . . 6 units

Technical Electives [At Least 12 Units]

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor. At least 9 units should be selected from the following list of approved technical electives:

Polymeric Materials (MSE 114) . . . . . 4 units
Ceramic Materials (MSE 115) . . . . . 3 units
Composites (MSE 116) . . . . . 3 units
New Materials (MSE 117) . . . . . 3 units
Introduction to Nanotechnology and Nanoscience (MSE 118. . . . 3 units
Materials Simulations (MSE 119) . . . . . 3 units
Introduction to Electron Microscopy (ENGR 170) . . . . . 3 units
Self-Assembling Molecular Systems (BIOE 110) . . . . . 3 units
Biomembranes (BIOE 111) . . . . . 3 units
Biomolecule-Substrate Interactions (BIOE 112) . . . . . 3 units
Quantum Chemistry and Spectroscopy (CHEM 112) . . . . . 3 units
Nanodevice Fabrication (MSE 126) . . . . . 3 units

NANOTECHNOLOGY EMPHASIS:

An emphasis in nanotechnology concurrent to a BS degree is offered to students who complete the following 2 required courses and 1 elective course. Students will learn both solution and vapor-based nanomaterial synthesis first hand, and they will be exposed to morphology characterization as well as basic property studies.

Required courses:

(1) Nanodevice Fabrication (MSE 126) . . . . . 3 units
(2) Introduction to Nanotechnology and Nanoscience (MSE 118) . . . . . 3 units

Elective Courses:

Polymeric Materials (MSE 114) . . . . . 4 units
New Materials (MSE 117) . . . . . 3 units
Materials Simulations (MSE 119) . . . . . 3 units
Self-assembling Molecular Systems (BIOE 110) . . . . . 3 units
Nanoscale Materials Chemistry (CHEM 140) . . . . . 3 units
Introduction to Electron Microscopy (ENGR 170) . . . . . 3 units

■ Mechanical Engineering Major

The undergraduate major in Mechanical Engineering provides students with a solid foundation and the necessary skills to assume leadership roles in industry and government agencies. The major also offers a number of opportunities for students intending to continue their education in graduate school. Mechanical Engineering impacts society by developing innovative technologies through the application of analysis for the design and synthesis of mechanical components and systems. The employment opportunities for graduates in this field are many and diverse. Mechanical engineers are recruited in a variety of industries, including automotive, aerospace, power generation, environmental, electronics, bioengineering, food processing, and consulting firms, among many others. Because of the variety of fields that are relevant to this profession, the undergraduate program covers areas in dynamics, materials, thermal/fluids, vibrations, controls, computer aided engineering, design and manufacturing. The innovative curriculum at UC Merced provides hands-on education that exposes students to engineering fundamentals, laboratory work and the use of computational tools to solve realistic engineering problems.

The program also prepares students to pursue graduate work in engineering or other disciplines. Mechanical Engineering is an evolving discipline that adapts to the current needs of society. Some of the exciting current areas of research include advanced energy systems, sustainable energy, autonomous vehicles, biomechanics and biosensors, nano/micro-technology, computational modeling, design optimization and complex systems. The programs at UC Merced emphasize a highly interdisciplinary approach; thus the curriculum offers several technical electives in topics inside and outside the Mechanical Engineering program.

MECHANICAL ENGINEERING LEARNING OUTCOMES

Upon graduation, our students demonstrate:

1. Ability to apply knowledge of informatics, mathematics, science, and engineering;

2. Ability to design and conduct experiments and numerical simulations, analyze, and interpret general scientific and engineering information;

3. Ability to design a system, component, or process to meet desired needs;

4. Ability to solve multidisciplinary problems;

5. Ability to identify, formulate, and solve engineering problems;

6. Understanding of professional and ethical responsibilities;

7. Ability to communicate effectively;

8. The broad education necessary to understand the impact of engineering solutions in a social context;

9. A sound basis and motivation to engage in lifelong learning and continuing education;

10. Knowledge of contemporary issues;

11. Ability to use the techniques, skills, and modern engineering and scientific tools necessary for engineering practice;

12. Working knowledge of the principles of Mechanics and Thermodynamics and how these principles evolve into other disciplines such as Heat and Mass Transfer, Vibration and Control, Computational;

13. Engineering, Mechanical Design, etc;

14. Ability to recognize new forms of thinking and new promising directions in engineering, and an understanding of modern tools

of analysis, synthesis and design (such as neural networks, genetic algorithms, adaptive and bio-mimetic design, virtual environments, uncertainty in simulations, life-cycle analysis, etc.);

15. Ability to incorporate interdisciplinary concepts from mathematics, physics, biology, chemistry and other disciplines into engineering solutions and vice-versa;

16. A culminating design experience.

REQUIREMENTS FOR THE MECHANICAL ENGINEERING MAJOR (ME)

The additional requirements that must be met to receive the B.S. in Mechanical Engineering at UC Merced include:

Engineering Fundamentals [18 Units]

The following fundamentals course is required by the School of Engineering:

Engineering Economic Analysis (ENGR 155). . . . . 3 units

Remaining engineering fundamentals courses for ME majors are:

Statics and Dynamics (ENGR 057) . . . . . 4 units
Introduction to Materials (ENGR 045) . . . . . 4 units
Strength of Materials (ENGR 151) . . . . . 4 units
Thermodynamics (ENGR 130) . . . . . 3 units

Mechanical Engineering Core [28 Units]

The Mechanical Engineering core consists of 8 upper division courses designed to give all students a common foundation of core knowledge specific to the discipline.

Fluid Mechanics (ENGR 120) . . . . . 4 units
Component Design (ME 120) . . . . . 3 units
Heat Transfer (ENGR 135) . . . . . 4 units
Numerical Methods I (MATH 131) . . . . . 4 units
Computer Aided Engineering (ME 137). . . . . 3 units
Vibration and Control (ME 140) . . . . . 4 units
Capstone Design (ME 170) . . . . . 3 units
Circuits Theory (ENGR 065) . . . . . 3 units

Technical Electives (12-15 Units)

Technical electives should be selected in a manner that is complementary to, yet integrated with, your major area of study, and should be determined through close interaction with your major area advisor. Examples of TE classes are:

Finite Element Analysis (ME 135). . . . . 3 units
Mechatronics (ME 142) . . . . . 4 units
Aerodynamics (ME 136) . . . . . 3 units
Special Topics in Mechanical Engineering (ME 190) . . . . . 3 units
Meteorology and Air Pollution (ENVE 130) . . . . . 4 units
Air Pollution Control (ENVE 132). . . . . 3 units
Sustainable Energy (ENVE 160) . . . . . 4 units
Modeling and Design of Energy Systems (ENVE 162). . . . . 3 units
Introduction to Nanotechnology and Nanoscience (MSE 118) . . . 3 units

Additional Degree Requirements

Professional Seminar (ENGR 191) . . . . . 1 unit

ATTENDING A SMALL SCHOOL HAS HELPED ME REMAIN FOCUSED ON THE TRUE REASON FOR ATTENDING COLLEGE, AND THAT IS TO EXPAND MY KNOWLEDGE THROUGH EDUCATION, INTERNSHIPS, PROJECTS, AND RESEARCH POSITIONS.

I WOULD ADVISE ALL FRESHMEN TO REMEMBER THAT COLLEGE IS SUPPOSED TO BE SOME OF THE BEST YEARS OF YOUR LIFE, BOTH SOCIALLY AND ACADEMICALLY. DON'T FORGET THAT THE FIRST REASON FOR BEING HERE, THOUGH, IS EDUCATION. I KNOW THAT THE SOCIAL ASPECTS SEEM MUCH MORE APPEALING, BUT MAKE SURE YOU TAKE CARE OF YOUR ACADEMICS FIRST. GET INVOLVED. YOU DON'T WANT TO WASTE AWAY YOUR TIME IN COLLEGE WISHING YOU HAD JOINED THAT CLUB OR STARTED THAT PROJECT. IT WILL TRULY HELP WHEN APPLYING FOR INTERNSHIPS, JOBS, AND GRADUATE SCHOOL.

—Bethany Robinson, Mechanical Engineering

Engineering Professor Christopher Viney in Africa conducting materials science research on hippos.

School Of Natural Sciences

The mission of the School of Natural Sciences is to share the joy of discovery of our natural world, to provide a stimulating environment that enables our students to better understand the scientific foundation of the world in which we live and to develop the skills of the next generation of leaders to meet the scientific challenges of the 21st century. Science, technology and innovation are the keys to future prosperity and quality of life.

THE SCHOOL OF NATURAL SCIENCES OFFERS THE FOLLOWING MAJORS:

- Applied Mathematical Sciences
- Biological Sciences
- Chemical Sciences
- Earth Systems Science
- Physics

THE SCHOOL OF NATURAL SCIENCES OFFERS THE FOLLOWING MINORS:

- Applied Mathematics
- Chemical Sciences
- Environmental Science and Sustainability
- Natural Sciences Education
- Physics

LETTER OF WELCOME FROM THE DEAN

Dear Science Students:

Science and mathematics have become increasingly important in today's world as we attempt to find new solutions to help society solve important problems in energy, the environment, stainability, and human health. All of these problems will require novel and creative approaches that depend heavily on interdisciplinary and diverse teams of scientists. A degree in the sciences will open the door to many careers, where you will be able to apply your knowledge to help develop solutions that could have a far-reaching global impact.

The UC Merced Natural Sciences faculty is committed to educating and training a new generation of scientists through the use of the latest theoretical, experimental, and computational technologies. Our graduates develop both the practical skills necessary to immediately start at a high-tech company as well as the fundamental scientific skills to pursue professional schools and graduate programs.

We welcome you to Merced and invite you to visit any of our faculty members to talk about the many exciting opportunities for you in the School of Natural Sciences and beyond.

Juan Meza
Dean, School of Natural Sciences

THE MOST INCOMPREHENSIBLE THING ABOUT THE WORLD IS THAT IT IS COMPREHENSIBLE.

—ALBERT EINSTEIN (1879–1955)

SCIENCE IS ABOUT DISCOVERY

The scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful. If nature were not beautiful, it would not be worth knowing, and if nature were not worth knowing, life would not be worth living.

—JULES HENRI POINCARÉ (1854–1912)

Mathematics, physics, biology, chemistry and Earth systems science are the links to making discoveries about the natural world, the impact of human activities on that world and the impact of that world on human health. The academic programs in the School of Natural Sciences are designed to help students learn fundamental scientific principles in the context of the real world.

SCIENCE IS ABOUT CREATIVITY, INNOVATION AND TECHNOLOGY

Discovery consists in seeing what everyone else has seen and thinking what no one else has thought.

—ALBERT SZENT-GYORGI (1893–1986)

Answering questions requires creativity and innovation—creativity to think about a problem in a different way; to design the strategy to, for example, discover the gene(s) responsible for asthma, cancer or cardiovascular disease; to generate ideas for new technologies. Students in the School of Natural Sciences receive the foundational learning to create innovative technologies to solve problems and implement solutions.

SCIENCE IS ABOUT STEWARDSHIP OF OUR NATURAL RESOURCES

A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community.

—ALDO LEOPOLD (1887–1948)

Understanding and prediction must precede protection. Students in the School of Natural Sciences fully understand the complex interactions between the physical and biological world and the consequences of society's actions on the Earth and its biota. With this understanding, they are well positioned to manage and preserve our resources for future generations.

SCIENCE IS ABOUT UNDERSTANDING THE HUMAN CONDITION

Louis Pasteur's theory of germs is ridiculous fiction.

—PIERRE PACHET, 1872

The understanding of science has improved and will continue to improve. Health and disease, prevention and treatment rely on understanding complex systems. Students in Natural Sciences at UC Merced are at the forefront of state-of-the art research and technology to unravel biological complexity. They are the world's future scientists, healers and policy makers.

SCHOOL OF NATURAL SCIENCES REQUIREMENTS

All School of Natural Sciences students, regardless of major, are expected to meet the minimum requirements for the BS degree.

The School of Natural Sciences degree requirements are at least 120, but not more than 150 semester units.

All courses required for completion of a major (or minor) in Natural Sciences must be passed with a grade of C- or better, not to include general education courses taken outside of Natural Sciences and Engineering. Students must maintain a minimum cumulative 2.0 GPA in all major coursework.

Natural Sciences Early Progress Policy

Majors in the School of Natural Sciences are competitive and space is limited. Students must make appropriate degree progress to remain in any Natural Sciences major. Students in the Natural Sciences must meet the following requirements to continue in the School:

All students must pass the following courses with a C- or better, prior to the start of the third regular (Fall/Spring) semester. If they fail to do this, they are ineligible for continued enrollment in a Natural Sciences major and are moved to undeclared status.

- Either MATH 005 or MATH 011 or MATH 021

AND

- Either CHEM 001 or CHEM 002

Students may repeat a course only one time (for a total of two attempts to earn a C- or better).

If students do not complete these requirements, they may take these courses at another institution and petition to be readmitted to the School of Natural Sciences.

Students who have been removed from the major for academic reasons must meet the following requirements in order to petition to be re-admitted to the School of Natural Sciences:

- Cumulative University of California grade point average of at least 2.0
- Current semester grade point average of at least 2.0
- Major grade point average of 2.5
- Completion of all lower division courses with grades of C- or higher

GENERAL EDUCATION AND COURSES REQUIRED OUTSIDE OF NATURAL SCIENCES AND ENGINEERING [24 UNITS]

The World at Home I (CORE 1) . . . . . 4 units
College Reading and Composition (WRI 010) . . . . . 4 units
One Lower Division elective in the Humanities or Arts . . . . . 4 units
One Lower Division elective in the Social Sciences . . . . . 4 units
One Upper Division elective from the Social Sciences, Humanities or Arts . . . . . 4 units
One Upper Division elective emphasizing oral or written communication . . . . . 4 units

Students in Natural Sciences have a freshman year that lays the foundation for further study in the majors. Students have the opportunity to explore the different UC Merced majors during that year through freshman seminars, research experiences and informal contact with faculty and graduate students. Currently freshman seminars are not required but highly encouraged for students within Natural Sciences. Taking a freshman seminar course and also

participating in research experiences gives students the opportunity to work closely with faculty.

One General Education course, CORE 001, The World at Home is common for all freshmen or sophomores entering UC Merced in the lower division. This course lays the foundation in skills and ideals articulated in the UC Merced Guiding Principles for General Education (see General Education section of this catalog). These include decision-making, communication, ethics, responsibility, leadership, teamwork, aesthetic understanding, creativity and an appreciation of diverse perspectives in both the global and community contexts. All UC Merced students take CORE 001 during their freshman year.

Major area upper division courses and emphasis track requirements are unique to each major. These are presented in the following section on Majors.

TRANSFER STUDENTS

Please see the transfer requirements included in the major portion of the catalog. Students who transfer with fewer than 45 transferable semester units will need to complete the Natural Sciences general education and courses required outside of Natural Sciences and Engineering.

PARTNERSHIP WITH KINGS CANYON, SEQUOIA AND YOSEMITE NATIONAL PARKS

UC Merced has partnership agreements for education and research with Sequoia/ Kings Canyon and Yosemite National Parks. In cooperation with schools in the San Joaquin Valley, the partnership has been sponsoring summer environmental education programs for high school students. With the dedication of the Sierra Nevada Research Institute Yosemite Field Station (pictured above), the partnership has kicked off a new phase of research collaboration that is advancing scientific and cultural understanding, meeting regional needs and enriching university and public education. Research buildings are also available in Sequoia/Kings Canyon National Parks.

Natural Science Majors

■ Applied Mathematical Sciences Major

Mathematics has been a central feature of humanity's intellectual achievements over the past several centuries. Its role in the physical sciences and engineering is well established and continues to aid in their development. Mathematics is also becoming increasingly important in the social and life sciences with a wide range of new applications requiring sophisticated mathematical techniques. Thus, the field of applied mathematical sciences is undergoing remarkable growth.

UC Merced offers an undergraduate major leading to a B.S. degree in the Applied Mathematical Sciences. This educational experience provides students with knowledge of the foundations of mathematics and the skills needed to apply mathematics to real-world phenomena in the social sciences, natural sciences and engineering. The curriculum is composed of courses in the fundamentals while allowing for building expertise in an application area through the emphasis tracks. There is a core set of courses all mathematical sciences students take. Beyond these classes, students complete an emphasis track consisting of courses in other fields. Some examples of emphasis tracks include physics, computational biology, economics, computer science and engineering, and engineering mechanics. New emphasis tracks will be added alongside new programs developing at UC Merced. Students may also design their own emphasis track with the approval of the faculty program leads for the Applied Mathematical Sciences major.

A degree in applied mathematical sciences opens the door to a wide variety of careers. Employers understand that a degree in mathematics means a student has been trained well in analytical reasoning and problem solving. Moreover, applied mathematical sciences majors with skills in scientific computing have the additional leverage of substantial computing experience. The market for applied mathematicians has usually been good, especially for those who can relate their mathematics to real world problems. In particular, applied mathematics majors familiar with concepts in management, biology, engineering, economics or the environmental sciences among others are well suited for many specialized positions. In addition, the breadth and rigor of this program provide an excellent preparation to teach mathematics at the elementary or high school levels.

REQUIREMENTS FOR THE APPLIED MATHEMATICAL SCIENCES MAJOR (MATH)

Applied Mathematical Sciences Requirements (80-82 units): In addition to the UC Merced and School of Natural Sciences General Education and Courses Required Outside of Natural Sciences and Engineering, the Applied Mathematical Sciences major consists of 20 or 21 courses (10 lower division and 10 or 11 upper division, depending on the emphasis track chosen) designed to give all students a common foundation of core knowledge specific to the discipline, plus breadth in an application area.

Lower Division Courses [38 Units]

BIO 001: Contemporary Biology*, ESS 001: Introduction to Earth Systems Science† or ESS 005: Introduction to Biological Earth Systems . . . . . 4 units
CSE 020: Introduction to Computing . . . . . 2 units
CHEM 002: General Chemistry I . . . . . 4 units
MATH 021: Calculus I for Physical Sciences and Engineering . . . . 4 units
MATH 022: Calculus II for Physical Sciences and Engineering. . . . 4 units

MATH 023: Vector Calculus . . . . . 4 units
MATH 024: Linear Algebra and Differential Equations . . . . . 4 units
MATH 032: Probability & Statistics . . . . . 4 units
PHYS 008: Introductory Physics I . . . . . 4 units
PHYS 009: Introductory Physics II . . . . . 4 units

* For the Computational Biology emphasis track listed below, students must take BIO 001 and BIO 001L: Contemporary Biology Lab

† For the Environmental emphasis track listed below, students will take ESS 1 to fulfill emphasis track requirements and must take a different course to fulfill the Lower Division Course requirement.

Upper Division Courses [24 Units]

MATH 122: Complex Variables and Applications . . . . . 4 units
MATH 125: Intermediate Differential Equations . . . . . 4 units
MATH 126: Partial Differential Equations . . . . . 4 units
MATH 131: Numerical Analysis I . . . . . 4 units
MATH 132: Numerical Analysis II . . . . . 4 units
MATH 141: Linear Analysis I . . . . . 4 units

Emphasis Tracks [18-20 Units]

The student must complete between 18 and 20 units of approved course work toward the completion of an emphasis track. At least 11 of these 18 units must be upper division courses. Some examples of emphasis tracks include physics, computational biology, economics, computer science, engineering and environmental. These examples appear in the sample course plans available on the Natural Sciences website, naturalsciences.ucmerced.edu. More application themes will become available as new programs on campus develop. Students may design their own emphasis track with approval from the faculty program leads for the Applied Mathematical Sciences major.

ADDITIONAL REQUIREMENTS FOR PHYSICS EMPHASIS TRACK

PHYS 010: Introductory Physics III . . . . . 4 units

AND

Any upper division physics courses, except PHYS 160, totaling at least 14 units.

ADDITIONAL REQUIREMENTS FOR COMPUTATIONAL BIOLOGY EMPHASIS TRACK

BIO 2: Introduction to Molecular Biology . . . . . 4 units

AND

BIO 175: Biostatistics or BIO 140: Genetics . . . . . 4 units
BIO 180: Mathematical Modeling for Biology . . . . . 4 units
BIO 181: Survey of Computational Biology . . . . . 4 units
BIO 182: Bioinformatics . . . . . 4 units

OR

BIO 175: Biostatistics or BIO 180: Mathematical Modeling for Biology . . . . . 4 units
BIO 140: Genetics . . . . . 4 units
BIO 144: Phylogenetics . . . . . 4 units
BIO 183: Population Genetics . . . . . 4 units

Additional Requirements for Economics Emphasis Track

ECON 1: Introduction to Economics . . . . . 4 units
ECON 10: Statistical Inference . . . . . 4 units
ECON 100: Intermediate Microeconomic Theory . . . . . 4 units
ECON 101: Intermediate Macroeconomic Theory . . . . . 4 units
ECON 130: Econometrics . . . . . 4 units

ADDITIONAL REQUIREMENTS FOR COMPUTER SCIENCE EMPHASIS TRACK

CSE 30: Introduction to Computer Science and Engineering I . . . 4 units
CSE 31: Introduction to Computer Science and Engineering II . . . 4 units
CSE 100: Algorithm Design and Analysis . . . . . 4 units

AND
Two of the following courses:

CSE 111: Database systems . . . . . 4 units
CSE 140: Computer architecture . . . . . 4 units
CSE 160: Computer Networks . . . . . 4 units
CSE 170: Computer graphics . . . . . 4 units
CSE 171: Programming Interactive 3D graphics and games . . . . . 4 units
CSE 173: Computational Cognitive neuroscience . . . . . 4 units
CSE 175: Introduction to artificial Intelligence . . . . . 4 units
CSE 176: Machine Learning . . . . . 4 units
CSE 185: Introduction to Computer vision . . . . . 4 units
ENGR 160: Discrete Math . . . . . 4 units
ENGR 140: Introduction to object oriented programming . . . . . 4 units

ADDITIONAL REQUIREMENTS FOR ENGINEERING EMPHASIS TRACK

ENGR 57: Statics and Dynamics . . . . . 4 units
ME 135: Finite Element Analysis . . . . . 3 units

AND
Three of the following courses:

ENGR 120: Fluid Mechanics . . . . . 4 units
ENGR 130: Thermodynamics . . . . . 3 units
ENGR 151: Strength of Materials . . . . . 4 units
ENGR 135: Heat transfer . . . . . 4 units
ME 140: Vibration and Control . . . . . 4 units

ADDITIONAL REQUIREMENTS FOR ENVIRONMENTAL EMPHASIS TRACK

Two of the following courses:

ESS 1: Introduction to Earth Systems Science . . . . . 4 units
ESS 2: Sustainability Science . . . . . 4 units
ESS 20: Fundamentals of Earth Processes . . . . . 4 units
ESS 25: Introduction to Ecosystem Science . . . . . 4 units
ENVE 20: Intro to Environmental Science and Technology . . . . . 4 units

AND
Three of the following courses:

ENVE 105: Environmental Data Analysis . . . . . 3 units
ENVE/ESS 110: Hydrology and climate . . . . . 4 units
ENVE/ESS 112: Subsurface hydrology . . . . . 4 units
ENVE 130: Meteorology and air pollution . . . . . 4 units
ENVE 160: Sustainable energy . . . . . 4 units
ESS 128: Theoretical Ecology . . . . . 4 units
ESS 148: Fundamentals of ecology . . . . . 4 units

TRANSFER STUDENTS

To be admitted to the Applied Mathematical Sciences major transfer students must meet the following requirements:

Applicants will, at the time of admission have completed at minimum each of the following courses (or their equivalent) with a "C-" or better:

Chemistry 2
Math 21 and 22
Physics 8 and 9

Applicants must have a minimum overall GPA of 2.8 in transferable courses. Any outstanding General Education and Major preparation coursework will be completed at UC Merced. Students should also consult the Information for Prospective Students link on the School of Natural Sciences website naturalsciences.ucmerced.edu for more information.

PROGRAM LEARNING OUTCOMES FOR THE APPLIED MATHEMATICAL SCIENCES MAJOR

The over-arching goal of the Applied Mathematical Sciences program is to build a community of life-long learners that use the analytical and computational tools of mathematics to solve real world problems.

Upon graduating, we expect students completing the Applied Mathematical Sciences major to have become effective problem solvers, meaning that student will be able to

1. Solve mathematical problems using analytical methods.

2. Solve mathematical problems using computational methods.

3. Recognize the relationships between different areas of mathematics and the connections between mathematics and other disciplines.

4. Give clear and organized written and verbal explanations of mathematical ideas to a variety of audiences.

5. Model real-world problems mathematically and analyze those models using their mastery of the core concepts.

Sample plans of study for the Applied Mathematical Sciences degree may be found in the School of Natural Sciences website naturalsciences.ucmerced.edu.

■ Biological Sciences Major

The Biological Sciences address many of the most important and fundamental questions about our world: What is life? How does our brain produce our ideas and emotions? What are the limits to human life and physical capabilities? How do we feed the world's growing population? Could medical science ensure that our children won't have to worry about disease? Moreover, there has never been a more exciting and important time to study biology. From the mapping of the genome to understanding the molecular basis of human disease to predicting the effects of global climate change on ecosystems to understanding fundamental processes that produce and sustain life on Earth, the Biological Sciences are at the forefront of finding answers to some of society's most vexing problems.

The undergraduate major in Biological Sciences is an excellent first step towards exciting careers in biology and the health sciences. Graduates of this program will also be well prepared for positions in the biotechnology and pharmaceutical industries, health care, conservation, environmental law and policy, and natural resources management (including forest and park services), as well as careers such as journalism, public policy and business, which increasingly involve the biological sciences. In addition, the breadth and rigor of this program are an excellent preparation for graduates to teach science at the elementary or high school levels.

> At UC Merced I've learned a lot about myself: What I can contribute to society and how I can start.
>
> —Stacy Vang, Biological Sciences Major

This program teaches biology as a multidisciplinary science, reflecting the increasing role of chemistry, physics, mathematics, computer science and advanced technologies in the life sciences. Students majoring in Biological Sciences can choose between five emphasis tracks providing backgrounds in different areas of biology: Molecular and Cell Biology, Ecology and Evolutionary Biology, Human Biology, Developmental Biology and Microbiology and Immunology. These emphasis tracks consist of a sequence of five or six upper division courses that are taken in the second, third and fourth years of the program.

REQUIREMENTS FOR THE BIOLOGICAL SCIENCES MAJOR (BIO)

In addition to the UC Merced and School of Natural Sciences General Education and Courses Required Outside of Natural Sciences and Engineering, the requirements that must be met to receive the B.S. in Biological Sciences at UC Merced are:

Major Requirements [46-49 Units]

BIO 1: Contemporary Biology . . . . . 4 units
BIO 1L: Contemporary Biology Lab . . . . . .1 unit
BIO 110: The Cell . . . . . 4 units
CHEM 2: General Chemistry 1 . . . . . 4 units
CHEM 8: Principles of Organic Chemistry . . . . . 4 units
CHEM 10: General Chemistry II. . . . . 4 units
MATH 11: Calculus I . . . . . 4 units
MATH 12: Calculus II. . . . . 4 units
MATH 15: Introduction to Scientific Data Analysis . . . . . 2 units
MATH 18: Probability and Statistics (or MATH 032, ENVE 105 or PSY 010) . . . . . 4 units
PHYS 18: Introductory Physics I for Biological Sciences . . . . . 4 units
PHYS 19: Introductory Physics II for Biological Sciences . . . . . 4 units
One additional Upper Division Course in science or Engineering . . . . . 3-4 units

Emphasis Track Core Courses [16–21 Units]

(Details on the Emphasis Tracks are given in next section)

- Molecular and Cell Biology: 4 courses
- Human Biology: 4 courses
- Ecology and Evolutionary Biology: 4 courses
- Developmental Biology: 5 courses
- Microbiology and Immunology: 5 courses

Upper Division Elective Courses [8-17 Units]

Two to four thematically linked courses chosen from the emphasis track elective list in the next section.

Undergraduate Major in Biological Sciences Research

As a capstone to the Biological Sciences Program, all Biological Sciences majors are encouraged to participate in a research experience. Students attend research lectures by UC Merced faculty, and students can elect to go on to participate in research projects during their senior year. The relevant course numbers are BIO 190 and BIO 195.

Transfer Students

To be admitted to the Biological Sciences major transfer students must meet the following requirements:

Applicants will, at the time of admission have completed at

minimum each of the following courses (or their equivalent) with a "C-" or better:

Biological Sciences 1 & 1L*
Chemistry 2 and 10
Math 11 or 21
Physics 18 or 8

Applicants must have a minimum overall GPA of 2.8 in transferable courses. Any outstanding General Education and Major preparation coursework will be completed at UC Merced. Students should also consult the Information for Prospective Students link on the School of Natural Sciences website naturalsciences.ucmerced.edu for more information.

* Biological Sciences 1 & 1L (if available at their originating school. A letter grade of "B" or better grade must be earned.)

BIOLOGICAL SCIENCES EMPHASIS TRACKS (BIO)

I. MOLECULAR AND CELL BIOLOGY

The Molecular and Cell Biology (MCB) emphasis track provides students with the skills and knowledge to pursue studies in graduate programs and professional schools and the background for careers in basic and applied biological research and medicine. MCB emphasizes the molecular and cellular principles that underlie all terrestrial life, as well as the genetic and evolutionary concepts explaining the diversity and unity of life. These topics form the foundation of modern health sciences and biomedical research.

Molecular And Cell Biology Core Courses [17-18 Units]

Introduction to Molecular Biology (BIO 002) . . . . . 4 units
Introduction to Molecular Biology Lab (BIO 002L) . . . . . .1 unit
Genetics (BIO 140) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Quantitative Biology Elective . . . . . 4-5 units

Quantitative Biology Elective list:

BIO 104 Biophysics
BIO 105 Enzymology
BIO 142 Genomics
BIO 175 Biostatistics
BIO 180 Mathematical Modeling for Biology
BIO 181 Introduction to Biomolecular Modeling
BIO 182 Bioinformatics
BIO 183 Population Genetics

Upper Division Elective Courses

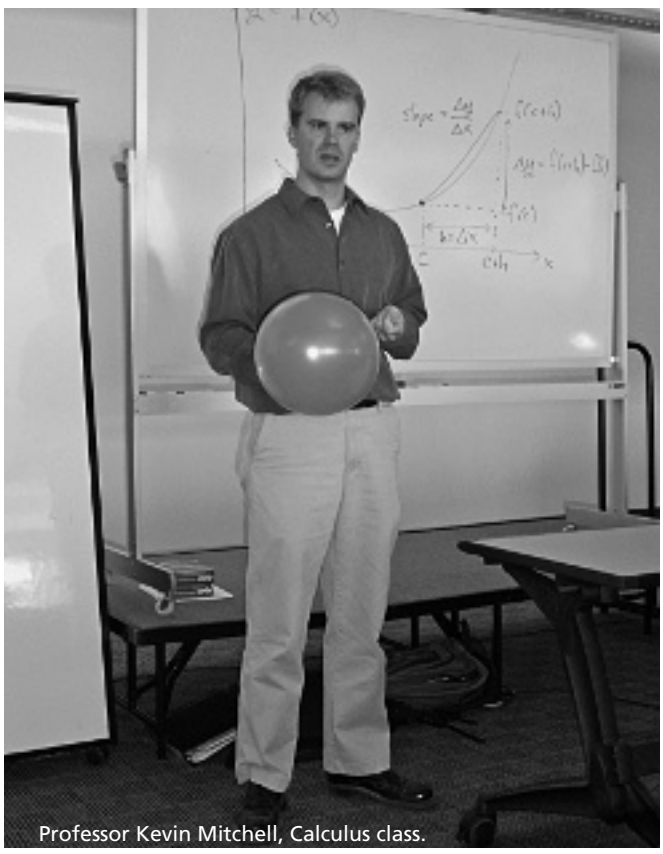
At least four courses chosen from the Molecular and Cell Biology elective list:

One course with Laboratory component . . . . . 5 units
Three additional courses . . . . . 12 units minimum

BIO 101 – Biochemistry
BIO 102 – Advanced Biochemistry and Molecular Biology
BIO 104 – Biophysics
BIO 104L – Biophysics Laboratory
BIO 105 – Enzymology
BIO 105L – Enzymology Laboratory
BIO 107 – Physical Biochemistry
BIO 111 – Cells, Tissues and Organs
BIO 120 – General Microbiology
BIO 120L – General Microbiology Laboratory
BIO 122 – Pathogenesis
BIO 124 – Microbial Evolution
BIO 127 – Virology
BIO 130 – Plant Biology
BIO 134 – Marine Sciences Theory and Practice
BIO 142 – Genome Biology
BIO 143 – Biodiversity
BIO 144 – Phylogenetics
BIO 144L – Phylogenetics Laboratory
BIO 150 – Embryos, Genes and Development
BIO 151 – Molecular Immunology
BIO 151L – Molecular Immunology Laboratory
BIO 152 – Cancer Genetics and Tumor Biology
BIO 153 – Evolution and Development
BIO 160 – Comparative Physiology
BIO 160L – Comparative Physiology Laboratory
BIO 161 – Human Physiology
BIO 163 – Endocrinology
BIO 170 – Neurobiology
BIO 170L – Neurobiology Laboratory
BIO 175 – Biostatistics
BIO 180 – Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Simulation
BIO 182 – Bioinformatics
BIO 183 – Population Genetics

II. HUMAN BIOLOGY

The Human Biology (HB) emphasis track provides students with a rich education in the scientific principles that underlie modern health sciences. This major is an excellent preparation for entrance into health-related professional careers including medicine, dentistry, pharmacy, genetic counseling, health education, public


Professor Kevin Mitchell, Calculus class.

health, clinical psychology, epidemiology, environmental health sciences and health administration, among others. The Human Biology emphasis track also provides a strong foundation for careers in biomedical research, and includes the courses most broadly required for advanced study in health sciences.

Human Biology Core Courses [17 Units]

Genetics (BIO 140) . . . . . 4 units
Biochemistry I* (BIO 101) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Human Physiology (BIO 161) . . . . . 5 units

*Requires CHEM 100, a 3 unit course

Upper Division Elective Courses

At least four courses chosen from the Human Biology elective list below:

One upper division Cognitive Science, Psychology or Neurology Course . . . . . 4 units
Three additional courses . . . . . 12 units minimum

ANTH 100 – History of Anthropological Thought and Practice
ANTH 114 – Social Memory
ANTH 120 – Introduction to Medical Anthropology
ANTH 121 – Ethnomedicine
ANTH 130 – Archaeology of Colonialism
ANTH 155 – Paleodemography
ANTH 160 – Human Origins
ANTH 162 – Growth, Development and Human Evolution
ANTH 169 – Trends in Biological Anthropology
ANTH 172 – Ethnohistory
BIO 104 – Biophysics
BIO 104L – Biophysics Laboratory
BIO 105 – Enzymology
BIO 107 – Physical Biochemistry
BIO 111 – Cells, Tissues and Organs
BIO 120 – General Microbiology
BIO 120L – General Microbiology Laboratory
BIO 122 – Microbial Pathogenesis
BIO 123 – Human Parasitology
BIO 125 – Emerging Public Health Threats
BIO 127 – Virology
BIO 142 – Genome Biology
BIO 150 – Embryos, Genes and Development
BIO 151 – Molecular Immunology
BIO 151L – Molecular Immunology Laboratory
BIO 152 – Cancer Genetics and Tumor Biology
BIO 164 - Human Anatomy
BIO 170 – Neurobiology
BIO 170L – Neurobiology Laboratory
BIO 175 – Biostatistics
BIO 180– Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Simulation
BIO 182 – Bioinformatics
COGS 101 – Mind, Brain and Computation*
COGS 103 – Introduction to Neural Networks in Cognitive Science*
PSY 121 – Cognitive Psychology
PSY 123 – Alcohol, Drugs and Behavior
PSY 130 – Developmental Psychology
PSY 140 – Clinical Psychology
PSY 145 – Human Sexuality
PSY 180 – Physiological Psychology

* Requires COGS 001 or PSY 001

III. ECOLOGY AND EVOLUTIONARY BIOLOGY

The Ecology and Evolutionary Biology (EEB) emphasis track prepares students for careers in areas of biology that lead to a more comprehensive understanding of biological processes that range across the mechanistic, organismal, population, community and ecosystem levels. Ecology and Evolutionary Biology incorporates multidisciplinary approaches to address biological questions in an evolutionary framework. Areas of research in Ecology and Evolutionary Biology include behavioral ecology, biomechanics, comparative anatomy and physiology, conservation biology, developmental genetics, ecology, population genetics, plant biology, molecular evolution, organismal interactions (e.g., plant-animal), paleobiology, phylogenetics, quantitative genetics and systematics.

Ecology And Evolutionary Biology Core Courses [17 Units]

Introduction to Molecular Biology (BIO 002) . . . . . 4 units
Introduction to Molecular Biology Lab (BIO 002L) . . . . . 1 unit
Genetics (BIO 140) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Ecology (BIO 148) . . . . . 4 units

Upper Division Elective Courses

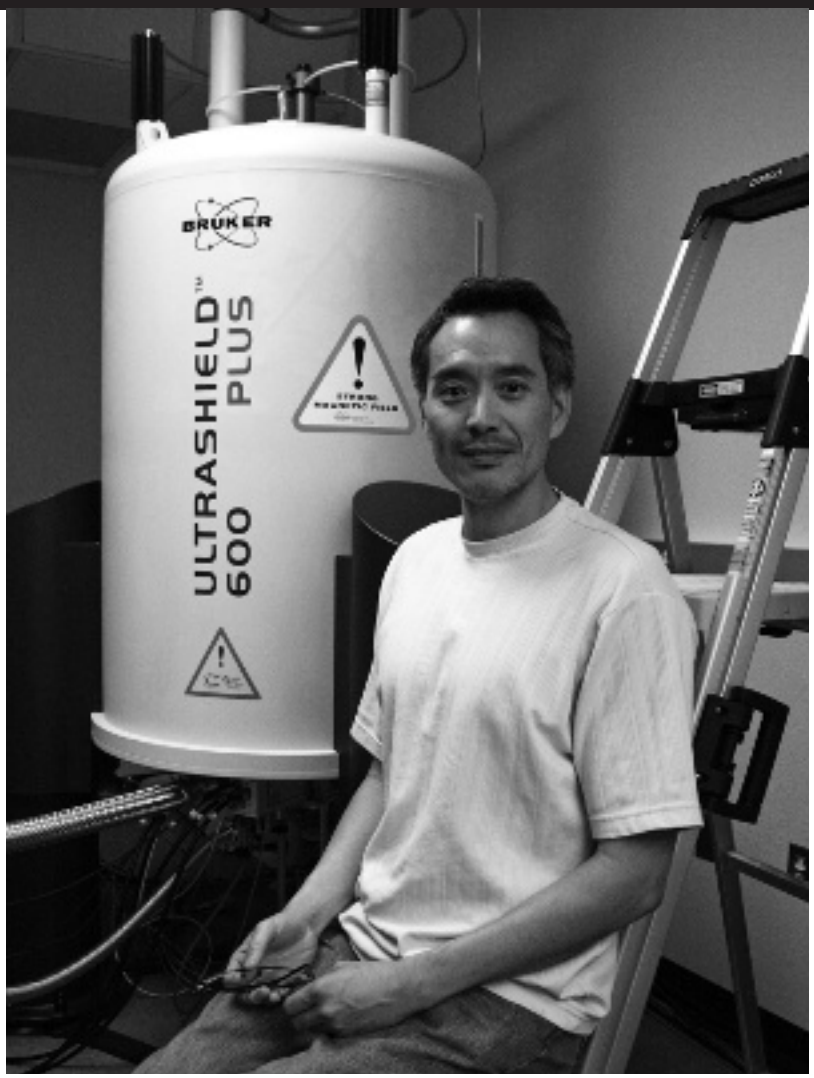
At least four courses chosen from the Ecology and Evolutionary Biology elective list below:

One course with Field component . . . . . 5 units
One course with Laboratory component . . . . . 5 units
Two additional courses . . . . . 8 units minimum

BIO 107 – Physical Biochemistry
BIO 111 – Cells, Tissues, Organs
BIO 124 – Microbial Evolution
BIO 134 – Marine Sciences (F)
BIO 142 – Genome Biology (L)
BIO 143 – Biodiversity
BIO 143F – Biodiversity and the Tree of Life Field
BIO 144 – Phylogenetics
BIO 144L – Phylogenetics Laboratory
BIO 146 – Paleobiology
BIO 147 – Astrobiology
BIO 149 – Conservation Biology
BIO 149F – Conservation Biology Laboratory (satisfies Field component requirement)
BIO 153 – Evolution & Development
BIO 160 – Comparative Physiology (L)
BIO 162 – Biomechanics
BIO 163 – Endocrinology
BIO 163 L – Endocrinology Laboratory
BIO 170 – Neurobiology
BIO 170L – Neurobiology Laboratory
BIO 180 – Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Simulation
BIO 182 – Bioinformatics
BIO 183 – Population Genetics
ESS 120 – Introduction to Ecological and Environmental Microbiology
ESS 124 – Terrestrial Ecosystem Ecology
ESS 128 – Theoretical Ecology

IV. DEVELOPMENTAL BIOLOGY

Developmental Biology (DB) emphasis track provides students with an understanding of the mechanisms that govern the generation of unique cell types and the assembly of cells into complex organisms. In addition to a strong foundation in genetics, cell biology and



Professor Andy LiWang next to a nuclear magnetic resonance spectrometer.

molecular biology, students can choose specialized courses covering topics such as immune system development, nervous system development, and the evolution of developmental mechanisms. Training in DB prepares students for careers in all aspects of the health sciences and biological research, particularly in the fields of stem cell biology, cancer biology, evolutionary biology, and regenerative medicine.

Developmental Biology Core Courses [21-22 Units]

Introduction to Molecular Biology (BIO 002) . . . . . 4 units
Introduction to Molecular Biology Lab (BIO 002L) . . . . . .1 unit
Genetics (BIO 140) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Embryos Genes and Development (BIO 150) . . . . . 4 units
Quantitative Biology Elective . . . . . 4-5 units

Quantitative Biology Elective list:

BIO 104 – Biophysics
BIO 105 – Enzymology
BIO 142 – Genomics
BIO 175 – Biostatistics
BIO 180 – Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Modeling
BIO 182 – Bioinformatics
BIO 183 – Population Genetics

Upper Division Elective Courses

At least three courses chosen from the Developmental Biology elective list below:

One course with Laboratory component . . . . . 5 units
Two additional courses . . . . . 8 units minimum

BIO 101 – Biochemistry I
BIO 102 – Advanced Biochemistry and Molecular Biology
BIO 104 – Biophysics
BIO 104 – Biophysics Laboratory
BIO 107 – Physical Biochemistry
BIO 111 – Cells, Tissues and Organs‡
BIO 120 – General Microbiology
BIO 120L – General Microbiology Laboratory
BIO 124 – Microbial Evolution
BIO 130 – Plant Biology
BIO 142 – Genome Biology
BIO 151 – Molecular Immunology
BIO 151L – Molecular Immunology Laboratory
BIO 152 – Cancer Genetics and Tumor Biology
BIO 153 – Evolution and Development‡
BIO 160 – Comparative Physiology
BIO 160L – Comparative Physiology Laboratory
BIO 161 – Human Physiology
BIO 163 – Endocrinology
BIO 164 – Human Anatomy
BIO 170 – Neurobiology
BIO 170L – Neurobiology Lab
BIO 180 – Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Simulation
BIO 182 – Bioinformatics
BIOE 114 – Tissue Engineering Design

‡ Recommended Elective Courses: at least one of the DB Elective Courses must be from this group.

V. MICROBIOLOGY AND IMMUNOLOGY

Students in the Microbiology and Immunology (MBI) emphasis track study the diversity, structure, evolution, method of transmission, replication, epidemiology and mechanism of pathogenesis of microorganisms and their interplay with the host immune system. Related topics in bioterrorism, environmental microbiology, drug resistance, development of the immune system, applications in biotechnology and their political and socioeconomic ramifications are also explored. A student in the Microbiology and Immunology emphasis track will have many career options including work in research, education, the pharmaceutical industry, regulatory agencies or health-related professions.

Microbiology And Immunology Core Courses [22-23 Units]

Introduction to Molecular Biology (BIO 002) . . . . . 4 units
Introduction to Molecular Biology Lab (BIO 002L) . . . . . .1 unit
Biochemistry I* (BIO 101) . . . . . 4 units
General Microbiology (BIO 120) . . . . . 4 units
General Virology (BIO 127) . . . . . 4 units
Molecular Immunology (BIO 151) . . . . . 4 units
General Microbiology Lab (BIO 120L) or Molecular Immunology Lab (BIO 151L) . . . . . 1-2 units

*Requires CHEM 100, a 3 unit course.

Upper Division Elective Courses

At least two courses chosen from the following Microbiology and Immunology elective list 8 units:

BIO 102 – Advanced Molecular Biology and Biochemistry
BIO 105 – Enzymology
BIO 107 – Physical Biochemistry
BIO 111 – Cells, Tissues and Organs
BIO 122 – Microbial Pathogenesis‡
BIO 123 – Human Parasitology‡
BIO 124 – Microbial Evolution
BIO 125 – Emerging Public Health Threats‡
BIO 140 – Genetics
BIO 141 – Evolution
BIO 142 – Genome Biology
BIO 150 – Embryos, Genes and Development
BIO 152 – Cancer Genetics and Tumor Biology‡
BIO 154 – Developmental Immunology‡
BIO 170 – Neurobiology
BIO 180 – Mathematical Modeling for Biology
BIO 181 – Introduction to Biomolecular Simulation
BIO 182 – Bioinformatics

‡ Recommended Elective Courses: at least one of the MBI Elective Courses must be from this group.

PROGRAM LEARNING OUTCOMES FOR THE BIOLOGY MAJOR

Graduates from the Biological Sciences programs will have demonstrated:

1. An understanding of the tenets of modern biology and an understanding of how cellular functions are integrated from the molecular level to the cellular level, through to the level of organism, populations, and functioning ecosystems.

2. An ability to develop and critique hypotheses and to design experiments, models, and/or calculations to address these hypotheses.

3. The ability to use appropriate instrumentation and computational tools to collect, analyze and interpret data.

4. The ability to read, evaluate, interpret, and apply numerical and general scientific information.

5. A familiarity with and application of safety in good laboratory and field practices.

Sample plans of study for the Biological Sciences degree may be found in the School of Natural Sciences website naturalsciences.ucmerced.edu.

■ Chemical Sciences Major

Chemistry is often known as "the central science" because of the key position it occupies in modern science and engineering. Most phenomena in the biological and Earth sciences can be described in terms of the chemical and physical behavior of atoms and molecules, and chemical principles also underlie much progress in medicine and engineering. In addition, chemical systems are fascinating and often beautiful in their own right. Recent developments in the chemical sciences are increasingly directed toward the study of phenomena at the nanoscale, the size range intermediate between individual molecules and macroscopic matter. The ability to measure, understand and control the properties of matter on these size scales allows us to draw conceptual and practical connections between the submicroscopic world of atoms and molecules, and the macroscopic world with which we interact.

UC Merced offers an undergraduate major leading to a B.S. degree in the Chemical Sciences. All of our programs are designed to satisfy the requirements for approval by the American Chemical Society.

The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor's degree as well as those who wish to go on for an advanced degree. We offer both a basic chemistry program and three emphasis tracks in biological chemistry, environmental chemistry and materials chemistry, which allow students to pursue interdisciplinary areas within a degree program that is still focused on chemistry.

A degree in the chemical sciences opens the door to a wide variety of careers in industry or government service, forensic chemistry in crime laboratories, commercial fields such as patent law and scientific writing, and high school science teaching. Many chemistry majors go on to graduate study to prepare for careers in teaching and/or research at the college or university level, or research positions in the chemical, pharmaceutical, electronics or other high-tech industries. A major in chemistry is also an excellent foundation for medical school or other careers in the health sciences.

REQUIREMENTS FOR THE CHEMICAL SCIENCES MAJOR (CHEM)

Chemical Sciences Requirements (80-91 units): To receive the B.S. in Chemical Sciences students must adhere to all UC Merced and School of Natural Sciences General Education and Courses Required Outside of Natural Sciences and Engineering. The Chemical Sciences major consists of 25-27 courses (12 lower division and 13-15 upper division, depending on emphasis track) designed to give all students a common foundation of core knowledge specific to the discipline.

Lower Division Major Requirements [46 Units]

BIO 001: Contemporary Biology* . . . . . 4 units
CHEM 002: General Chemistry I . . . . . 4 units
CHEM 008: Principles of Organic Chemistry . . . . . 4 units
CHEM 010: General Chemistry II. . . . . 4 units
CSE 020: Introduction to Computing I** . . . . . 2 units
MATH 021: Calculus of a Single Variable I. . . . . 4 units
MATH 022: Calculus of a Single Variable II . . . . . 4 units
MATH 023: Vector Calculus . . . . . 4 units
MATH 024: Linear Algebra and Differential Equations . . . . . 4 units
MATH 032: Probability and Statistics . . . . . 4 units
PHYS 008: Introductory Physics I . . . . . 4 units
PHYS 009: Introductory Physics II . . . . . 4 units

*BIO 001L (1 unit) is recommended but not required.

**MATH 015: Introduction to Scientific Data Analysis (2 units) or CSE 005: Introduction to Computer Applications (4 units) may be taken in place of CSE 020.

Upper Division Major Requirements [28 Units]

CHEM 100: Organic Synthesis and Mechanism . . . . . 3 units
CHEM 101L: Advanced Synthetic Laboratory. . . . . 2 units
CHEM 111/BIO 101: Biochemistry I . . . . . 4 units
CHEM 112: Quantum Chemistry and Spectroscopy . . . . . 3 units
CHEM 113: Chemical Thermodynamics and Kinetics . . . . . 3 units
CHEM 115: Instrumental Analysis and Bioanalytical Chemistry . . 3 units
CHEM 120: Inorganic Chemistry . . . . . 3 units
CHEM 150: Instrumental Analysis Laboratory . . . . . 2 units
CHEM 153: Physical Chemistry Laboratory . . . . . 2 units
CHEM 155: Instrumental Analysis Laboratory . . . . . 2 units
CHEM 194: Ethics and Communication in Chemistry . . . . . .1 unit

EMPHASIS TRACK REQUIREMENTS [6-17 UNITS]

REQUIREMENTS FOR CHEMISTRY EMPHASIS TRACK

Any two of the following in-depth course electives:

Any other 3- or 4-unit CHEM course numbered 100-189 . . 3 or 4 units
Any 200-level CHEM course (instructor approval required) . . . . . 3 units
ESS 100: Environmental Chemistry . . . . . 4 units
MSE 110: Solid State Materials Properties . . . . . 4 units
MSE 118: Introduction to Nanotechnology and Nanoscience. . . . 3 units

REQUIREMENTS FOR MATERIALS CHEMISTRY EMPHASIS TRACK

ENGR 045: Introduction to Materials. . . . . 4 units

AND
One of the following materials electives:

CHEM 140: Nanoscale Materials Chemistry. . . . . 3 units
ENGR 170: Introduction to Electron Microscopy . . . . . 3 units
MSE 110: Solid State Materials Properties . . . . . 4 units
MSE 113: Materials Characterization. . . . . 4 units
MSE 114: Polymeric Materials . . . . . 4 units
MSE 115: Ceramic Materials . . . . . 3 units
MSE 116: Composites. . . . . 3 units
MSE 118: Introduction to Nanotechnology and Nanoscience. . . . 3 units
MSE 119: Materials Modeling . . . . . 3 units

AND
One of the following in-depth course electives:

Any other 3- or 4-unit CHEM course numbered 100-189 . . 3 or 4 units
Any 200-level CHEM course (instructor approval required) . . . . . 3 units
ESS 100: Environmental Chemistry . . . . . 4 units

REQUIREMENTS FOR BIOLOGICAL CHEMISTRY EMPHASIS TRACK

BIO 102/CHEM 122: Biochemistry and Molecular Biology . . . . . 4 units
Two other upper division biology courses . . . . . 7-9 units

AND
One of the following in-depth course electives:

Any other 3- or 4-unit CHEM course numbered 100-189 . . 3 or 4 units
Any 200-level CHEM course (instructor approval required) . . . . . 3 units
ESS 100: Environmental Chemistry . . . . . 4 units
MSE 118: Introduction to Nanotechnology and Nanoscience. . . . 3 units

REQUIREMENTS FOR ENVIRONMENTAL CHEMISTRY EMPHASIS TRACK

ESS 100: Environmental Chemistry . . . . . 4 units

AND
Two of the following environmental course electives:

ESS 102: Chemical Processes in the Soil Environment . . . . . 3 units
ESS 103: Geochemistry of Earth Systems. . . . . 3 units
ESS 106: Spectroscopic and Microscopic Methods. . . . . 3 units
ESS 108: Surface and Colloid Chemistry of Earth Materials . . . . . 3 units
ENVE 171: Environmental Organic Chemistry . . . . . 3 units

TRANSFER STUDENTS

To be admitted to the Chemical Sciences major transfer students must meet the following requirements:

Applicants will, at the time of admission have completed at minimum each of the following courses (or their equivalent) with a "C-" or better:

Chemistry 2 and 10

Math 21 and 22

Physics 8 and 9

Applicants must have a minimum overall GPA of 2.8 in transferable courses. Any outstanding General Education and Major preparation coursework will be completed at UC Merced. Students should also consult the Information for Prospective Students link on the School of Natural Sciences website naturalsciences.ucmerced.edu for more information.

PROGRAM LEARNING OUTCOMES FOR CHEMICAL SCIENCES

1. Fundamental knowledge and skills: Students are able to describe the major concepts and theoretical principles in chemistry. They can identify the central ideas underlying the principal subfields of chemistry—analytical, inorganic, organic, and physical chemistry—as well as the broader interdisciplinary subfields of biological, environmental and materials chemistry. Students are able to operate modern chemical instrumentation, perform chemical syntheses and carry out other essential chemical experiments with strict adherence to sound laboratory techniques as well as good safety and hygiene practices. They know how to use modern web-based methods to effectively search the scientific literature.

2. Scientific methodology: Students have developed the ability to integrate the aforementioned fundamental knowledge and skills into scientific inquiries. They can formulate well-defined and quantitative questions, develop testable hypotheses, design and execute experiments, analyze and interpret the results and reach appropriate conclusions. They are also able to critically analyze the work of other scientists and assess its correctness, importance, and relevance.

3. Communication and teamwork skills: Students are able to write organized and concise reports and present technical information using electronic media, posters and oral presentations. They have developed the communication and teamwork skills that allow them to work effectively both as leaders and as team members in a group.

4. Citizenship, ethics, role of chemistry in society: Students have an appreciation for the role of chemistry in the global society as well as the central role chemistry plays in other scientific disciplines such as biology, medicine, environmental science, and engineering sciences. They conduct themselves ethically and responsibly in science-related professions.

Sample plans of study for the Chemical Sciences degree may be found in the School of Natural Sciences website naturalsciences.ucmerced.edu.

■ Earth Systems Science Major

The undergraduate major in Earth Systems Science prepares students to understand and solve critical challenges facing our environment, including:

- climate change
- water and soil pollution
- conservation of biological diversity
- management of natural resources.

The major is highly interdisciplinary, integrating the study of fundamental physical, chemical, and biological processes that shape our environment with practical applications to real-world problems. Core courses within the major provide students with a firm foundation in the fundamentals of chemistry, biology, hydrology, ecology and Earth sciences, while upper division elective courses allow students the flexibility to pursue a variety of topics related to Earth and environmental systems. This major emphasizes an integrated approach to Earth Systems Science, incorporating field studies, laboratory experiments and computations. Coursework in the social sciences exposes students to the political, economic and societal implications of human interactions with the environment.

Graduates of this major will have a strong background in the theory and application of Earth Systems Science. They will be well prepared for either graduate studies or jobs in the areas of environmental conservation and consulting, ecosystem and natural resource management and science, and many aspects of agricultural sciences. Additionally, Earth Systems Science is an excellent foundation for professional careers in law, policy and administration that increasingly involve the environmental sciences.

The location of UC Merced in the San Joaquin Valley near the Sierra Nevada offers an excellent and diverse real-world laboratory for studying the natural environment and how it is affected by human activity. Additionally, the UC Merced Sierra Nevada Research Institute provides a rich milieu of faculty expertise, research seminars and other activities, and provides opportunities for undergraduate internships.

A hallmark of the Earth Systems Science major is its breadth and flexibility. Lower division coursework emphasizes foundation courses in physical, chemical and biological sciences, and mathematics, with a choice of a lower division elective science course. Upper division requirements consist of five core courses that provide students with a balance of key concepts in Earth Systems Science, and exposure to environmental science and policy. In the upper division, students choose three elective courses to tailor their program to their individual interests. An upper division seminar highlights the latest research in interdisciplinary Earth Systems Science. General education coursework in communications and economics prepares majors to apply their quantitative science skills in the job market or in further studies at the graduate level. Students participate in research, internship, or service learning activities with faculty as part of their undergraduate studies.

REQUIREMENTS FOR THE EARTH SYSTEMS SCIENCE MAJOR (ESS)

Earth Systems Science Requirements (80-90 units): To receive the B.S. in Earth Systems Sciences students must adhere to all UC Merced and School of Natural Sciences General Education and Courses Required Outside of Natural Sciences and Engineering. The Earth Systems Science program consists of a minimum of 14 courses (6 lower division and 8 upper division plus a seminar course) designed to give all students a common foundation of core knowledge specific to the discipline.

Lower Division Major Requirements [42-44 Units]

One Earth Systems Science course (ESS 001, 10, 34, or 50) . . . . . 4 units
General Chemistry I (CHEM 002) . . . . . 4 units
Computer Science (MATH 015, CSE 005, or CSE 020) . . . . . 2-4 units
General Chemistry II (CHEM 010) . . . . . 4 units
Calculus I (MATH 011 or MATH 021) . . . . . 4 units
Calculus II (MATH 012 or MATH 021) . . . . . 4 units
Probability and Statistics (MATH 018, MATH 032, or ENVE 105) . 4 units
Introductory Physics I (PHYS 008 or PHYS 018) . . . . . 4 units
Introductory Physics II (PHYS 009 or 019) . . . . . 4 units
Two additional science or engineering courses* . . . . . 6 8 units

*Relevant courses outside of Natural Sciences or Engineering by approval

Upper Division Major Requirements [30-33 Units]

Environmental Chemistry (ESS 100) . . . . . 4 units
Hydrology and Climate (ESS 110) . . . . . 4 units
Introduction to Ecological and Environmental Microbiology (ESS 120) . . . . . 4 units
Fundamentals of Ecology (BIO 148) . . . . . 4 units
Environmental Science and Policy (ESS 141) or equivalent course (by approval) . . . . . 4 units
Three elective courses in ESS or related fields . . . . . 9-12 units
Undergraduate Seminar (ESS 190) . . . . . .1 unit

Additional Degree Requirements [10-13 Units]

Economics of the Environment and Public Policy (ECON 120) or Intermediate Microeconomic Theory (ECON 100) or Engineering Economic Analysis (ENGR 155) . . . . . 3-4 units
Two upper division electives in Natural Sciences or Engineering* . . . . . 6-8 units
Research (ESS 095 or ESS 195) and/or Service Learning (ENGR 097 or ENGR 197) . . . . . 1-3 units

*Relevant courses outside of Natural Sciences or Engineering by approval

Upper Division Elective Courses in ESS or related fields

Elective courses in the major can be selected from among upper division ESS courses (3 or 4 units) or from related courses offered in other areas, such as Biology (BIO), Environmental Engineering (ENVE), Engineering (ENGR), geography (GEOG), and management (MGMT). A list of approved courses offered each semester is available in the Natural Sciences office. Example elective courses include:

Applied Climatology (ESS 132) . . . . . 3 units
Astrobiology (ESS 147) . . . . . 3 units
Chemical Processes in the Soil Environment (ESS 102) . . . . . 3 units
Conservation Biology (ESS 149) . . . . . 3 units
Economics of the Environment and Public Policy (ECON 120) . . . 4 units
Environmental Organic Geochemistry (ENVE 171) . . . . . 4 units
Evolution (BIO 141) . . . . . 4 units
Field Methods in Snow Hydrology (ENVE 181) . . . . . 3 units
Field Methods in Subsurface Hydrology (ENVE 183) . . . . . 3 units
Fundamentals of Soil Science (ESS 170) . . . . . 4 units
Geochemistry of Earth Systems (ESS 103) . . . . . 3 units
Genome Biology (BIO 142) . . . . . 5 units
Global Change (ENVE 118) . . . . . 4 units
Remote Sensing of the Environment (ENVE 152) . . . . . 3 units
Microbial Ecology (ESS 125) . . . . . 4 units
Mountain Hydrology of the Western U.S. (ENVE 114) . . . . . 4 units
Subsurface Hydrology (ESS 112) . . . . . 4 units
Terrestrial Ecosystem Ecology (ESS 124) . . . . . 4 units
Watershed Biogeochemistry (ESS 105) . . . . . 3 units

TRANSFER STUDENTS

To be admitted to the Earth Systems Science major transfer students must meet the following requirements:

Applicants will, at the time of admission have completed at minimum each of the following courses (or their equivalent) with a "C-" or better:

Chemistry 2 and 10
Math 11 or 21
Physics 18 or 8

Applicants must have a minimum overall GPA of 2.8 in transferable courses. Any outstanding General Education and Major preparation coursework will be completed at UC Merced. Students should also consult the Information for Prospective Students link on the School of Natural Sciences website naturalsciences.ucmerced.edu for more information.

PROGRAM LEARNING OUTCOMES FOR THE EARTH SYSTEMS SCIENCE MAJOR

Students in the Earth Systems Science major will achieve the following:

1. Foundational knowledge of physics, chemistry, biology, and mathematics related to Earth systems that supports a working knowledge of basic research methodologies, data analysis, and interpretation for a variety of Earth-related data.

2. Knowledge of major concepts, theoretical principles, experimental findings, and areas of study related to Earth systems science, and comprehension of the interactions between natural Earth systems and human economic, political, and social systems.

3. An ability to employ critical thinking, quantitative and numerical analyses, and hypothesis-driven methods of scientific inquiry in the formulation of research questions, experimental design, application and use of laboratory and field instrumentation, and analysis and interpretation of data related to Earth systems.

4. Effective written and oral communication skills, especially the ability to transmit complex technical information.

5. An ability to work effectively individually and in teams in classroom, laboratory, and field settings.

Sample plans of study for the Earth Systems Science degree may be found in the School of Natural Sciences website naturalsciences.ucmerced.edu.

■ Physics Major

Physics is the study of nature at its most fundamental. Its scope covers everything from the tiniest particles of matter—such as atoms, electrons, and quarks—to the structure of the entire universe, encompassing innumerable galaxies and stars.

Physicists seek to understand complex phenomena in terms of simple, unifying principles. Their queries have ranged from the seemingly innocuous, like "What causes an object to fall?" to the more elemental, like "What is the true nature of light?" Such questions led to the discovery of the gravitational force, which governs the motion of planets and stars, as well as to the biggest breakthrough of the twentieth century—quantum mechanics—which governs the very small. Answers to physicists' questions have revolutionized society, not only altering our basic understanding of the universe, but also profoundly affecting our day-to-day lives, laying the foundation for numerous technological innovations such as the laser, computer, and cellular phone. And physics continues to evolve and excite us, with unanswered questions from a multitude of active and emerging fields of research, such as Quantum Computation, Superconductivity, Chaos, Biophysics, and String Theory, to name a few.

The Physics Program at UC Merced provides a strong foundation in the fundamentals of theoretical and applied physics, while also emphasizing the increasingly interdisciplinary role played by physicists in the scientific and technological community. This is reflected in the "core plus emphasis track" model of the major. The core is a rigorous grounding in fundamental physical principles, including electricity and magnetism, quantum and classical mechanics, and thermodynamics. The emphasis tracks consist of flexible specialization options. They include, but are not limited to Atomic, Molecular, and Optical (AMO) Physics; Mathematical Physics; Biophysics; and Condensed Matter and Materials Physics.

Physics students develop excellent quantitative and analytical skills, enabling them to approach new and complex problems that arise in any field. These fundamental skills are essential preparation for a wide range of careers in such fields as aerospace, biotechnology, computers, engineering, medicine, education, law, finance, business, and consulting.

> My experiences here at UC Merced have given me the opportunity to think outside the box and understand new ideas that I never thought I would have understood. These ideas will stay with me as I move forward with graduate studies.
>
> —Daniel Titcher, Psychology

REQUIREMENTS FOR THE PHYSICS MAJOR (PHYS)

Physics Requirements (79-82 units): To receive the B.S. in Physics, students must adhere to all UC Merced and School of Natural Sciences General Education and Courses Required Outside of Natural Sciences and Engineering. The Physics major consists of 21 courses (11 lower division and 12 upper division) designed to give all students a common foundation of core knowledge specific to the discipline.

Lower Division Major Requirements [41-42 Units]

CHEM 002: General Chemistry I . . . . . 4 units
CSE 020: Introduction to Computing I . . . . . 2 units
MATH 021: Calculus of a Single Variable I . . . . . 4 units
MATH 022: Calculus of a Single Variable II . . . . . 4 units
MATH 023: Vector Calculus . . . . . 4 units
MATH 024: Linear Algebra and Differential Equations . . . . . 4 units
MATH 032: Probability and Statistics . . . . . 4 units
PHYS 008: Introductory Physics I . . . . . 4 units
PHYS 009: Introductory Physics II . . . . . 4 units
PHYS 010: Introductory Physics III . . . . . 4 units
One "breadth" science or engineering elective that is not physics or math . . . . . 3-4 units

Required Upper Division Core Physics Courses [28 Units]

PHYS 105: Analytic Mechanics Core . . . . . 4 units
PHYS 110: Electrodynamics Core . . . . . 4 units
PHYS 108: Thermal Physics Core . . . . . 4 units
PHYS 137: Quantum Mechanics Core . . . . . 4 units
PHYS 160: Modern Physics Lab . . . . . 4 units
PHYS 111: Electromagnetic Radiation Minicourse . . . . . 2 units
PHYS 122: Waves Minicourse . . . . . 2 units
PHYS 124: Atomic Structure Minicourse . . . . . 2 units
PHYS 126: Special Relativity Minicourse . . . . . 2 units

Required Thesis Research [4 Units]

PHYS 195: Upper Division Undergraduate Research . . . . . 2 units
PHYS 196: Undergraduate Thesis . . . . . 2 units

Additional Required Courses [6-8 Units]

Two upper division physics electives . . . . . 6-8 units

Appropriate nonphysics courses may be substituted for the physics electives, with faculty approval, as part of an emphasis track.

MINICOURSES

The minicourses are half-semester courses designed to round out a student's core training in physics. Current minicourses are: Electromagnetic Radiation (PHYS 111), Waves (PHYS 122), Special

Relativity (PHYS 126), and Atomic Structure (PHYS 124). Physics majors are required to take all four of these minicourses.

SENIOR RESEARCH

All students are required to complete a senior thesis consisting of independent research performed under the tutelage of a faculty advisor. Typically, this research is the culmination of a student's emphasis track (see below). The thesis advisor may be a faculty member in either physics or another discipline, allowing for the possibility of cross-disciplinary research projects. To complete the thesis, a student must take (at least) 2 units of PHYS 195 and 2 units of PHYS 196, typically in the fall and spring, respectively, of the senior year.

EMPHASIS TRACKS

Students are encouraged to choose their electives to form an emphasis track in an area of physics or interdisciplinary study. The established emphasis tracks are: Atomic, Molecular, and Optical (AMO) Physics; Mathematical Physics; Biophysics; and Condensed Matter and Materials Physics (CMMP). Students may also propose and design their own customized emphasis tracks, with the assistance of their faculty advisors. A customized track must consist of at least 12 units. Typically, the track includes the two upper division physics electives and culminates with the student's senior thesis (PHYS 195/196). Other upper division courses may be substituted for the two physics electives if they are deemed appropriate to the track. Any customized emphasis track must be approved by the student's faculty advisor. A student may also choose not to participate in the track program at all, although the senior thesis and physics electives are still degree requirements.

Examples of Emphasis Tracks

Below are the requirements for students who wish to select their Physics electives to form an established emphasis track. Note that students are not required to follow an established track. Modifications to the suggestions below may be made with faculty approval, and customized tracks may also be developed.

ATOMIC/MOLECULAR/OPTICAL (AMO) PHYSICS

PHYS 148: Modern Optics. . . . . 4 units
PHYS 144: Modern Atomic Physics . . . . . 4 units
PHYS 195/196: Undergraduate Research (in AMO physics) . . . . . 4 units

In addition it is strongly recommended that students use a free elective to take PHYS 141.

BIOPHYSICS

PHYS 104: Biophysics . . . . . 4 units
PHYS 195/196: Undergraduate Research (in biophysics) . . . . . 4 units
Plus at least one upper division BIO/BIOE elective from this list: BIO 101, 106, 107, 110, 140, 141, 145, 161, 180, 181, BIOE 102, 104, 113 (Other courses may be substituted with advisor approval).

It is also highly recommended students take the lower division course BIO 001 as a free elective.

CONDENSED MATTER AND MATERIALS PHYSICS (CMMP)

PHYS 141: Condensed Matter Physics . . . . . 4 units
MSE 110: Solid State Materials Properties . . . . . 4 units
PHYS 195/196: Undergraduate Research (in CMMP) . . . . . 4 units

In addition it is strongly recommended that students use free electives to take PHYS 144 and/or PHYS 148.

I WILL NEVER FORGET THE BEAUTIFUL RAINBOW THAT APPEARED ONE AFTERNOON SHORTLY AFTER I TRANSFERRED TO UC MERCED. IT STRETCHED OVER THE CLASSROOM & OFFICE BUILDING AND SCIENCE & ENGINEERING. IT WAS AS IF IT WERE PROCLAIMING THAT THIS IS A SPECIAL PLACE, WHICH IS SOMETHING I HAVE FOUND TO BE TRUE.

—Janice Gatzke, Cellular and Molecular Biology

MATHEMATICAL PHYSICS

At least two of the following:

MATH 122: Complex Variables and Applications . . . . . 4 units
MATH 125: Intermediate Differential Equations. . . . . 4 units
MATH 126: Partial Differential Equations. . . . . 4 units
MATH 131: Numerical Analysis I . . . . . 4 units
MATH 132: Numerical Analysis II. . . . . 4 units
MATH 141: Linear Analysis . . . . . 4 units
MATH 150: Mathematical Modeling . . . . . 4 units
MATH 181: Stochastic Processes . . . . . 4 units
Plus: PHYS 195/196: Undergraduate Research (in math physics) . 4 units

TRANSFER STUDENTS

To be admitted to the Physics major transfer students must meet the following requirements:

Applicants will, at the time of admission have completed at minimum each of the following courses (or their equivalent) with a "C-" or better:

Chemistry 2
Math 21 and 22
Physics 8 and 9

Applicants must have a minimum overall GPA of 2.8 in transferable courses. Any outstanding General Education and Major preparation coursework will be completed at UC Merced. Students should also consult the Information for Prospective Students link on the School of Natural Sciences website naturalsciences.ucmerced.edu for more information.

PHYSICS PROGRAMMATIC LEARNING OUTCOMES

Graduates from the Physics B.S. program will have demonstrated the following:

1. Physical Principles. Students will be able to apply basic physical principles—including classical mechanics, electricity and magnetism, quantum mechanics, and statistical mechanics—to explain, analyze, and predict a variety of natural phenomena.

2. Mathematical Expertise. Students will be able to translate physical concepts into mathematical language. Furthermore students will be able to apply advanced mathematical techniques (e.g., calculus, linear algebra, probability, and statistics) in their explanations, analyses, and predictions of physical phenomena.

3. Experimental Techniques. Students will be able to take physical measurements in an experimental laboratory setting and analyze these results to draw conclusions about the physical system under

investigation, including whether their data supports or refutes a given physical model.

4. Communication and Teamwork Skills. Students will be able to clearly explain their mathematical and physical reasoning, both orally and in writing, and will be able to communicate and work effectively in groups on a common project.

5. Research Proficiency. Students will be able to formulate personal research questions that expand their knowledge of physics. Students will be able to apply sound scientific research methods to address these questions, either by researching the current literature or developing independent results.

Sample plans of study for the Physics degree may be found in the School of Natural Sciences website naturalsciences.ucmerced.edu.

■ Natural Sciences Minors

To declare a minor, students must have an overall grade-point average of 2.0 (C) or better. Students should consult an advisor in the School of Natural Sciences to officially declare the minor and plan their courses. The following guidelines must be adhered to:

- At least five courses, four of which must be upper division, must be taken for a letter grade.
- At least three of the required courses must be taken at UC Merced.
- Only one course may be used to satisfy two minor programs' requirements.
- Only one course may be used to satisfy both a minor and a major requirement.
- Work for the minor must be completed within the 150 unit maximum limit for graduation.
- If the student's major and minor are in different schools, the higher unit maximum will apply.
- Students must consult the UC Merced General Catalog for prerequisites to required courses.
- The minor will appear on the student's transcript and diploma.

■ APPLIED MATHEMATICS MINOR

Mathematics has been a central feature of humanity's intellectual achievements over the past several centuries. It is well established that mathematics provides the underlying framework to develop theory in the physical sciences and engineering. Moreover, mathematics is becoming increasingly important in the development of new knowledge in the social sciences and life sciences. These new application areas for applied mathematical sciences are undergoing remarkable growth. The Applied Mathematics minor gives students an opportunity to learn the fundamentals of modeling, analysis and scientific computing that make up the foundation of applied mathematics. The Applied Mathematics minor may be useful to students seeking to strengthen their educational experience in their major through building additional skills in quantitative reasoning and problem solving.

PROGRAM LEARNING OUTCOMES FOR THE APPLIED MATHEMATICS MINOR

Upon graduating, we expect students completing the Applied Mathematical Sciences minor to able to:

1. Solve mathematical problems using analytical and/or computational methods.

2. Identify the usefulness of applying mathematics to solve real-world problems.

3. Give clear and organized written and verbal explanations of mathematical ideas to a variety of audiences.

4. Recognize the relationships between different areas of mathematics and the connections between mathematics and other disciplines.

To receive a minor in Applied Mathematics, a student must complete the following requirements (20 units total), and follow the Natural Sciences guidelines on minors.

Required Lower Division MATH Courses (4 units)

MATH 018 Statistics (4) or MATH 032: Probability and Statistics (4)

Required Upper Division Core Applied Mathematics Courses (4 units)

MATH 121: Applied Mathematics Methods I (4)

Note that the following courses are prerequisites to the required course MATH 121: MATH 021: Calculus of a Single Variable I (4), MATH 022: Calculus of a Single Variable II (4), MATH 023: Vector Calculus (4), and MATH 024: Introduction to Linear Algebra and Differential Equations (4).

Required Additional Upper Division Applied Mathematics Courses (12 units)

A student must take at least three additional upper division Applied Mathematics courses, of his/her choice, totaling at least 12 units. Possible courses are:

MATH 122: Applied Mathematics methods II (4)

MATH 131: Numerical Analysis I (4)

MATH 132: Numerical Analysis II (4)

MATH 141: Linear Analysis I (4)

MATH 142: Linear Analysis II (4)

MATH 150: Mathematical Modeling (4)

MATH 198: Independent Study (4)

■ CHEMICAL SCIENCES MINOR

Chemistry is often known as "the central science" because of the key position it occupies in modern science and engineering. Most phenomena in the biological and earth sciences can be described in terms of the chemical and physical behavior of atoms and molecules, and chemical principles also underlie much progress in medicine and engineering. For these reasons, chemistry is a natural and useful minor for students majoring in other science and engineering disciplines. The Chemical Sciences minor allows students to pursue interests in chemistry in some depth without requiring the breadth of course work and extensive laboratory time required for the Chemical Sciences major.

PROGRAM LEARNING OUTCOMES FOR THE CHEMICAL SCIENCES MINOR

Students are able to describe the major concepts and theoretical principles in chemistry. They can identify the central ideas underlying the principal subfields of chemistry--analytical, inorganic, organic, and physical chemistry--as well as the broader interdisciplinary subfields of biological, environmental and materials chemistry. Students are able to operate modern chemical instrumentation, perform chemical syntheses and carry out other essential chemical experiments with strict adherence to sound laboratory techniques as well as good safety and hygiene practices. They know how to use modern web-based methods to effectively search the scientific literature.

REQUIREMENTS FOR THE CHEMICAL SCIENCES (CHEM) MINOR

To receive a minor in Chemical Sciences, a student must complete the following requirements:

Required Lower Division Chemistry Course (4 units):

CHEM 010: General Chemistry II [4]

Required Upper Division Chemistry Courses (4-5 units):

CHEM 100: Organic Synthesis and Mechanism [3]

CHEM 100L: Organic Chemistry Laboratory [1] or CHEM 101L: Advanced Synthetic Laboratory [2]

Additional Upper Division Chemistry Courses (9-12 units):

Any three additional upper division CHEM courses, other than research and independent study, each worth at least 3 units. Graduate level CHEM courses may be substituted with instructor approval.

All of these courses must be taken for a letter grade. At least four of these courses must be unique to the CHEM minor, i.e. they may not also be used to satisfy a major requirement. If more than one of the required courses for the CHEM minor is also needed to satisfy major requirements, one or more additional upper division or graduate CHEM courses (worth at least 3 units) must be completed.

■ ENVIRONMENTAL SCIENCE AND SUSTAINABILITY MINOR

Environmental science is an interdisciplinary academic field that focuses on application of concepts and methods from the physical, chemical, biological, and social sciences to the study of the natural environment, and seeks solutions to environmental problems. Sustainability science aims to improve the quality of human life within the carrying capacity of supporting ecosystems. The Environmental Science and Sustainability minor at UC Merced allows students from diverse backgrounds to pursue interests in earth and environmental sciences in some depth without requiring the breadth of course work and extensive laboratory and field time required for the Earth System Science major.

PROGRAM LEARNING OUTCOMES FOR THE ENVIRONMENTAL SCIENCE AND SUSTAINABILITY MINOR

Graduates with a minor in Environmental Science and Sustainability will be able to:

- Use knowledge and techniques from three to four areas of Environmental Science and Sustainability (Earth and Atmospheric Sciences; Environmental Biology; Society and Environment; and Research, Communication, and Design Skills) to gather and report environmental data using appropriate measurement tools.
- Analyze information on environmental quality and recommend appropriate technical, political, or economic solutions to environmental problems.
- Communicate to diverse stakeholders the major concepts and principles of Environmental Science and Sustainability, such as how elements of the Earth system are interconnected, the carrying capacity of natural systems, and how governmental policy and economics can both perpetuate and solve environmental problems.

REQUIREMENTS FOR THE ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (ESS) MINOR

To receive a minor in Environmental Science and Sustainability, a student must complete the following requirements.

Below are courses that satisfy requirements for an Environmental Science and Sustainability minor. All of these courses must be taken for a letter grade. At least four of these courses must be unique to the Environmental Science and Sustainability minor, i.e. they may not be also used to satisfy a major requirement. If more than one of the required courses for the Environmental Science and Sustainability minor is also needed to satisfy a major requirement, one or more additional upper division or graduate ESS, ES, ENVE course (worth at least 3 units) must be completed.

Course work requirements*:

1. One lower division core course
2. One upper division core course
3. One upper division course each in at least three of the four areas listed below
    i. One course in the area of Earth and Atmospheric Sciences
    ii. One course in the area of Environmental Biology
    iii. One course in the area of Society and Environment
    iv. One course in the area of Research, Communication, and Design skills

*As new courses become available they will be added as options to the upper division electives. Students may be able to satisfy the requirements for the minor (a) using additional courses that are not listed below or (b) by swapping some of the core upper division and area courses. Students must receive approval for the conditions listed above (a and b) before completion of their course work.

ESS Minor Approved Courses:

Lower division core courses: ESS 001, ESS 002, ESS 010 or ENVE 020

Upper division core courses: ESS 100, ESS 141 or ENVE 160

Earth and Atmospheric Sciences courses: ESS 103, ESS 105, ESS/ENVE 110, ESS 132/ENVE 116, ESS 134, ESS 170, ENVE 114 or ENVE 176

Environmental Biology courses: ESS 120, ESS 124, ESS/BIO 147, ESS/BIO 148, ESS/BIO 149

Society and Environment: ECON 120, ENVE 140, ENVE/MGMT 155, ENVE 164, GEOG 142

Research, Communication and Design skills: ANTH 170, ARTS 170, ENGR 180, ENVE 105, ENVE 162, ENVE 181, ENVE 183, ESS 180 or LIT 180

■ NATURAL SCIENCES EDUCATION MINOR

The Natural Sciences Education (NSED) minor is designed to prepare UC Merced students for admission to the teacher credential program or pursue graduate studies in education. Students who complete the coursework and the fieldwork associated with this program can be eligible for admission to the teacher credential programs at many local institutions. Additional support and resources for students interested in teaching careers are available through the Science and Mathematics Initiative (SMI) program with the School of Natural Sciences.

PROGRAM LEARNING OUTCOMES FOR THE NATURAL SCIENCES EDUCATION MINOR

Upon completion of the NSED minor program students are expected to:

1. Comprehensively articulate what constitutes a profession of a science or mathematics teacher including being able to address the following questions:

a. What constitutes responsibilities and duties of a teacher?

b. What skills and knowledge are necessary to become a successful professional?

2. Demonstrate skills of a beginning teacher such as:

a. Ability to develop a lesson plan and deliver an effective lesson at the secondary school level,

b. Design different types of assessments to evaluate students learning,

c. Distinguish between students with different learning abilities and needs and adapt their teaching methodology to address this diversity.

3. Demonstrate familiarity with requirements, special aspects and structure of California educational system such as:

a. Credentialing process,

b. Instructional state standards and requirements,

c. Strategies to address diverse demographics of California schools such as instruction to English Learners.

MINIMUM REQUIREMENTS:

Two of the following seminar courses:

- NSED 023: Introduction to Teaching Science in Elementary School (1 unit)
- NSED 043: Introduction to Teaching Science in Middle School (1 unit)
- NSED 063: Introduction to Teaching Science in High School (1 unit)
- NSED 033: Introduction to Teaching Mathematics in Elementary School (1 unit)
- NSED 053: Introduction to Teaching Mathematics in Middle School (1 unit)
- NSED 073: Introduction to Teaching Mathematics in High School (1 unit)

Two of the following fieldwork courses—total 60 hours fieldwork:

- NSED 024: Fieldwork - Introduction to Teaching Science in Elementary School (1 unit)
- NSED 044: Fieldwork - Introduction to Teaching Science in Middle School (1 unit)
- NSED 064: Fieldwork - Introduction to Teaching Science in High School (1 unit)
- NSED 034: Fieldwork - Introduction to Teaching Mathematics in Elementary School (1 unit)
- NSED 054: Fieldwork - Introduction to Teaching Mathematics in Middle School (1 unit)
- NSED 074: Fieldwork - Introduction to Teaching Mathematics in High School (1 unit)

The additional required courses, all of which must be taken for a letter grade are:

- COGS 121: Cognitive Psychology (4 units) (Prerequisite: COGS 001 or PSY 001) or PSY 130: Developmental Psychology (4 units) (Prerequisite: PSY 001)
- NSED 100: Introduction to Instruction, Assessment, and Management for Beginning Teachers (4 units)
- NSED 120: Diversity in Education (4 units)
- WRI 115: Topics in Science Writing (4 units), or another approved upper division writing course (4 units)
- HIST 016: Forging of the US (4 units) or POLI 001: Introduction to Political Science (4 units)

■ PHYSICS MINOR

Physics is the study of nature at its most fundamental. It addresses the underlying principles that govern all phenomena in the universe, both within everyday life as well as within the most exotic situations.

The physics minor equips students with a broad foundation to understand these diverse phenomena, including such topics as dynamics, planetary motion, quantum mechanics, atomic structure, special relativity, electricity, optics, and much more. The minor also provides an opportunity for a student to develop significant depth and explore modern topics in a few areas of his or her choosing. The physics minor may be useful for any student studying science or engineering who would like an enhanced foundation in his or her discipline. It may also appeal to any student who simply wishes to understand better the beauty and logic that governs the world around us and our place within it.

PROGRAM LEARNING OUTCOMES FOR THE PHYSICS MINOR

Students graduating with a minor in Physics will have demonstrated the following learning outcomes:

1. Physical Principles. Students will be able to apply basic physical principles—including classical mechanics, electricity and magnetism, quantum mechanics, and statistical mechanics—to explain, analyze, and predict a variety of natural phenomena.

2. Mathematical Expertise. Students will be able to translate physical concepts into mathematical language. Furthermore students will be able to apply advanced mathematical techniques (e.g., calculus, linear algebra, probability, and statistics) in their explanations, analyses, and predictions of physical phenomena.

To receive a minor in physics, a student must complete the following requirements, all of which must be taken for a letter grade (32 units total):

Required Lower division Physics/Math Courses (16 units)

MATH 023: Vector Calculus (4)

MATH 024: Introduction to Linear Algebra and Differential Equations (4)

MATH 032: Probability and Statistics (4)

PHYS 010: Introductory Physics III (4)

Note that prerequisites for these courses must also be completed (namely, PHYS 008, PHYS 009, MATH 021 and MATH 022, or their equivalents).

Required Upper Division Core Physics Courses (8 units)

A student must take any two of the following four core physics courses:

PHYS 105: Analytic Mechanics Core (4)

PHYS 108: Thermal Physics Core (4)

PHYS 110: Electrodynamics Core (4)

PHYS 137: Quantum Mechanics Core (4)

Required Additional Upper Division Physics Courses (8 units)

A student must take at least two additional upper division physics courses, of his/her choice, totaling at least 8 units.

School Of Social Sciences, Humanities And Arts

The educational mission of our School is to create a rich learning environment by looking at people and society through the lenses of the many disciplines comprising the social sciences, humanities and arts.

A WELCOME FROM THE SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS

Dear Students:

In 1962, Marshall McLuhan, a Canadian professor of English literature, coined the term "global village," which meant to him a future in which communication across cultures and across the world could be instantaneous. Today, his vision has been made into a reality by the Internet, which allows us to be in Merced and Kathmandu at the same virtual moment. But merely being able to communicate does not erase the reality of cultural and linguistic diversity—to truly and effectively communicate, one must also understand the social, political, economic, aesthetic, and religious variability that characterizes the world in which we live. In other words, to be a true global citizen, one must have the ability to think critically, write well, have knowledge of the past so as to inform the present, and to develop a capacity for life-long learning.

To help you become this global citizen, our school embraces many disciplines, including cognitive and information sciences, humanities and world cultures, psychological sciences, and social sciences and management. Our faculty are among the very best scholars in the world and they have joined UC Merced to create exciting new programs that appeal to our leaders of the future. Although we offer traditional majors and minors, we also seek to broaden your horizons by offering courses of multidisciplinary studies—ones that cross-cut traditional fields. In some classes, you will learn the basics—the fundamental knowledge of a discipline, and how that knowledge can be used to get a better understanding of the complexity of the human condition. In other classes, you will be challenged to develop critical thinking skills that can be used in any career no matter what the content. And in many of our courses, you will learn how to write effectively, collaborate with your peers, and speak in public settings, both large and small. When you leave UC Merced, you will be equipped with the knowledge and skill sets that will enable you to engage with the world, to recognize and solve problems of all kinds, and to succeed in a career.

Take advantage of the limitless opportunities you have before you in the School of Social Sciences, Humanities, and Arts. Become that global citizen!

Sincerely,

Mark Aldenderfer
Dean, School of Social Sciences, Humanities, and Arts

Educational Philosophy

Our educational philosophy can be captured by the following principles which guide the way that the School of Social Sciences, Humanities and Arts constructs a learning foundation for our students:

Doing is the basis for learning. Students are encouraged to create the forms they are studying—whether they are plays, maps, persuasive essays or social surveys. We believe that developing writing skills leads to critical reading; being an articulate speaker leads to becoming a better listener; and developing models of decision-making from a holistic multidisciplinary perspective leads to a better appreciation of how policy is developed. We invite students to participate in the research programs of our faculty, to create student-led teams and to embark on individual, mentored research projects. Through their research, students learn to evaluate and use evidence and construct persuasive arguments based upon actual events and previous experience.

Learning is ubiquitous. Some of the best learning occurs outside of the classroom around peers and in communities. Diverse learning environments allow students to make connections between books and the world. Human beings are natural learners, and our job as educators is to provide an environment where students can engage these natural instincts. Courses are the anchors, but a lot of exciting learning depends upon students' own discovery of the links between formal academic programs and other endeavors such as foreign travel, artistic performance, political or business internship or community service.

Citizenship is founded in community. When we develop an informed and critical engagement with our own community, we can make better sense of what is happening there, and we can begin to see how our home is related to the globe. We live in a world where we are globally interdependent. Political borders, which change over time, determine citizenship and affect life opportunities. Ideas, diseases, languages, goods and individuals have always moved around the region and the world, but they do not reach all destinations with equal ease; they do not have equivalent effects when they alight in different places; and they are transformed by their new environments. We envision our community of students as developing a zone of comfort that allows them to act simultaneously as local and global citizens.

As a new campus, UC Merced has the singular opportunity to foster an integrative environment that draws from these disciplinary research traditions, but is not limited by their boundaries. The School of Social Sciences, Humanities and Arts offers a broad range of undergraduate and graduate programs dedicated to preparing students for varied roles as responsible and thoughtful citizens and leaders. We offer research and academic programs in anthropology, the arts, cognitive science, economics, foreign languages, history, literatures and cultures, management, philosophy, political science, psychology, sociology and world heritage that:

- prepare students for meaningful careers and professions;
- encourage intellectual and moral growth;
- promote sound decision-making;
- instill the values of lifelong learning; and
- encourage civic responsibility, public service, and understanding in a diverse, global society.

In my 30 year career, I have never enjoyed teaching as much as I have here at UC Merced. It is the highlight of my day.

—Professor Will Shadish, Psychology

Students have the opportunity to follow personal paths of discovery in disciplinary or interdisciplinary curricula, while at the same time gaining depth and expertise in methodological domains such as social statistics, historiography, Geographic Information Systems, economics, cultural analysis and cognitive science.

Culture, society, and artistic expression differ widely on the basis of their historical era and geographical location. Individuals and their cultures are affected by diverse natural environments, the questions we ask about ourselves and the world, the changing ways in which the world has been measured and envisioned, and the legacies of contacts, migrations or isolation. As students learn to understand the ways that time and place have shaped lives, institutions and works of the imagination, they develop perspectives that enable them to better understand and shape our futures.

SCHOOL OF SOCIAL SCIENCES, HUMANITIES AND ARTS REQUIREMENTS

All students in the School of Social Sciences, Humanities and Arts, regardless of major, are expected to meet the minimum requirements for a degree. The School of Social Sciences, Humanities and Arts degree requirements are:

At least 120 units to include the following:

- At least 45 semester units of general education courses. Courses graded with a pass/no pass grading option are limited to one third of the total number of units required.
- At least 60 semester units of upper division courses. Courses graded with a pass/no pass option are limited to one-third of the total number of units required.
- Students must complete all course prerequisites with a C- or better.
- Students must complete all major requirements with a C- or better and maintain a 2.0 GPA in all major course work.
- Students must complete all major requirements with a letter grade option unless the course is only offered on a pass/no pass basis.
- Students must obtain pre-approval through the SSHA Advising Office for all courses completed at institutions other than UC Merced.

General Education Requirements [48 Units]

Students in the School of Social Sciences, Humanities and Arts are required to complete the following list of general education courses.

Lower Division UCM General Education Requirements

College One Core course,
The World at Home (CORE 001) . . . . . 4 units
College Reading and Composition (WRI 010) . . . . . 4 units
Mathematical/Quantitative Reasoning course* . . . . . 4 units

Lower Division SSHA General Education Requirements*

Natural Sciences or Engineering Introductory course with or

without laboratory, field or studio . . . . . 4 units
Second Natural Sciences or Engineering course with or without laboratory, field or studio . . . . . 4 units
Humanities, Arts, or Foreign Language course (outside of your major(s)) . . . . . 4 units
Social Sciences course (outside of your major(s)) . . . . . 4 units

Upper Division SSHA General Education Requirements*

Four Upper Division General Education courses outside area of emphasis or major(s) . . . . . 16 units

*Courses must be selected from the approved general education list, found on ssha-advising.ucmerced.edu.

TRANSFER STUDENTS

Please review the "General Education for Transfer Students" section on the UC Merced General Education page. Transfer students are strongly encouraged to complete IGETC in order to prepare for work within the School of Social Sciences, Humanities and Arts. Students who do not complete IGETC before transferring are required to complete SSHA Foundations, an IGETC-like general education pattern. Please contact the SSHA Advising Office for more information at ssha.advising@ucmerced.edu.

FOREIGN LANGUAGE PLACEMENT AT UC MERCED

To ensure proper placement in our foreign language courses, students with previous academic instruction in the language that they would like to study are encouraged to take the placement exam for that language. However, students wishing to use language proficiency to satisfy a major, minor or general education requirement must have their placement scores confirmed by the foreign language program. Please contact the Foreign Language Program Coordinator or a UC Merced academic advisor for more information.

Note: Students may not complete placement exams after they have enrolled in a UC Merced course in that language.

SOCIAL SCIENCES, HUMANITIES AND ARTS MAJORS

Major area upper division courses and emphasis track requirements are unique to each major. These are presented in the following section on majors.

The School of Social Sciences, Humanities and Arts also offers several minor programs (Anthropology, American Studies, Arts, Chicano(a) Studies, Cognitive Science, Economics, History, Literatures and Cultures, Management, Philosophy, Political Science, Psychology, Interdisciplinary Public Health, Services Science, Sociology, Spanish and Writing). Detailed descriptions of each minor, as well as minor requirements, are listed following the overview of major programs.

Social Sciences, Humanities And Arts Majors

■ Anthropology Major

Anthropology is dedicated to understanding humankind's diversity as well as what makes us uniquely human. Through the specific perspectives and methods of socio-cultural, archaeological, and biological anthropology, students learn how the human experience (past and present) is constituted through the interaction of social, cultural, political, material, historical, environmental, and biological factors. Anthropology strives for a holistic understanding of humankind and, depending on the questions asked and the means used to discover answers, anthropological knowledge can straddle the social sciences, humanities, and natural sciences.

The undergraduate major in Anthropology emphasizes how topics and issues central to the human experience such as migration, gender, power, health, kinship, race, and identity are examined and understood through diverse anthropological methodologies. In upper division courses, students explore particular socio-cultural, archaeological, and biological perspectives on such issues in greater depth, and these courses may specifically engage perspectives from two or more sub fields. Other courses may consider a range of topics within a specific geographical area, while acknowledging certain limitations to the area studies configuration of knowledge.

Undergraduate majors in Anthropology develop critical skills in thought, written and oral expression, and the application of knowledge, as well as a valuable understanding of human cultural diversity. In an increasingly globalized world in which interaction with people of diverse cultures is becoming the norm, developing a cross cultural understanding about the complexities of human societies past and present is what makes Anthropology an ideal education for the 21st century. A bachelor's degree in Anthropology is valuable preparation for a career in law, medicine, education, business, government, museums, and various areas of non profit, public, and international service, including public policy and cultural resource management. The Anthropology program also provides a strong foundation for graduate study in any sub field of anthropology. By offering undergraduate majors opportunities to work with faculty research and apply knowledge and skills to local communities, agencies, and business through service learning and internships, students are further prepared for advanced study and successful careers.

REQUIREMENTS FOR THE B.A. IN ANTHROPOLOGY (ANTH)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Anthropology major requires at least 64 units in Anthropology courses, as well as one additional 4-unit quantitative reasoning course and one additional 4-unit upper division interdisciplinary thematic articulation course that may simultaneously fulfill General Education Requirements. Courses in the major must be taken for a letter grade, and specifically may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses are:

Lower Division Major Requirements [16 Units]

Introduction to Socio-cultural Anthropology (ANTH 001). . . . . 4 units
Introduction to Anthropological Archaeology (ANTH 003) . . . . . 4 units
Introduction to Biological Anthropology (ANTH 005)* . . . . . 4 units

*May not be used to satisfy a general education requirement for students in the ANTH Major.

One lower division quantitative methods course from the following:

Statistical Inference (ECON 010) . . . . . 4 units
Statistics for Scientific Data Analysis (MATH 018) † . . . . . 4 units

Analysis of Political Data (POLI 010). . . . . 4 units
Analysis of Psychological Data (PSY 010). . . . . 4 units
Statistics for Sociology (SOC 010) . . . . . 4 units

† Meets the Quantitative Reasoning General Education requirement.

Upper Division Major Requirements [40 Units]

History of Anthropological Thought and Practice (ANTH 100) . . . 4 units

One upper division field methods course selected from the following:

Ethnographic Methods (ANTH 170). . . . . 4 units
Archaeological Field Methods (ANTH 176) . . . . . 4 units

One upper division laboratory or archival methods course selected from the following:

Ethnohistory (ANTH 172) . . . . . 4 units
Lithic Analysis (ANTH 174) . . . . . 4 units
Human Osteology (ANTH 178) . . . . . 4 units
Bioarchaeology (ANTH 179) . . . . . 4 units

One upper division anthropology course from each of the following three fields:

Socio-cultural anthropology (ANTH 110 through ANTH 129). . . . 4 units
Anthropological archaeology (ANTH 130 through ANTH 149) . . . 4 units
Biological anthropology (ANTH 150 through ANTH 169). . . . . 4 units

Additional Degree Requirements [16 Units]

At least three additional upper division courses in Anthropology . . . . . 12 units
At least one upper division interdisciplinary thematic articulation course outside of Anthropology . . . . . 4 units

(Please consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for approved courses).

The upper division field methods requirement may be satisfied by taking an archaeological Field School from an approved institution.

TRANSFER STUDENTS

Transfer students who wish to major in Anthropology should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Anthropology major without specific major preparation. Please contact the Office of Admissions for current information.

ANTHROPOLOGY PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Anthropology will:

- Possess and apply fundamental anthropological knowledge, including terminology, concepts, intellectual traditions, and theoretical approaches;
- Identify and analyze common topics of research shared by the sub-fields of anthropology;
- Understand ethics and responsibility in the practice of anthropology and in our roles as citizens;
- Recognize and appreciate what it means to be human and how ethnographic, archaeological, and biological knowledge contribute to that understanding;
- Understand both qualitative and quantitative research methods as they apply to anthropological inquiry;
- Possess skills to communicate anthropological knowledge effectively through writing, oral presentation, and data presentation in various formats for diverse audiences.

I like UC Merced because I have great friends here! We study together and come up with many random things to do and it makes my time more worthwhile.

—Maira Alcala, Orosi, Psychology Major

■ Cognitive Science Major

Cognitive Science is the interdisciplinary study of human thought and behavior. It combines methods, theories, and applications from many disciplines, including philosophy, psychology, linguistics, computer science, neuroscience, and biology. The Cognitive Science majors, B.A. and B.S., provide a broad knowledge of cognitive science, including language and communication, reasoning, memory, categorization, cognitive modeling, perception and action, philosophical foundations, artificial intelligence, cognitive engineering, and cognitive science applications for the business setting. A degree in Cognitive Science provides in-depth training in research methods, data analysis, modeling, and lab-based research, and it provides excellent training for jobs in high-tech companies. It is ideal for students who want to pursue graduate work in cognitive science, neuroscience, psychology, computer science and engineering, information sciences and information management, communications, medicine, business, management, law, and education. Students can work with cognitive science faculty to tailor their own program of study to emphasize one or two specific areas within cognitive science. Example specializations include cognitive neuroscience, cognitive linguistics, computational modeling, decision sciences, and philosophy of cognitive science.

REQUIREMENTS FOR THE B.A. IN COGNITIVE SCIENCE (COGS)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Cognitive Science major, B.A., requires 50-52 units (some of which simultaneously meet general education requirements). Courses in the major must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. All major course requirements must be completed with a grade of C- or better. Required courses include:

Lower Division Major Requirements [22-24 Units]

Introduction to Cognitive Science (COGS 001) . . . . . 4 units

Two additional introductory courses chosen from the following:

Introduction to Language and Linguistics (COGS 005). . . . . 4 units
Introduction to Economics (ECON 001)* . . . . . 4 units
Introduction to Philosophy (PHIL 001)† . . . . . 4 units
Introduction to Psychology (PSY 001)*. . . . . 4 units
Analysis of Psychological Data (PSY 010)‡ . . . . . 4 units
(ECON 010 or MATH 032 may also be considered by petition.)
Calculus I (MATH 011) or equivalent‡ . . . . . 4 units
An introductory lower division computing course (e.g., CSE 005 or CSE 020) . . . . . 2-4 units

*Meets Social Science course outside of major General Education requirement.

†Meets Humanities, Arts or Foreign Language course outside of major General Education requirement.

‡Meets Quantitative Reasoning General Education Requirement

Upper Division Major Requirements [28 Units]

Mind, Brain, and Behavior (COGS 101) . . . . . 4 units

Research Methods for Cognitive Scientists (COGS 105). . . . . 4 units
At least four additional upper division courses in Cognitive Science*. . . . . 16 units
One additional upper division course in Cognitive Science, Philosophy, Political Science, Psychology, Arts, Management, Economics, Biology or Computer Science and Engineering. . . . . 4 units

*One upper division course in Philosophy may be substituted.

TRANSFER STUDENTS

Transfer students planning to major in Cognitive Science, B.A. should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. They must also complete at least three UC-transferable introductory social sciences courses, including one introductory psychology or philosophy course, two lower division natural sciences or engineering courses, including one with a lab, field, or studio component, one computer science course, one semester of calculus and one UC-transferable statistics course.

REQUIREMENTS FOR THE B.S. IN COGNITIVE SCIENCE (COGS)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, students in the Cognitive Science major, B.S., must complete 60-65 units (some of which simultaneously meet general education requirements). Compared to the B.A., the B.S. requires three additional lower division courses, one each in math, science and computing. In addition, B.S. students are encouraged to pursue upper division courses in Biology or Computer Science and Engineering. Courses in the major must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses include:

Lower Division Major Requirements [32-37 Units]

Introduction to Cognitive Science (COGS 001) . . . . . 4 units

Two introductory courses chosen from the following:

Introduction to Language and Linguistics (COGS 005). . . . . 4 units
Introduction to Economics (ECON 001)* . . . . . 4 units
Introduction to Philosophy (PHIL 001) . . . . . 4 units
Introduction to Psychology (PSY 001)* . . . . . 4 units
Analysis of Psychological Data (PSY 010)† . . . . . 4 units
(ECON 010 or MATH 032 may also be considered by petition.)
Calculus I (MATH 011) and Calculus II (MATH 012) or equivalent ‡. . . . . 8 units
Two lower division computing courses (e.g., CSE 020 and CSE 021; CSE 005 will not meet this requirement) . . . . . 4-8 units
Science Introductory Course with Laboratory, Field, or Studio Component (In addition to 8 units required for the General Education Natural Sciences/Engineering Requirement).
Designated courses include BIO 001+BIO 001L, CHEM 002, CHEM 008, PHYS 008, PHYS 009 . . . . . 4-5 units

*Meets Social Science course outside of major General Education requirement.

†Meets Humanities, Arts or Foreign Language course outside of major General Education requirement.

‡Meets the Quantitative Reasoning General Education requirement

Please consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for a current list of designated natural sciences/engineering courses.

Upper Division Major Requirements [28 Units]

Mind, Brain, and Behavior (COGS 101) . . . . . 4 units
Research Methods for Cognitive Scientists (COGS 105). . . . . 4 units

Cognitive Science Professor Teenie Matlock lecturing to a student group.

At least four additional upper division courses in Cognitive Science* . . . . . 16 units
One additional upper division course in Cognitive Science, Philosophy, Political Science, Psychology, Arts, Management, Economics, Biology or Computer Science and Engineering . . . . . 4 units

*One upper division course in Biology, Computer Science and Engineering, or Philosophy may be substituted.

TRANSFER STUDENTS

Transfer students planning to major in Cognitive Science, B.S. should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Cognitive Science major without specific major preparation. Please contact the Office of Admissions for current information.

COGNITIVE SCIENCE PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Cognitive Science will be able to:

- Explain and apply knowledge of landmark findings and theories in cognitive science, and use that knowledge as context for understanding the current state of affairs. Evidence will be collected in the form of embedded test questions in COGS 1.
- Students should have the following abilities:
  - Ability to interpret / evaluate / synthesize information in research papers
  - Ability to design a cognitive science research project
  - Ability to write clearly and scientifically
- Interpret and appreciate formal and computational

approaches in cognitive science.

- Take theoretical positions in cognitive science and argue for them or against them. Evidence will be collected in the form of an essay from one of the writing-intensive cognitive science courses.
- Be able to use a cognitive science education outside of the undergraduate classroom, particularly in terms of employment and career development. Evidence will be collected in the form of student surveys.

■ Economics Major

Economists study how scarce resources are allocated so that the well-being of individuals is maximized. Whether the resource that is being allocated is income, time, or a precious commodity, there is always some tradeoff associated with allocating the resource for one use and not another. Individuals, businesses, and governments face these tradeoffs in countless ways everyday. The most important thing students learn from studying economics is how to identify, measure, and understand the essential elements of this tradeoff.

The Economics major is built on a foundation of strong theoretical and statistical training. The major provides students solid grounding in microeconomic and macroeconomic theory, statistical and econometric methodology, as well as applied economic analysis. The Economics major emphasizes the role of incentives and institutions in shaping economic outcomes and how public policies influence economic performance and individual outcomes. Special emphases in the program include labor economics, public economics, political economy, law and economics, environmental economics, empirical methods, and U.S. economic history.

In addition to having a solid understanding of economic theory, our program has a special emphasis on empirical research methods in economics. All students engage in research (with faculty, in teams, and independently) that involves analyzing data and answering well formulated questions related to public policies. With these research experiences, our students are competitive for research internships, fellowships, and pre-graduate summer programs while still in school.

Because students with a degree in economics develop strong analytical and quantitative skills and the ability to solve complex problems effectively, studying economics is excellent preparation for many careers in business, law, management consulting, education, or public service. Businesses of all types and sizes, financial institutions, consulting firms, government agencies, non-governmental organizations, as well as graduate business and law schools actively seek graduates with bachelor's degrees in economics. In addition, many of our students go on to do graduate study in economics, law, public policy, or business.

REQUIREMENTS FOR THE B.A. IN ECONOMICS (ECON)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Economics major requires 48 units (some of which simultaneously fulfill general education requirements). Courses in the major must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Students must complete all major course prerequisites with a C-or better.

Lower Division Major Requirements [16 Units]

Introduction to Economics (ECON 001). . . . . 4 units
One introductory course chosen from*: . . . . . 4 units

- Introduction to Cognitive Science (COGS 001)
- Introduction to Psychology (PSY 001)
- Introduction to Political Science (POLI 001)
- Introduction to Sociology (SOC 001)

Statistics (ECON 010 OR POLI 010 OR SOC 010 OR PSY 010) † . . 4 units
Calculus I (MATH 011) or equivalent † . . . . . 4 units

* Meets Social Sciences course outside of major General Education requirement.

† Meets the Quantitative Reasoning General Education requirement.

Upper Division Major Requirements [32 Units]

Intermediate Microeconomic Theory (ECON 100) . . . . . 4 units
Intermediate Macroeconomic Theory (ECON 101). . . . . 4 units
Econometrics (ECON 130). . . . . 4 units
At least five additional upper division courses in Economics. . . . 20 units

SPECIALIZATIONS

Students are encouraged to choose one of the following two Specializations, each requiring three upper division courses [12 units] that also satisfy the five course upper-division Economics course requirement:

1) Strategy and Finance: At least 3 courses from:

- Industrial Organization (ECON 115 or MGMT 115)
- Economics of Organizations (ECON 116)
- Marketing Strategy (ECON 117)
- Economics of Money, Credit and Banking (ECON 121)
- Human Resource Economics (ECON 141)
- Judgment and Decision Making (ECON 153)
- Corporate Finance (ECON 162 or MGMT 165)
- Economics of Investments, Futures and Options (ECON 163)
- Game Theory (ECON 170)

2) Economic Analysis and Policy: At least 3 courses from:

- American Economic History (ECON 111)
- Economics of the Environment and Public Policy (ECON 120)
- Labor Economics (ECON 140)
- Human Resource Economics (ECON 141)
- Economics of Gender and Poverty (ECON 142)
- Health Economics (ECON 145)
- Economic Development (ECON 150)
- Public Economics (ECON 151)
- Law and Economics (ECON 152)
- Urban and Regional Economics (ECON 156)
- Political Economics (ECON 155)
- International Microeconomics (ECON 160)

TRANSFER STUDENTS

Transfer students planning to major in Economics should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Economics major without specific major preparation. Please contact the Office of Admissions for current information

ECONOMICS PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Economics will be able to:

- Understand the role of organizations and institutions in a society; understand the impact of organizations and institutions on the economic environment and outcomes; and to understand how incentives influence individual and organizational behavior and performance;
- Recognize how government actions affects economic performance and how economic interests influence government decisions;
- Design and conduct research that will inform managerial and policy decision-making; be able to collect, analyze, and interpret data using familiar software packages;
- Define problems and identify multifaceted explanations for complex economic phenomena; use information and data from multiple sources to answer the questions at hand;
- Think critically about the information that they encounter, whether it is in their work or reported in the media;
- Have an ability to communicate clearly and cogently in written and oral form using modern technology;
- Engage in life-long learning.

■ History Major

The Greek historian Thucydides wrote many centuries ago that the study of history is of value to any "who desire an exact knowledge of the past as an aid to the interpretation of the future." In a diverse and interdependent world, the study of History provides students with the tools to make sense of both the past and present, and to prepare for the future. We cannot hope to address America's contemporary racial dilemmas without understanding the history of slavery and Manifest Destiny. Nor can we grasp today's global patterns of poverty and prosperity without grappling with the history of empire and the spread of capitalism. The long history of immigration that has made California's Central Valley such a diverse region is intertwined with both global and national histories of war, revolution, commerce, culture, and politics.

Though rooted in the study of the past, the tools employed by historians are useful in a broad array of modern careers and professions. History, with its focus on research, writing, and argumentation, is well known as an excellent preparation for graduate school, law school, and other professions. History majors may also find employment related to their degrees in schools, museums, editing and publishing, archives, historic preservation, federal, state and local agencies, and as consultants and contractors.

History majors at UC Merced choose a field of concentration in either United States History or World History. They apply their classroom learning to research problems outside the classroom, where they can contribute to expanding public knowledge and awareness of cultural issues. Students may explore thematic topics such as environmental history, the history of science and technology, the history of migration and cultural intersections, as well as issues of world, national, state and local history.

Current UC Merced faculty members' areas of expertise include archives and museums, the study of global conflict and diplomacy, American history, world history, political geography, and the digital mapping of historical and cultural phenomena.

REQUIREMENTS FOR THE B.A. IN HISTORY (HIST)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the History major requires 68 units. Courses in the major must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Students must complete all major course prerequisites with a C-or better.

Lower Division Major Requirements [24 Units]

A two-semester lower division introductory sequence in area of concentration . . . . . 8 units

Please choose one of the following combinations:

Concentration in World History: Introduction to World History to 1500 (HIST 010) and Introduction to World History since 1500 (HIST 011)

Concentration in United States History: The Forging of the United States, 1607-1877 (HIST 016) and The Modern United States, 1877-Present (HIST 017)

(Additional introductory region/nation sequence courses in History may be taken to meet this requirement as those courses are developed in future years. Please consult a SSHA advisor and/or visit SSHA's website to check for approved new course sequence additions).

Two other lower division courses, at least one of which is from HIST 010, 011, HIST 016, or 017 . . . . . 8 units

One year of college-level courses in a Language other than English. . . . . 8 units

Professor Kathleen Hull at UC Merced's Commencement Ceremony.

See the SSHA Advising website for more information on Foreign Language Placement: ssha-advising.ucmerced.edu/policies/foreign-language-placement-guidelines.

(Students must take one year of the same language. This requirement may be satisfied through alternative means, such as proficiency testing and/or prior college-level course work. Does not meet the lower division Humanities, Arts or Foreign Language General Education requirement).

Upper Division Major Requirements [32 Units]

The Historian's Craft (HIST 100) (must be taken in junior year). . . 4 units

History Capstone (HIST 191) . . . . . 4 units

At least six additional Upper Division courses in History including: . . . . . 24 units

- At least two upper division History courses in area of concentration
- At least two upper division History courses outside area of concentration

Breadth Requirement [8 Units]:

Two non-History courses (lower or upper division) from within the chosen concentration.

(Consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for approved courses).

TRANSFER STUDENTS

Transfer students who wish to major in History should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the History major without specific major preparation. Please contact the Office of Admissions for current information.

CONCENTRATIONS

Currently, two concentrations are available within the History major. Students choosing to concentrate in U.S. History take courses exploring the development of America and its peoples from the centuries before European colonization through the present day. Courses within the U.S. History concentration range from African American history to the history of the Cold War and American foreign policy. Students in this concentration also take two courses in other disciplines that will broaden their understanding of U.S. history. Thus students might take a course in contemporary U.S. literature or Asian American music as a way of broadening their understanding of the diverse cultures that have historically shaped the development of the United States.

Students choosing to concentrate in World History take a one-year introductory sequence exploring themes of human cultural and social development and the connections among peoples from the emergence of the human species until the present day. Following this course, students will have the opportunity to take upper division courses of global scope on topics such as trade, mapping, or the environment; and also courses focusing on some aspect of the history of a particular part of the world. Students in this concentration also take two courses in other disciplines that broaden their understanding of World History. Thus students might take an Anthropology course in Transnationalism, or an advanced course in a language other than English.

HISTORY HONORS PROGRAM

UCM History majors may petition to join the Honors Program, which will have additional requirements beyond the standard History major. Undergraduate majors who are accepted and successfully complete the Honors Program will receive a notation to that effect upon their diploma at graduation.

To be eligible for the Honors Program , a History major must achieve a minimum overall GPA of 3.3, a minimum GPA of 3.5 in the major and a minimum grade of A- in the major induction course, HIST 100: The Historian's Craft. Applications from qualified students will be considered by the History Honors Committee (composed of Academic Senate faculty in History). Please contact SSHA Advising for more information.

HISTORY PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in History will be able to:

- Recognize the processes by which societies, cultures, and institutions change over time;
- Describe particular historical developments and explain their wider context;
- Critically read, analyze, and synthesize primary and secondary sources;
- Use methods of narrative and analysis appropriately for communicating historical phenomena;
- Identify the various contexts that shape the construction and use of historical sources and knowledge.

■ Literatures and Cultures Major

The major in Literatures and Cultures at the University of California, Merced asks students to recognize the complex interactions of history, culture, and literature, and in doing so, to ask questions of gender and minority thought and discourse, and of intersections with other fields such as cognitive science, social sciences, and information science. Literatures and Cultures offers a program of study that develops in students the critical skills most necessary to understand how culture shapes and is shaped by the production, dispersal, and consumption of literary and cultural texts; it seeks to ensure that students understand the basic notion of cultural production, and that they are, through a variety of courses, familiarized with the inherent relationship between society and literature, between reading and thinking, and between individual and societal forms of expression. In keeping with the campus' primary directive of interdisciplinary approaches, the Literatures and Cultures major situates itself at a disciplinary crossroads, both inviting collaboration with the other schools and disciplines within the School of Social Sciences, Humanities and Arts and across the campus, and illustrating, within its own precepts, a wide ranging set of disciplinary approaches and interests.

Currently, the major asks students to select one of two concentrations, consisting of three overlapping interdisciplinary areas, each of which can be understood as a distinct geographic, intellectual, linguistic, and aesthetic territory, and which can also be studied in relation to the others. They are as follows: Literatures of the Spanish Speaking World, focusing on Mexico and the U.S., South and Central American countries and European countries such as Spain and Portugal; and Literatures of the English Speaking World, emphasizing literatures, both oral and written, produced within the United States and England, but also encompassing geographic terrains such as Australia and South Africa. The Literatures of the Spanish Speaking World concentration has a global reach and interest, which includes Peninsular, American, African, and Asian literatures in Spanish, as well as a Portuguese component. Courses in this area are taught in Spanish (with some eventually in Portuguese), and are available to students interested in cultural and linguistic proficiency in Spanish. The Literatures of

the English Speaking World concentration also has global reach and interest, and includes colonial and postcolonial literatures, and indigenous literatures, including a focus on American regional literature and environmental literatures, including literature of the Great Central Valley, California literatures, and the literature of Yosemite. Additionally, a third area is encompassed by an overlap both geographical and cultural, and comprises courses students take within both concentrations. This area of study, Literatures and Cultures of the Americas, will enable a bold hemispheric approach, exploring commonalities and differences between native and postcolonial cultures in North America, Central America, South America and the Caribbean.

Overall, UC Merced's highly comparative approach to literature enables the interdisciplinary training of students in literature, cultural studies, theory and comparative studies. Upon graduation, students will find themselves prepared for a number of career possibilities, including education, graduate and professional programs, including the fields of law, medicine and business, as well as advertising, editing and publishing, journalism, communications and mass media.

REQUIREMENTS FOR THE B.A. IN LITERATURES AND CULTURES (LITC)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Literatures and Cultures major requires 52-60 units (some of which simultaneously fulfill general education requirements). Courses in the major must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Students must complete all major course prerequisites with a C- or better.

Lower Division Literatures And Cultures Major Requirements [32-40 Units]

Two lower division introduction courses in area of concentration (preferably within a sequence).

Concentration in Literatures of the English Speaking World. . . . . 8 units

- Introduction to World Literature I (LIT 020)
- Introduction to World Literature II (LIT 021)
- Introduction to American Literature I (LIT 030)
- Introduction to American Literature II (LIT 031)
- Introduction to British Literature I (LIT 040)
- Introduction to British Literature II (LIT 041)

Concentration in Literatures of the Spanish Speaking World . . . 8 units

- Introduction to Hispanic Literature I (LIT 050)
- Introduction to Hispanic Literature II (LIT 051)

Two additional lower division LIT courses. . . . . 8 units

Foreign Language Requirement. . . . . 8–16 units

- Literatures of the English Speaking World (at least 2 semesters of college-level foreign language)*
- Literatures of the Spanish Speaking World (at least 4 semesters of college-level Spanish)*

*Students must take at least one year of the same language. This requirement may be satisfied through alternative means, such as proficiency testing and/or prior college-level course work. Does not meet the lower division Humanities, Arts or Foreign Language General Education requirement.

See the SSHA Advising website for more information on Foreign Language Placement: ssha-advising.ucmerced.edu/policies/foreign-language-placement-guidelines.

Upper Division Literatures And Cultures Major Requirements [20 Units]

Engaging Texts: Introduction to Critical Practice (LIT 100) . . . . . 4 units

Senior Project (LIT 190) . . . . . 4 units

At least 3 concentration-specific upper division courses in Literature . . . . . 12 units

Breadth Requirement [8 Units]:

Two non-literature courses from within the student's chosen concentration. These may be either upper- or lower-division courses.

(Please consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for approved courses).

Students interested in a concentration other than those listed above (for example, a thematic concentration in gender or race or a geographical location in US literature or Literature of the Americas) may submit a petition with a proposed list of courses that would constitute their concentration. Over time, additional approved concentrations may be added to the list above.

TRANSFER STUDENTS

Transfer students who wish to major in Literatures and Cultures should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Literature & Cultures major without specific major preparation. Please contact the Office of Admissions for current information.

LITERATURES AND CULTURE PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Literatures and Cultures will be able to:

- Interpret texts with due sensitivity to both textual and contextual cues;
- Appreciate and evaluate the aesthetic qualities of texts and the cultures from which they are drawn;
- Take positions on the ethical questions raised by texts, and defend those positions;
- Apply to other contexts various interpretive strategies developed in literary study;
- Articulate, cogently and with sensitivity to context, in both speech and writing, her/his interpretations and evaluations.

■ Management Major

The Management major responds to the growing needs of California's business environment. UC Merced's Management major provides rigorous analytical and quantitative training from a blend of fields including economics, management theory and other social sciences. Real-life management problems do not fit neatly into subject areas. Today's managers tackle issues that involve a number of management functions—so solutions need to draw on expertise from a variety of different areas. The UC Merced approach is to step away from thinking of management as a set of separate functions drawing from single disciplines. Instead, students learn to integrate key ideas from across subject areas to understand all the dimensions of a given issue. Creativity, innovation and entrepreneurship are emphasized.

The major is based on the premise that organizations of different kinds—for-profit, nonprofit, technological and governmental—require employees who are trained in analytical and quantitative decision-making, who work effectively in teams and on projects, who are comfortable in various cultures, who are "well rounded" in sciences and humanities, and who have learned the art of self-directed learning.

The Management major prepares students for a broad range of management-related careers. Students will learn the analytical tools that are needed to succeed in a modern, volatile business environment. The curriculum provides a strong foundation in economics, organization, business, finance, accounting and quantitative methods. It focuses on analysis and problem solving across a wide spectrum of management activities. The theoretical underpinning for the undergraduate program comes from economics and management science disciplines that use tools and techniques based on applied mathematics and statistics to solve problems in virtually all areas of business and government. The typical undergraduate student develops skills to build quantitative models of complex operations and competitive markets and be able to use those models to facilitate decision-making.

REQUIREMENTS FOR THE B.S. IN MANAGEMENT (MGMT)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Management major requires 56 units (some of which simultaneously fulfill general education requirements). Courses in the major emphasis must be taken for a letter grade and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. For limits on pass/no pass grading, please contact the SSHA advising office. Students must complete all major course prerequisites with a C- or better. All major course requirements must be completed with a grade of C- or better. Students in the Management major must maintain a 2.0 grade point average in all major coursework.

Lower Division Major Requirements [24 Units]

Introduction to Economics (ECON 001) . . . . . 4 units
Introduction to Finance (MGMT 025) . . . . . 4 units
Introduction to Accounting (MGMT 026) . . . . . 4 units
Statistical Inference (ECON 010)* . . . . . 4 units
Calculus I (MATH 011) or equivalent* . . . . . 4 units
Introduction to Computer Applications (CSE 005) . . . . . 4 units

*Meets the Quantitative Reasoning General Education requirement.

Upper Division Major Requirements [32 Units]

Intermediate Microeconomic Theory
(ECON 100 OR MGMT 100) . . . . . 4 units
Intermediate Macroeconomic Theory
(ECON 101 OR MGMT 101) . . . . . 4 units
Econometrics (ECON 130 OR MGMT 130). . . . . 4 units
Marketing (MGMT 120) . . . . . 4 units
Corporate Finance (ECON 162 OR MGMT 165). . . . . 4 units
Three additional MGMT Courses* . . . . . 12 units

* Students may substitute a Management-related course for one of these courses. Students should consult a SSHA Advisor or the SSHA Advising website ssha-advising.ucmerced.edu for an updated list of appropriate course substitutions.

TRANSFER STUDENTS

Transfer students who wish to major in Management should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Management major without specific major preparation. Please contact the Office of Admissions for current information.

MANAGEMENT PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Management will:

- Analyze information, solve problems, and make decisions from a holistic, multidisciplinary perspective;
- Apply theories and concepts in management and related fields (accounting, economics, statistics, finance, marketing, human resource management, strategic planning and business law) to various management situations;
- Use effective written and oral communication consistent with the management and professional environment;
- Apply appropriate information technology to analyze problems, develop business research, report key data, and recommend management strategies and actions;
- Evaluate ethical, social, cultural, and political issues as they relate to the organization, operations, human resources, and business ventures.

■ Political Science Major

Political Science is the social scientific study of political institutions and political behavior. The study of political institutions includes topics such as the effect of the design of electoral systems on the quality of representation in government, the formal and informal elements of the legislative process and their implications for the making of law, and the impact of domestic political institutions on the incidence of international conflict. Under the rubric of political behavior, political scientists study how and why people choose to participate in politics, the determinants of vote choice, and the nature and origins of public opinion. Students studying political science at UC Merced develop a strong substantive understanding of both political institutions and behavior. Students also learn the theories that help us better understand the political world and the methods by which these theories are tested and refined.

Political Science majors choose courses from three subfields of the discipline: American Politics, Comparative Politics, and International Relations. The study of institutions and behavior is central to all three of these subfields, although the substantive emphasis differs. Courses in American Politics focus on domestic politics in the U.S., while courses in Comparative Politics examine government and politics in other nations. International Relations classes address issues in foreign policy, international conflict, and the institutions intended to govern the interactions between nations. Students focus on one of these three subfields, although they also are required to take courses in one or both subfields outside of their focus.

The knowledge and skills acquired with the Political Science Major should provide a strong foundation for graduate training in law, political science or other social sciences. Students graduating with a degree in political science can also pursue a wide variety of other careers, such as public administration, campaign management or consultation, grassroots political organization, corporate governmental affairs, Foreign Service, journalism, lobbying or teaching.

REQUIREMENTS FOR THE B.A. IN POLITICAL SCIENCE (POLI)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Political Science major requires 48 units, some of which may simultaneously meet general education requirements. Courses in the major must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis.

Lower Division Major Requirements [16 Units]

Introduction to American Politics (POLI 001) . . . . . 4 units

Two courses chosen from . . . . . 8 units

- Contemporary Problems in American Politics (POLI 002)
- Introduction to Comparative Politics (POLI 003)
- Introduction to International Relations (POLI 005)
- Global Issues (POLI 006)
- Community Mobilization and Politics (POLI 009)

Analysis of Political Data (POLI 010)* . . . . . 4 units

*Meets the Quantitative Reasoning General Education requirement.

Upper Division Major Requirements [32 Units]

Three upper division Political Science courses from one of the following three subfields . . . . . 2 units

- American Politics (POLI 100-127)
- Comparative Politics (POLI 130-140)
- International Relations (POLI 150-160)

Two Political Science courses from outside the primary area of focus . . . . . 8 units

At least three additional upper division courses in Political Science. . . . . 12 units

TRANSFER STUDENTS

Transfer students planning to major in Political Science must complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Political Science major without specific major preparation. Please contact the Office of Admissions for current information.

POLITICAL SCIENCE PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Political Science will be able to:

- Understand the processes, theories, and empirical regularities of political institutions and political behavior in the student's chosen emphasis area: American politics, comparative politics, or international relations;
- Employ critical thinking and demonstrate social scientific literacy, including basic quantitative literacy;
- Utilize contemporary social science research methods to conduct rigorous research on political phenomena;
- Write effectively, particularly to convey complex concepts and information in a clear and concise manner;
- Apply abstract theory and research methods to understand contemporary political events and public policies.

■ Psychology Major

The undergraduate major in Psychology provides students with an understanding of the major questions and methodologies across Psychology, including a common core of statistical and experimental methods courses. Upper division courses and projects allow students to explore the various substantive specialties in psychology, and to identify the areas of psychology that they might wish to pursue further. Many students with an undergraduate degree in psychology go on to graduate study in psychology or closely related fields such as cognitive science or organizational behavior. The psychology program strongly encourages further graduate study, and supports its undergraduate majors in reaching this goal by providing opportunities to work with faculty on research.

The Psychology major also prepares undergraduates for many other careers even without further graduate training. The American Psychological Association reports that only about 5% of 1997 and 1998 bachelor's degree psychology major graduates had taken a job that is actually in psychology. Most psychology major graduates—about two thirds—took employment in private sector business settings. Graduates with an undergraduate psychology major are highly marketable because they are trained to have good research and writing skills, to be effective problem solvers in both team and individual settings, and to use critical thinking skills to analyze, synthesize, and evaluate information. Specific examples of employment include administrative support, public affairs, education, business, sales, service industries, health, the biological sciences, computer programming, employment counselors, correction counselor trainees, interviewers, personnel analysts, probation officers, and writers. The same APA report finds that two thirds of psychology major graduates believe their job is closely or somewhat related to their psychology background and that their jobs hold career potential.

REQUIREMENTS FOR THE B.A. IN PSYCHOLOGY (PSY)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Psychology major requires 48 units (some of which simultaneously fill General Education Requirements as indicated below). Courses in the major emphasis must be taken for a letter grade, and may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses include:

Lower Division Major Requirements [16 Units]

Introduction to Psychology (PSY 001) . . . . . 4 units

One Introductory course chosen from the following* . . . . . 4 units

- Introduction to Cognitive Science (COGS 001)
- Introduction to Economics (ECON 001)
- Introduction to Political Science (POLI 001)
- Introduction to Public Policy (PUBP 001)
- Introduction to Sociology (SOC 001)
- Introduction to Socio-cultural Anthropology (ANTH 001)

Analysis of Psychological Data (PSY 010)† . . . . . 4 units

Research Methods (PSY 015). . . . . 4 units

* Meets Social Science course outside of major General Education requirement.

†Meets Quantitative Reasoning General Education requirement.

Upper Division Major Requirements [32 Units]

Writing in the Disciplines: Psychology (WRI 101) . . . . . 4 units

One upper division psychology course from each

of the following three groups . . . . . 12 units

- Group A (Cognition, Brain and Behavior): PSY 160-169, PSY 180-189, or any upper division COGS course
- Group B (Social-Personality, Development): PSY 130-139 or PSY 150-159
- Group C (Applied Psychology): PSY 120-129, PSY 140- 149 or PSY 170-179

At least four additional upper division courses in Psychology . . . 16 units

EXIT EXAMINATION REQUIREMENT

Psychology majors must take an exit examination in their last year of study in order to graduate. The purpose of the examination is to help assess the effectiveness of the Psychology undergraduate program in achieving its Program Learning Outcomes. The examination is not intended to assess individual students, and students cannot fail the examination. Nonetheless, we encourage students to do their best on the examination so that the faculty can accurately assess how well Program Learning Outcomes are being achieved.

TRANSFER STUDENTS

Transfer students who wish to major in Psychology should complete the IGETC at their community college. Transfer students may not be admitted to the Cognitive Science major without specific major preparation. Please contact the Office of Admissions for current information.

PSYCHOLOGY PROGRAM LEARNING OUTCOMES

Students who complete the Psychology major will:

- Show knowledge of the key substantive content of the field of psychology, including memory and thinking, sensory psychology and physiology, developmental psychology, clinical and abnormal psychology, and social psychology;
- Demonstrate that they understand the basic principles of and correctly interpret applications of the designs and methods that psychologists use to gather data;
- Show that they can understand and correctly interpret the statistical analyses psychologists use to analyze data;
- Show that they understand and can apply the writing style used in psychological literature (APA style).

■ Sociology Major

Sociology is the scientific study of society, social institutions and social relationships. A key contribution of the discipline is that social factors matter; our lives are not only shaped by personal psychology, but also by our place in the social world. Sociology's areas of inquiry range from intimate family relationships to ties between nationstates; from divisions by race, class, gender and sexuality to shared ideas of common culture; and from understanding the influence of broad-scale social movements to analyzing how adolescents become productive adults. Sociologists help develop theories to understand how the social world works and also use analytic tools to craft policies and create programs that address important social issues, such as neighborhood and educational inequality. Few disciplines offer such a broad scope of relevance for understanding individual and collective relations in society.

The substantive breadth and skills in conducting and analyzing research that sociology majors obtain can be useful for a range of career paths including: business and marketing, criminal justice, education, environment and technology, graduate school, law, public health, leadership in faith communities, non-profit and social service organizations, public policy, social welfare and social work. Students will leave the major with research skills developed in conjunction with knowledge of substantive material relevant to a variety of social service and non-profit research positions. They also will have an excellent basis for pursuing graduate studies in law, sociology and other social and cultural studies programs.

REQUIREMENTS FOR THE B.A. IN SOCIOLOGY (SOC)

In addition to adhering to the UC Merced and School of Social Sciences, Humanities and Arts requirements, the Sociology major requires at least 52 units in Sociology and related courses. Courses in the major emphasis must be taken for a letter grade, and specifically may not be taken on a pass/no pass basis unless the course is only offered on a pass/no pass basis. Required courses are:

Lower Division Major Requirements [16 Units]

Introduction to Sociology (SOC 001) . . . . . 4 units
Statistics for Sociology (SOC 010)* . . . . . 4 units
Sociological Research Methods (SOC 015). . . . . 4 units
At least one additional lower division Sociology course† . . . . . 4 units

*Meets Quantitative Reasoning General Education requirement.

†Not including courses numbered in the 090s.

Upper Division Major Requirements [36 Units]

Sociological Theory (SOC 100) . . . . . 4 units
At least 6 additional upper division Sociology courses* . . . . . 24 units
At least two additional upper division related courses outside of Sociology . . . . . 8 units

*Not including courses numbered in the 190s.

(See a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for a list of acceptable courses).

TRANSFER STUDENTS

Transfer students who wish to major in Sociology should complete the Intersegmental General Education Transfer Curriculum (IGETC) at their community college. Transfer students may not be admitted to the Sociology major without specific major preparation. Please contact the Office of Admissions for current information.

SOCIOLOGY PROGRAM LEARNING OUTCOMES

Upon graduation, students majoring in Sociology will be able to:

- Think critically about the causes and consequences of social inequality;
- Design and evaluate empirical sociological research;
- Explain and apply the major theoretical perspectives in sociology;
- Communicate orally and in writing about sociological concepts;
- Use their sociological education outside of the undergraduate classroom, particularly in their careers or further education.

■ SSHA Programs

The following programs represent loci of research and instructional excellence within the School of Social Sciences, Humanities and Arts. While these programs do not have specific curricula, and may not be degree-granting disciplinary areas, we encourage students to broaden their horizons by considering courses from these areas during their undergraduate studies at UC Merced.

THE GLOBAL ARTS STUDIES PROGRAM

The Global Arts Studies Program (GASP) defines the arts broadly in order to promote an interdisciplinary study of the arts. GASP offers a unique curriculum by integrating subjects conventionally housed in disparate departments, including art history, music and ethnomusicology, media studies, and cultural and ethnic studies. GASP students gain a broad multicultural understanding of the arts by investigating the effects of industrialization, colonialism, commercialism and globalization on art practices in a balanced, inclusive range of critical perspectives. GASP students can seek a variety of graduate studies and employment opportunities in teaching, arts and music management, museums and galleries, the recording industry, publishing, broadcasting, and public relations.

The focus in GASP on research and scholarly work recognizes the important role in which culture participates in the larger social world inside and outside of academe. Students will develop a set of critical skills and specialized knowledge through an interdisciplinary yet rigorous curriculum. While concentrating on a particular area of study such as visual culture or music studies, GASP students are required to take courses outside of their focus, which broadens their perspectives. For example, a student on the music studies track whose main interest is jazz history will have the opportunity to take classes on Latin American or Asian Pacific visual art. Additionally, students are required to take courses outside of GASP, becoming the flexible yet critical thinkers prepared to participate in the opportunities, as well as meet the challenges of the future.

Global Arts Studies Program Learning Outcomes

Students participating in the Global Arts Studies Program (GASP) will be able to:

- Describe artworks in technical or theoretical terms.
- Enlarge technical/theoretical vocabulary.
- Analyze art works.
- Engage with artworks critically.

FOREIGN LANGUAGES

To be able to communicate in a foreign language is a fundamental asset in any profession, from careers in education, translating, and interpreting, to those in international studies, health, business or law. The knowledge of a foreign language is also useful for traveling and research in many parts of the world. The School of Social Sciences, Humanities and Arts offers four foreign languages for UC Merced students: Chinese, French, Japanese and Spanish.

All lower division courses in Chinese, French, Japanese and Spanish are content-based, learner-oriented and follow the communicative learning approach. In addition to helping students develop skills to communicate at an introductory and intermediate level in the target language, these courses attempt to promote a cultural awareness of the countries and communities where the languages are spoken.

The Spanish language program at UC Merced offers courses at the lower and upper division level plus a minor in Spanish. Lower division course offerings include introductory and intermediate courses and courses for Spanish heritage speakers who would like to improve their oral, writing and reading skills. At the upper division level, the Spanish program offers a wide variety of courses that provide students with the opportunity to broaden their knowledge of the language and of Hispanic cultures, as well as to learn the vocabulary and expressions commonly used in specific professions. Consult the Minors section of this catalog for information on the minor in Spanish.

To ensure appropriate placement in our foreign language courses, students with previous academic instruction in the language that they would like to study are encouraged to take the placement exam for that language. Spanish heritage speakers who wish to improve their oral, writing and reading skills should not take the Spanish placement exam, but register in SPAN 10-11. Students should have fulfilled the requirements (SPAN 4 or SPAN 11) or equivalent to register in an upper division Spanish course. For information about placement exams please go to orientation.ucmerced.edu or speak to a UC Merced academic advisor. You can also contact the Foreign Languages Program Coordinator for questions related to the placement exam or any other foreign language issues.

See the SSHA Advising website for more information on Foreign Language Placement: ssha-advising.ucmerced.edu/policies/foreign-language-placement-guidelines.

Foreign Language Learning Outcomes

After completing two years (Intermediate level II) of the foreign language of their choice, students will be able to identify and analyze cultural traits and concepts relevant to the country and communities where the target language is spoken. In addition, they will have developed intermediate writing, reading, listening and oral proficiency in that foreign language, which means that students will:

- Possess listening skills equivalent at least to the Intermediate-Mid level of the ACTFL Proficiency.
- Guidelines: Ability to understand main ideas and some facts from interactive exchanges and aural texts.
- Posses speaking skills equivalent at least to the Intermediate-Mid level of the ACTFL Proficiency.
- Guidelines: Ability to handle successfully a variety of

> If you're looking to apply to graduate school in the future, get to know your professors NOW. UC Merced offers the best opportunities to work with faculty members on their research projects. You even have the opportunity to have your name published in a research journal, something typically only graduate students get the honor of doing, and something that will definitely raise some eyebrows when you put it on your graduate school application.
>
> —William Ngo, Cognitive Science

uncomplicated communicative tasks in straightforward social situations.

- Possess reading skills equivalent at least to the Intermediate-Mid level of the ACTFL Proficiency.
- Guidelines: Ability to read consistently with increased understanding simple, connected texts dealing with a variety of basic and social needs.
- Possess writing skills equivalent at least to the Intermediate-Mid level of the ACTFL Proficiency.
- Guidelines: Able to meet a number of practical writing needs. They can write short, simple communications, compositions, descriptions, and requests for information in loosely connected texts that are based on personal preferences, daily routines, common events, and other topics related to personal experiences and immediate surroundings.
- Demonstrate in their oral presentations, compositions, and other class assignments a reasonable knowledge of the ways of thinking, behavioral practices, and the cultural products of the country and communities where the target language is spoken.

Students that complete Foreign Language courses at the upper division level will be able to identify and analyze cultural traits and concepts relevant to the country and communities where the target language is spoken. In addition, they will develop skills in critical thinking and advanced writing, reading, listening and oral proficiency in the target language.

MEDIA ARTS TECHNIQUE PROGRAM

Art has the potential to illuminate all aspects of life. As a form of creativity, art is distinguished by its metaphoric attributes. Art has an immense capability to transform and transcend. Dedication to diversity, cross cultural exploration, interdisciplinary collaboration, as well as belief in the value of freedom to explore characterizes Media Arts Technique Program curriculum.

The goal of the Media Arts Technique Program is to offer students the opportunity to sample multiple art techniques, from traditional to experimental, and to allow them to find their own individual ways of integrating art into their lives. Courses are designed to provide students with tools that will enhance their ability to grow, to adjust to new environments and to new ideas throughout their lives. Access to multiple art techniques aims to give students the opportunity to develop holistic understanding of art media as well as respect for the diverse ways in which art is manifested in different cultures. Media Arts Technique Program is designed to develop capacity to create new forms of expression and communication.

Media Arts Technique Program curriculum strives to help students integrate specialized art techniques into their chosen fields of study. Students are encouraged to enroll in courses that suit their personal interests. Students are able to choose courses according to applicability to their majors, or in order to gain perspective on their own disciplines. In addition, students may choose courses in order to strengthen their cognitive abilities, to learn to understand art and creativity better, to develop heuristic methods of learning, to access intuitive holistic thinking, to sharpen their powers of inquiry, to enhance their cultural literacy, or to develop empathy.

Courses in the following art media are offered: architecture, digital arts, fine arts, music, performing arts, and photography. The Artist in Residence Program, which is part of Media Arts Technique Program, provides students with opportunity to study the practice of art with professional artists. Past Artists in Residence included Latina theater director and actress, African American choreographer specializing in West African dance, and sculptor recognized for pioneering work in feminist art.

Enrollment in Media Arts Technique Program courses is open to all students, regardless of major or prior art experience.

Media Arts Technique Program Learning Outcomes

The content of Media Arts Program (MAP) courses is designed to guide students to:

- Demonstrate understanding and acquisition of (through hands-on projects) the principal attributes and mechanics of art technique(s) in medium of choice
- Demonstrate the ability to communicate the aesthetic, historical, cultural, social and contemporary aspects of the medium(media) they are studying
- Demonstrate the knowledge and application of certain traits that guide artistic creativity
- Express ideas through an art medium

PHILOSOPHY PROGRAM

UC Merced's philosophy program combines traditional approaches to philosophy with interdisciplinary and applied approaches, which are on the leading edge of the field. The program has special emphases in (1) applied ethics and political philosophy, and (2) philosophy of mind and cognitive science. Students are expected to demonstrate mastery of the material they study in traditional ways, including critical written analyses and written exams, but are also expected to make use of non-traditional methods. Examples include incorporating readings from outside of the philosophy literature, conceptual analysis of non-philosophical texts (such as scientific texts and policy analyses), and in some cases computer and mathematical modeling projects.

Philosophy Program Learning Outcomes

Upon graduation, we expect students minoring in philosophy to fulfill all of the following:

- Basic fluency in interpretation and criticism of arguments. Have the ability to independently study, summarize and criticize philosophical arguments, including arguments presented in classic texts and in contemporary philosophical literature.
- Ability to present and defend original arguments. Have the ability to present well-defined claims of one's own, to give clear philosophical arguments in defense of these claims, and to respond to critical objections others might raise against these claims.
- Basic fluency in logical inference. Be able to distinguish between logically valid and invalid deductive arguments, be able to translate verbal statements into symbolic expressions having correct logical form, and be able to give proofs of elementary propositions of logic.
- Interdisciplinary applications. Be able to use philosophy in an interdisciplinary way, for example, by philosophically analyzing non-philosophical texts (e.g. texts form a literature, history, psychology, or physics course), or by using formal methodological tools, such as mathematical and computer models, in the analysis of philosophical problems.

Additionally, we expect students minoring in philosophy to fulfill at least two of the following:

- Basic fluency in inductive logic. Be able to provide and assess evidence for causal claims and identify various fallacies in inductive reasoning (e.g. sample bias).
- Ability to appraise normative claims. Be able to distinguish between descriptive and normative philosophical claims, and to use certain descriptive claims either to support or to criticize certain normative claims.
- Historical understanding. Have an appreciation of how the discipline of philosophy has developed over time in response to internal challenges and to advances in science and changes in social life. (E.g., the renaissance in philosophy of mind was stimulated in part by the development of contemporary artificial intelligence).

THE KAREN MERRITT WRITING PROGRAM

The Karen Merritt Writing Program is charged with carrying out the university's mission "to convey information to and communicate and interact effectively with multiple audiences, using advanced skills in written and other modes of communication" (Guiding Principles for General Education at UC Merced).

The Karen Merritt Writing Program offers an array of courses in which students explore the art of critical thinking, craft their written expression, and address a variety of issues and audiences.

Students learn to use language actively, inventively, and responsibly by exchanging their work at all stages of their writing process while building cumulative portfolios. The faculty's interdisciplinary approach to writing offers students the opportunity to reflect broadly on their college education as well as to consider a range of pre-professional and academic opportunities.

Writing classes generally feature about twenty students per section; teacher-student conferences; frequent written and verbal feedback on writing and ideas; interdisciplinary teaching, ranging from scientific literacy to aesthetic appreciation; conversational and collaborative in-class projects; portfolio projects that emphasize process and product in writing; and detailed assessment of student learning and teaching effectiveness. For more details, please visit writingprogram.ucmerced.edu.

Writing Program Learning Outcomes

After completing the Writing Minor curriculum, students will be able to:

- Demonstrate engagement with the multi-stage processes of critical reading, formal writing, and public speaking.
- Select and apply the appropriate conventions of personal, academic, or professional forms of expression.
- Synthesize diverse perspectives through collaboration in academic discourse communities.
- Craft language that reveals aesthetic awareness.
- Apply professional ethical standards to the research process and its public representation.

WORLD HERITAGE PROGRAM

World Heritage is an emerging interdisciplinary and cross disciplinary area that includes architecture, history, archaeology, art history, geography, anthropology, management, law, environmental sciences and other disciplines. Thus, faculty in this field brings together the humanities, social sciences, policy, and management, consistent with the interdisciplinary intent of the World Cultures program within SSHA.

The key feature of the program, a strong technology orientation, will permit us to create a new discipline and innovative profiles for new economics, computer science, educational purposes and many others.

The challenge for our contemporary classroom work is to construct a curriculum that blends humanistic interests and technology. Students will learn that the codes, metadata, and interfaces of today are in constant change and thus the fundamental task will be to determine how to set up a sustainable management system for digital media and global heritage study. The learning outcome from such teaching should be the acquisition of a methodology aimed at understanding and communicating information about tangible and intangible heritage, cultural and natural sites. Each student in the World Heritage Program should learn to apply this methodology to the specialization of their field or to specific case studies within their field.

World Heritage Program Learning Outcomes

The main task is to study the evolving technologies and methodologies of analysis, interpretation, communication and presentation of heritage sites (natural and cultural), evaluating their potential to enrich contemporary societies in the light of the reconstruction of the past. Students will be able to:

- Define the concept of World Heritage and explain its implications for contemporary society.
- Dialogue with different disciplines such as architecture, history, art history, geography, anthropology, management, cognitive science, computer science.
- Understand how multiple academic disciplines and methodologies contribute to World Heritage.
- Use integrated computer technologies to complete heritage case studies and understand the appropriate context for the use of different technologies in the heritage field.
- Evaluate the key principles and policies of cultural heritage protection and management through international heritage institutions, conventions and charters.
- Experience and understand a visit to a monument, a landscape, or a site.

■ SSHA Minors

The School of Social Sciences, Humanities and Arts offers seventeen minors: American Studies, Anthropology, Arts, Chicano(a) Studies, Cognitive Science, Economics, History, Literatures and Cultures, Management, Philosophy, Political Science, Psychology, Interdisciplinary Public Health, Services Science, Sociology, Spanish and Writing.

The following guidelines pertain to all SSHA minors:

- To complete any SSHA minor, students must complete a minimum of five courses, at least four of which must be upper division.
- All courses must be taken for a letter grade.
- A minimum overall grade point average of 2.0 (C) in upper division courses is required. The only exception is a minor in Arts, for which the minimum GPA in upper division courses is 2.7 (B-).
- At least three of the five required courses must be taken at UC Merced.

- Only one course may be used simultaneously to satisfy requirements for two minors.
- Only one course may be used to satisfy both a minor and a major requirement.
- Students must consult the UC Merced General Catalog for prerequisites to required courses.

■ MINOR IN AMERICAN STUDIES

The American Studies minor builds on the tradition of an interdisciplinary field of study that promotes a broad humanistic understanding of American culture, past and present. By incorporating economics, history, literature, sociology, art history, anthropology, ethnic studies and public policy (among other areas), this minor encourages students and faculty within those fields to exchange ideas on scholarship as it relates to the American experience. In addition, the American Studies minor seeks to move beyond traditional limitations of American Studies, by allowing students to take relevant courses in engineering or the natural sciences. Inclusion of these courses is based on the rationale that cultural practices often stem from our understanding of and research in those sciences.

Minimum Requirements

One of the following courses:

- HIST 016 The Forging of the United States, 1607-1877
- HIST 017 The Modern United States, 1877-Present
- LIT 030 Introduction to American Literature I
- LIT 031 Introduction to American Literature II

One upper division American history course

One upper division American literature course

One upper division non-HIST/LIT course on American topics.

One upper division courses in American ethnicity, race or gender.

Please see the SSHA Advising website for a list of appropriate courses ssha-advising.ucmerced.edu.

■ MINOR IN ANTHROPOLOGY

Anthropology is dedicated to understanding humankind's diversity as well as what makes us uniquely human. Through the specific perspectives and methods of socio-cultural, archaeological, and biological anthropology, students taking the Anthropology minor learn how the human experience (past and present) is constituted through the interaction of social, cultural, political, historical, environmental, and biological factors. Anthropology strives for a holistic understanding of humankind and depending on the questions asked and the means used to discover answers, anthropological knowledge can straddle the social sciences, humanities, and natural sciences.

Minimum Requirements

ANTH 001 Introduction to Socio-cultural Anthropology

One additional lower division course from the following:

- ANTH 003 Introduction to Anthropological Archaeology
- ANTH 005 Introduction to Biological Anthropology

ANTH 100 (History of Anthropological Thought and Practice) OR one upper division methods course within the ANTH 170 through ANTH 179 series

SINCE WE'RE A FAIRLY SMALL CAMPUS, CONNECTING WITH THE STUDENTS HERE ON CAMPUS IS EASY AND HAS PROBABLY BEEN ONE OF MY MOST LIFE CHANGING EXPERIENCES.

—Kristin Tran, alumnae

Three additional upper-division courses in at least two of the following subfields:

- Socio-cultural anthropology (within ANTH 110 through ANTH 129 series)
- Anthropological archaeology (within ANTH 130 through ANTH 149 series)
- Biological anthropology (within ANTH 150 through ANTH 169 series)

■ MINOR IN ARTS

A minor is by definition a form of study that can truly be referred to as enrichment. The minor in Arts provides students the opportunity to explore courses from the three parallel tracks in the Arts curriculum: history (interpreting works of art from all media within their context and purpose), theory (concentrating on research) and art technique and practice (acquiring and applying art techniques in fine arts, music and performing arts).

Minimum Requirements

One lower division GASP course

One lower division ARTS course

A minimum of four upper division ARTS or GASP courses

■ MINOR IN CHICANO/A STUDIES

The Minor in Chicano/a Studies is an interdisciplinary program that introduces students to the complex experiences, history, cultural practices, and social interactions of one of the largest ethnic groups in the United States. The program has been designed around conceptual and theoretical units that are central to Chicano/a Studies as a field. In the upper division courses, students, in final papers/projects, will be able to critically examine the concepts below as they tie in to each particular. UC Merced's Minor in Chicano/a Studies is organized around the following central questions that the program will explore, and students will address, from multiple disciplinary perspectives:

- the role that race and ethnicity play and have played in shaping the experiences of different ethnic groups in the United States, with an emphasis on Chicanos/as;
- the dynamics of migration and immigration, and the ensuing changes in identity, language, social and cultural practices, and national (or transnational) allegiances; particular attention will be paid to the borderlands and its role in defining a Chicano/a identity over the years;
- cultural contact and conflict in a historical context, including an in depth examination of activism and its role in raising consciousness, political mobilization (both contentious and non-contentious behavior), building a sense of community, and advancing Chicano/a civil and human rights;
- literature and the ways in which it reflects and advances

social changes, produces artistic renditions of Chicano/a and non-Chicano/a life, facilitates a sense of community, and interacts with readers from different cultural backgrounds;

- language, with special attention to bilingualism, the social and the artistic uses of mixing languages, as well as the tension between spoken and written versions of those languages;
- the indigenous component of the Chicano/a identity; Chicanos/as are the descendants of multiple indigenous groups from present-day Mexico and the United States, and exploring that descent is central to Chicano/a studies.

Minimum Requirements

LIT 060: Introduction to Chicano/a Culture and Experiences

Four upper-division courses chosen from a list on the SSHA Advising website ssha-advising.ucmerced.edu

■ MINOR IN COGNITIVE SCIENCE

Cognitive Science is the study of human thought and its relation to human activities, including the study of language, perception, memory and reasoning. The Cognitive Science minor increases students' knowledge of the mind and how it is studied from various perspectives, and helps them to acquire critical skills in scientific research and formal areas such as computer science and mathematics. Students are encouraged to become involved with faculty research.

Minimum Requirements

COGS 001 Introduction to Cognitive Science

COGS 101 Mind, Brain and Computation or COGS 121/PSY 160 Cognitive Psychology

A minimum of three additional upper division COGS courses (one PSY course may be substituted)

A semester of lab-based research (e.g. COGS 095, COGS 098, COGS 099, COGS 195, COGS 198, COGS 199) is encouraged, but not required

■ MINOR IN ECONOMICS

Students with an interest in developing a solid grounding in economic theory are encouraged to consider the minor in Economics. The minor provides students with an understanding of how incentives and institutions shape society. Students in the Economics minor have opportunities for strong theoretical and statistical training in areas of labor economics, public economics, environmental economics, political economy and economic data analysis.

Minimum Requirements

ECON 001 Introduction to Economics

ECON 010 Statistical Inference

A minimum of four upper division ECON courses.

■ MINOR IN HISTORY

Students find that a minor in History makes an invaluable contribution to their studies. A knowledge of history provides an appreciation of the context within which important developments in politics, art, literature, philosophy and science or technology take place, and is necessary to an understanding both of their origins and their implications.

Minimum Requirements

Two lower division HIST survey courses (courses can be in combination, but a completion of a full sequence is encouraged):

- HIST 010 Introduction to World History to 1500
- HIST 011 Introduction to World History Since 1500
- HIST 016 The Forging of the United States, 1607-1877
- HIST 017 The Modern United States, 1877-Present
- HIST 030 Early European History
- HIST 031 Modern European History

A minimum of four upper division HIST courses.

■ MINOR IN LITERATURES AND CULTURES

The Literatures and Cultures minor enables students who are majoring in other disciplines to nonetheless develop strong skills in literary and cultural analysis, critical reading, and effective writing. Literary study asks questions of history and culture, of gender and minority thought and discourse, of intersections with other fields such as cognitive science, social science, and information science. The UC Merced Minor in Literatures and Cultures seeks to ensure both that students understand the basic notion of cultural production and reception, and that they are, through a variety of courses, familiarized with the relationships between society and literature, between reading and thinking, and between self and societal forms of expression.

Minimum Requirements

Students must complete a minimum of five Literature courses, including at least one lower division LIT course and at least four must be upper division. While the major requires a field of concentration, the minor may be drawn from all Literatures and Cultures offerings. Students are encouraged to develop a focus in consultation with faculty and with SSHA advising staff. All courses must be taken for a letter grade. An exception can be made for one course with written permission from LIT faculty.

■ MINOR IN MANAGEMENT

The Management minor at UC Merced provides an opportunity for students who are majoring in another field, such as the sciences or engineering, to learn the fundamental analytical and quantitative tools necessary for management decision-making. Students receive training in economic theory, statistics, accounting, and fields including human resources, strategy, finance, and organizational theory.

Minimum Requirements

MGMT 026 Introduction to Accounting

ECON 010 Statistical Inference

A minimum of four upper division MGMT courses.

■ MINOR IN PHILOSOPHY

The minor in Philosophy provides students with an understanding of the principles, methods, and areas of application of contemporary philosophy. Philosophers study conceptual questions within and between the humanities, arts and sciences: What is art? What is justice? What is the relation between mind and brain? Philosophy at UC Merced combines a traditional curriculum with an emphasis on these interdisciplinary linkages. Because of this, students should be able to use their training in philosophy to complement their other

coursework and to identify connections between their various areas of study.

Minimum Requirements

PHIL 001 Introduction to Philosophy

PHIL 005 Logic and Critical Reasoning

A minimum of four additional upper-division PHIL courses.*

*Pre-approved courses from other areas may be substituted. Pre-approval should be sought from Philosophy faculty.

■ MINOR IN POLITICAL SCIENCE

The Political Science minor offers broad coverage of the study of politics. Political science is the social scientific study of political processes involving political institutions and political behavior. The study of political institutions includes topics such as the effect of the design of electoral systems on the quality of representation in government, the formal and informal elements of the legislative process and their implications for the making of law, and the impact of domestic political institutions on the incidence of international conflict. Under the rubric of political behavior, political scientists study how and why people choose to participate in politics, the determinants of vote choice, and the nature and origins of public opinion. Students studying political science at UC Merced develop a strong substantive understanding of both political institutions and behavior. Students also learn the theories that help us better understand the political world and the methods by which these theories are tested and refined.

Minimum Requirements

One of the following courses:

- POLI 001 Introduction to American Politics
- POLI 003 Introduction to Comparative or
- POLI 005 Introduction to International Relations

A minimum of four upper-division POLI courses.

■ MINOR IN PSYCHOLOGY

Psychology is a social science that helps students better understand and interpret scientific information and ways to apply quantitative tools such as statistics. Psychology is often of inherent interest to students. Taking a psychology minor provides an interesting exposure to novel and exciting ideas that students would not otherwise encounter and can be of great use to students who are majoring in other fields. For example, students taking a pre-med curriculum find a psychology minor useful for understanding the social and psychological aspects of medical care or as preparation for a career in psychiatry. Students in management and economics find coursework in social psychology, decision-making and organizational and industrial psychology to be of particular use to their careers.

Minimum Requirements

PSY 001 Introduction to Psychology

PSY 010 Analysis of Psychological Data

A minimum of four upper-division PSY area courses, at least one course each from Group A, Group B and Group C

- Group A (Cognition, Brain and Behavior): Any PSY course in the 160s or 180s
- Group B (Social-Personality, Development): Any PSY course in the 130s or 150s
- Group C (Applied Psychology): Any PSY course in the 120s, 140s, or 170s

(More course options may be added to this list over time. Please check with the SSHA Advising Office for updates).

Students taking a psychology minor must take an exit examination in their last year of study in order to graduate. The purpose of the examination is to help assess the effectiveness of the Psychology undergraduate program in achieving its Program Learning Outcomes. The examination is not intended to assess individual students, and students cannot fail the examination. Nonetheless, we encourage students to do their best on the examination so that the faculty can accurately assess how well Program Learning Outcomes are being achieved.

■ MINOR IN INTERDISCIPLINARY PUBLIC HEALTH

Public health can be defined as an approach to promote health, prevent disease, prolong life and improve quality of life through organized efforts of society. Focusing on the health and wellbeing of populations, public health complements medicine's concern for individuals with diseases. Through activities ranging from basic research, to frontline efforts such as vaccination programs, promotion of healthy lifestyles and environments, disease control, and leadership on health policy formation, public health issues and outcomes touch the lives of people throughout the world. Public health is an interdisciplinary field drawing on the natural and social sciences as well as the humanities. One of the most important themes in public health is the disparities in health observed in different groups, for example related to economic resources and race/ethnicity, which is a focus in this curriculum.

- To complete this minor, students must complete a minimum of six courses, at least four of which must be upper division.
- At least four of the six required courses must be taken at UC Merced.
- Only one course may be used simultaneously to satisfy requirements for two minors.
- Only one course may be used to satisfy both a minor and a major requirement.

Minimum Requirements

PH 100: Introduction to Epidemiology [4 units]

PSY 124: Health Disparities [4 units]

One course providing an overview of mechanisms underlying human health and disease, from the following [4 units]:

- BIO 003: To Know Ourselves: Molecular Basis of Health and Disease
- BIO 161: Human Physiology

One course addressing statistics, from the following [4 units]:

- BIO 175: Biostatistics
- ECON 010: Statistical Inference
- MATH 018: Statistics for Scientific Data Analysis
- POLI 010: Analysis of Political Data
- PSY 010: Analysis of Psychological Data
- SOC 010: Statistics for Sociology

Two courses that address topics in health, disease, and disparities [6-8 units] Consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for approved courses.

Substitutions and waivers are subject to approval by the Interdisciplinary Public Health Coordinator.

■ MINOR IN SERVICES SCIENCE

The economies of most developed countries are dominated by services; even traditional manufacturing companies such as General Electric and IBM are adding high-value services to grow their businesses. Improving productivity in services often requires combining technical, social and business innovations. Effective combinations of these innovations often develop naturally together. Cross-disciplinary knowledge and skills relevant to services are becoming necessary for most college graduates. The minor in Services Science aims to provide these skills by drawing together cross-disciplinary courses to understand services from management, economics, engineering and/or cognitive science perspectives.

Minimum Requirements

MGMT 150 Services Science and Management

One upper-division MGMT-project course.

Three additional courses, one from each of the following areas (at least two must be upper-division):

- Cognitive Sciences
- Computer Sciences and Engineering
- Economics

■ MINOR IN SOCIOLOGY

The minor in Sociology gives students the ability to understand the complexities of today's society by examining human behavior and social actions. In examining how social structures (such as work, the family, religion, etc.) help shape social rules, processes, and agency, students gain a better understanding of the entirety of today's world—from poverty, to gender, to race, to organizational behavior, to politics. In studying these issues, students learn to use analytical reasoning and apply sociological theories to explain a wide range of social phenomena.

Minimum Requirements

SOC 001 Introduction to Sociology

SOC 015 Sociological Research Methods

A minimum of four upper-division SOC courses

■ MINOR IN SPANISH

To be able to communicate in a foreign language is a fundamental asset in any profession, from careers in education, translating and interpreting, to those in international studies, health, business or law. A minor in Spanish addresses the needs of students who seek the ability to communicate in more than one language in order to be competitive in their chosen profession. The study of Spanish language and culture is of special importance in the United States, the country with the second largest Spanish-speaking population in the world. The Spanish minor offers students the linguistic confidence needed for studying in another country and the benefits of being exposed to other cultures.

Minimum Requirements

SPAN 103 Spanish Composition and Conversation

Four additional courses (at least three must be upper division). Consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for approved courses.

Substitutions and waivers are subject to approval by the Foreign Language Coordinator.

Students may complete only one course in English to be counted toward the minor.

See the SSHA Advising website for more information on Foreign Language Placement: ssha-advising.ucmerced.edu/policies/foreign-language-placement-guidelines.

■ MINOR IN WRITING

It is the responsibility of the University to ensure that their graduates communicate effectively and write proficiently. A minor in writing explicitly engages students in the writing process and fosters their development as writers in academic and pre-professional contexts.

Writing courses train students in academic discourse and provide them with extensive opportunities for professional development within and across the disciplines. Emphasizing writing as a process, writing minor courses offer challenging curricula that develop students' abilities to research, synthesize, and innovate. Within these courses, students demonstrate individual and collaborative responsibility, applying their studies from other courses. The analytical approaches they practice in writing courses are applicable to any course that they take at the University.

The writing minor enhances students' understanding of the theoretical, interdisciplinary and professional aspects of writing, and helps them develop the vocabulary, syntax, style and voice appropriate to the practice of composition in diverse fields. By using the writing process to strengthen their ideas, students develop strategies for participating in research, policy-making, professional advancement, and creative expression. The writing minor fosters respect for language, for the contributions of peers, and for the value of effective communication.

The minor in writing is open to—and appropriate for—students majoring in any field, and prepares those proceeding on to graduate work for the challenges of advanced academic writing. By representing the student's intensive work in writing, the minor also signals to prospective employers the student's distinguished preparation for the demands of the professional workplace.

Students can follow one of two tracks in the minor, focusing either on Professional Writing or Creative Writing.

Minimum Requirements*

One lower-division course from the following list:

- WRI 025 Introduction to Creative Writing
- WRI 030 Introduction to Professional Writing

Four additional upper-division courses: Consult a SSHA advisor or the SSHA Advising website ssha-advising.ucmerced.edu for approved courses.

With an instructor's permission, students may repeat WRI 125 and WRI 130 as their specific topics change.

* With the approval of the Director of Writing, one writing-intensive course may be substituted for any of the required minor program courses. The Director may also allow applying one lower division writing course completed elsewhere towards fulfillment of this minor program.

Graduate Studies

WELCOME FROM THE DEAN

Dear Students:

Graduate education is an experience in learning the process of discovery. Be it in the laboratory, the field, a museum or library, students will learn how to identify, investigate and analyze major problems of importance to society. As a natural laboratory for research of international significance, California's San Joaquin Valley is defined by the diversity of its people and the proximity of the Sierra Nevada mountains. These elements offer a critical venue for a broad palette of studies that span the gamut from the humanities and social sciences to the natural and engineering sciences.

The University of California, Merced is building a world-class faculty. These individuals provide abundant opportunities for graduate students to interact with a broad range of internationally acclaimed scientists and policy makers while also providing access to some of the world's most powerful research instrumentation.

I hope you will explore UC Merced for your graduate education. As the first new American research university in the 21st century, we offer our graduate students the matchless experience of being here at the beginning. You will have a profound impact on the campus spirit, culture and traditions that will become the hallmarks of the San Joaquin Valley's first UC campus.

Graduate education is about adventure and exploration; so too is the development of a new campus. The entrepreneurial spirit that drives the best graduate students is identical to that needed on a new campus. The faculty and the Graduate Division look forward to providing our students an educational experience that will be the stepping-stone to a truly exceptional career.

Samuel J. Traina
Dean, Graduate Division

SOLVING SOCIETY'S CHALLENGES

Society's most intractable problems are broad based and multifaceted. UC Merced is committed to offering graduate students an opportunity to work on many of society's most pressing and important problems. The research interests of our faculty reach across the spectrum of modern research and scholarship. Research interests among UC Merced's faculty can be found on facultyexperts.ucmerced.edu. Given UC Merced's plans for substantial growth during the coming years, research topics and interests will expand rapidly.

The current list of UC Merced faculty can be found online at www.ucmerced.edu/faculty/facultylist.asp.

While the scope of graduate education at UC Merced is national and international, the campus location also offers unique research avenues. From the cultural diversity of the San Joaquin Valley to the ecological diversity of the Sierra and the coastal mountains, the interior of California offers an abundance of unique living, learning and research opportunities. The interdependence of the Valley and the surrounding mountains provides a natural laboratory for creating environmental sustainability in the presence of an expanding and diverse population base.

Our programs are designed to prepare students for careers in academia, industry, government or private research organizations.

UC Merced offers graduate research and education in the following areas:

- Applied Mathematics
- Biological Engineering and Small-Scale Technologies
- Cognitive and Information Science
- Electrical Engineering and Computer Science
- Environmental Systems
- Mechanical Engineering and Applied Mechanics
- Physics and Chemistry
- Psychological Sciences
- Quantitative and Systems Biology
- Social and Cognitive Sciences
- World Cultures

Graduate students excel in a uniquely supportive setting where world-renowned professors and promising students strive together to research human nature, society and the natural world. The graduate group structure for overseeing each of these emphases is composed of faculty from multiple Schools. Each program is highly interdisciplinary in approach and intended to facilitate interactions between faculty and students from a broad scope of traditional

Our major in Literatures and Cultures really embraces my research, which looks at non traditional literatures and even non textual forms of literature. I love being able to bring this approach into my classes, and I've enjoyed the research opportunities it has created with undergraduates. My work crosses a lot of disciplinary boundaries, and I feel that Merced is the perfect place to do that.

—Professor Jan Goggans, Literatures and Cultures

academic disciplines. This is intended to offer graduate students the flexibility to address major societal problems using the tools of a wide variety of disciplines.

PREPARING FOR AN ADVANCED DEGREE

Admission to a graduate program at UC Merced requires a bachelor's degree, or its equivalent, that is comparable to a degree from the University of California both in the level of scholarly achievement and in the distribution of academic subject matter. Although applications for graduate study will be evaluated primarily on scholarly achievement, UC Merced will utilize the totality of a prospective student's qualifications, including research, work experience, recommendations and other creative accomplishments, to render a decision. To be eligible for graduate admission at UC Merced, you must have a minimum 3.0 grade point average in your undergraduate coursework. In addition to a formal graduate admission application and official transcripts, applicants must submit official Graduate Record Examination (GRE) scores, and three letters of recommendation. Certain Graduate Groups may require a writing sample of your work that can be evaluated by the admissions committee.

APPLYING FOR ADMISSION

Applications to UC Merced can be accessed electronically at graduatedivision.ucmerced.edu. Applications are accepted for the fall semester only. Prospective students are encouraged to begin the admissions process as early as possible in the prior academic year. International applicants should check the Graduate Division website for details regarding application and admission. All application materials must be submitted to the Graduate Division by January 15. In order for an application to be fully considered, a non-refundable application fee must be paid. You may pay online with a credit card (minimal surcharge added) at epaygradapp.ucmerced.edu. Alternatively, checks should be made payable to UC Regents, accompanied by the Graduate Application Fee Form for Admission, and mailed to the Graduate Division Office. Fee exemptions for UC-approved programs are available. The Graduate Division website, graduatedivision.ucmerced.edu, provides further information about admission requirements, financial assistance, deadlines and important contacts.

International Students

Students with credentials from universities outside the United States should begin the application process well in advance of the deadline date. Official copies or certified copies of all transcripts in English and in the original language are required.

Applicants whose native language or language of instruction is not English must show evidence of having recently taken the Test of English as a Foreign Language (TOEFL) or the International English Language Testing Service (IELTS) examination. A score of at least 7 on the IELTS is required. For TOEFL-IBT (Internet-based test), UC Merced requires an overall score of 68 with minimum scores on each section are as follows:

- 18 / writing
- 17 / speaking
- 16 / listening
- 17 / reading

A minimum score of at least 26 on the speaking section is required to be appointed as a teaching assistant; therefore, the overall minimum requirement is 77. Some programs may require higher scores. Please check individual program websites for specifics.

Information on the TOEFL is available online at www.toefl.org and IELTS information at www.ielets.org. These requirements are waived for applicants who have received an advanced degree from a U.S. institution or from a country where English is the language of instruction.

International applicants must certify that they have sufficient funds to cover fees, tuition and living expenses for the first year of their study at UC Merced. A Foreign Applicant Questionnaire for the purpose of verifying the amount and source of funds available for graduate study will be forwarded upon acceptance into graduate study. Financial verification must be provided before visa forms can be issued.

ADMISSIONS AND REGISTRATION

A formal notice from the Dean of the Graduate Division is the official proof of admission to graduate study at UC Merced. Successful applicants will be notified as soon as possible after the program faculty has made its recommendations to the Dean of the Graduate Division. Accepted students will be asked to submit their intention to register by April 15. Submission of the Statement of Intent to Register reserves your slot in the program. Should you choose not to accept the offer of admission, we ask that you also notify us of your decision so that we can offer the placement to another applicant.

Students must be enrolled in 8 units each semester to retain graduate student standing. Students with teaching assistant or research appointments are required to enroll in 12 units each semester. Registration provides the necessary access to courses, facilities and faculty. Students holding non-immigrant visas must register for each semester covered by their visa.

Programs Of Study

UC Merced offers the Master of Science (M.S.), Master of Arts (M.A.) and Doctor of Philosophy (Ph.D.) degrees. New students are assigned a faculty advisor and committee that assist them in developing a curriculum to meet the requirements. Although considerable flexibility to meet individual needs exists, requirements usually include a core of required material that a student must master.

The M.S. and M.A. degrees are either Plan I or Plan II programs. Plan I requires a minimum of 20 semester units of upper division and graduate courses plus completion of a thesis. Plan II requires at least 24 semester units of upper division and graduate courses, followed by a comprehensive examination administered by the faculty.

Students pursuing M.S. or M.A. Plan I degrees will begin their thesis research at the end of the first year. Although they may continue to take additional graduate seminars or independent study, the majority of the second year involves thesis research and writing. The thesis committee must approve the scope of the thesis and provide guidance during the process of developing the thesis. Approval of the thesis must be unanimous for the award of the master's degree.

The Ph.D. degree is designed to prepare students for creative activity and original research. A doctoral degree is awarded in recognition of a student's knowledge of a broad field of learning and for distinguished accomplishment in that field through an original contribution of significant knowledge. The dissertation must demonstrate a high level of critical ability, imagination and synthesis. In contrast to the master's degrees, there are no University unit requirements for the doctorate, although individual programs may set specific course requirements. However, students must complete at least four semesters of academic residence at UC Merced and successfully complete the course requirements before they are allowed to take the Qualifying Examination.

All students pursuing the Ph.D. degree must pass a Qualifying Examination before admission to candidacy. Students are expected to pass the Qualifying Examination before the beginning of their third year of graduate study unless they successfully petition the Graduate and Research Council to take it at a specified later date. The intent of this examination is to ascertain the breadth of a student's comprehension of fundamental facts and principles that apply in the major field of study. It will also determine the student's ability to think critically about the theoretical and practical aspects of the field. Students are advanced to candidacy when they fulfill the following requirements:

- Successfully completed the Qualifying Exam;
- Maintained a minimum grade point average of 3.0;
- Received incomplete grades in no more than two courses; and
- Fulfilled any language requirement associated with their program. Once a student is advanced to candidacy, it is imperative that he/she begin his/her dissertation studies promptly.

Graduate programs are built around an interdisciplinary, graduate group model that melds faculty expertise and scholarly approaches, transcending normal disciplinary boundaries.

MASTERS PROGRAM LEARNING OUTCOMES:

The goal of the M.S./M.A. degree at UC Merced is to sufficiently educate students at an advanced level in specific fields of knowledge so that they may continue in their pursuit of graduate education, or be competitive for careers in the private or public sector.

1. Graduates will obtain an understanding of the principles that underlie the field of study.

2. Graduates are able to use the research and/or working methodologies of the field of study.

3. Graduates are able to use the communication formats of their field to effectively communicate with professional, specialist audiences as well as to other audiences as appropriate for the field.

4. Graduates are proficient in the professional skills necessary to lead productive careers in their chosen profession.

DOCTORAL PROGRAM LEARNING OUTCOMES:

The goal of the Ph.D. degree at UC Merced is to advance human knowledge and to provide for the dissemination and use of that new knowledge. We will educate students at the most advanced level in specific fields of knowledge so that they may assume positions of leadership in research, teaching, industry, business and government.

1. Graduates are able to apply the underlying fundamental principles and philosophies of their field in the production of new knowledge.

UC Merced's first Ph.D. recipient Ricardo Cisneros with Graduate Dean Samuel Traina.

> The thing I enjoy most at UC Merced is working with students. Everyone here has the pioneering spirit which makes teaching classes fun and exciting.
>
> —Professor Arnold Kim, Mathematics

2. Graduates are able to use the research methodologies of the field of study.

3. Graduates have added to human knowledge.

4. Graduates are able to use the communication formats of their field to effectively communicate with professional, specialist audiences as well as to other audiences as appropriate for the field.

5. Graduates are self-directed learners able to advance their field of study.

6. Graduates are proficient in the professional skills necessary to lead productive careers in their chosen profession.

7. Graduates are versed in the topic of research integrity and apply in their work the ethical norms of behavior associated with their field of study.

■ APPLIED MATHEMATICS (AM)

appliedmath.ucmerced.edu
Contact: Applied Math Graduate Committee, amgrad@ucmerced.edu

Applied Mathematics involves the use of analytical and computational mathematics to solve real-world problems. Its core is based on modeling, analysis and scientific computing. The Applied Mathematics graduate emphasis offers opportunities for students interested in multidisciplinary mathematics projects at the interface with life sciences, physical sciences, engineering and social sciences. Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees are offered. The coursework provides training in the fundamental tools of applied mathematics, including ordinary and partial differential equations, asymptotic and perturbation methods, numerical analysis and scientific computing. An explicit goal of applied mathematical sciences is to contribute significantly to another discipline. Hence, the objective of applied mathematics is to foster multidisciplinary research and education.

During a student's first year, he or she will take Applied Mathematics Core courses, take the preliminary exams, and become familiar with the various active research areas in the group. In the second year, a student will complete the Core courses, take Special Topics courses, and begin working on a M.S. or Ph.D. research project. M.S. students typically complete their degrees in two years. Ph.D. students take their qualifying exam in the second or third year of studies, and are expected to complete their degrees in four to six years total.

M.S. and Ph.D. graduates in Applied Mathematics will find a wide variety of careers and ongoing study opportunities. Employers value the analytical and computational skills acquired through the training provided in Applied Mathematics. Potential employers include government and industrial research labs in a broad array of fields including engineering, energy, telecommunications, transportation and pharmaceutical sciences, as well as consulting firms, financial institutions, schools, etc. The unique combination of solid mathematical background, computational expertise and advanced knowledge of an application area places our graduates ahead of the curve on a job market that increasingly values interdisciplinary research. Graduates seeking a career in academia as post-doctoral researchers or college professors will be in a distinctly favorable position through their teaching and research training, and through the breadth of their mathematical, computational, and scientific qualifications.

All Applied Mathematics graduate students are required to pass preliminary exams offered in the first year of studies, and to complete the five core courses covering partial-differential equations, asymptotic and perturbation methods, numerical methods and scientific computing. Details regarding specific degree requirements may be found at appliedmath.ucmerced.edu/grad-requirements.html.

PROGRAM LEARNING OUTCOMES

Doctoral Program Learning Outcomes

Upon graduating, we expect students completing the PhD degree in Applied Math to be able to:

1. Solve advanced mathematical problems using analytical methods.

2. Solve advanced mathematical problems using computational methods.

3. Recognize the relationships between different areas of mathematics and the connections between mathematics and other disciplines.

4. Give clear and organized written and verbal explanations of mathematical ideas to a variety of audiences including teaching undergraduate students.

5. Model real-world problems mathematically and analyze those models using their mastery of the core concepts.

6. Become skilled in ethics and responsible conduct of research and learn how to apply those skills to everyday situations.

Masters Program I Learning Outcomes

Upon graduating, we expect students completing the MS I (with a thesis) degree in Applied Math to be able to:

1. Solve advanced mathematical problems using analytical methods.

2. Solve advanced mathematical problems using computational methods.

3. Give clear and organized written and verbal explanations of mathematical ideas to a variety of audiences including teaching undergraduate students.

4. Model real-world problems mathematically and analyze those models using their mastery of the core concepts.

5. Become skilled in ethics and responsible conduct of research and learn how to apply those skills to everyday situations.

Masters Program II Learning Outcomes

Upon graduating, we expect students completing the MS II (with a capstone requirement) degree in Applied Math to be able to:

1. Solve advanced mathematical problems using analytical methods.

2. Solve advanced mathematical problems using computational methods.

3. Give clear and organized written and verbal explanations of mathematical ideas to a variety of audiences including teaching undergraduate students.

4. Become skilled in ethics and responsible conduct of research and learn how to apply those skills to everyday situations.

PARTICIPATING FACULTY AND RESEARCH AREAS

Harish Bhat, *Assistant Professor of Natural Sciences*. Wave phenomena in electromagnetic media and compressible fluids studied using applied/computational analysis and geometric mechanics.

François Blanchette, *Assistant Professor of Natural Sciences*. Computational and theoretical multiphase fluid dynamics with applications to sedimenting systems and surface tension dominated flows.

Boaz Ilan, *Associate Professor of Natural Sciences*. Analytical and computational modeling of linear and nonlinear waves applied to

ultrafast optics, Bose-Einstein condensates, and solar science.

Arnold D. Kim, *Associate Professor of Natural Sciences*. Wave propagation in random media applied to biomedical optical imaging and wireless communications.

Roummel Marcia, *Assistant Professor of Natural Sciences*. Linear algebra and nonlinear optimization with application to compressive optics, computational biochemistry, and anomaly detection.

Kevin Mitchell, *Associate Professor of Natural Sciences*. Dynamical systems applied to atomic, molecular and optical physics.

Mayya Tokman, *Assistant Professor of Natural Sciences*. Computational science, numerical analysis, mathematical modeling applied to plasma physics.

■ BIOLOGICAL ENGINEERING AND SMALL-SCALE TECHNOLOGIES (BEST)

best.ucmerced.edu
Chair: Valerie J. Leppert
vleppert@ucmerced.edu

The engineering sciences are undergoing a vast and fundamental metamorphosis from isolated disciplines to more integrative and multidisciplinary topics. BEST offers Masters of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in the synergistic areas of Biological Engineering and Materials Engineering with specializations in diverse themes. Research projects are available on topics ranging from fundamental characterization of materials to tissue engineering, and coursework will provide a background in the tools and integration of modern materials.

Our faculty and staff take pride in combining exceptional teaching with state-of-the-art research to advance the education and research of this rapidly maturing discipline. Our researchers are actively participating both within and beyond the university community to apply biotechnology principles to the solutions of essential medical, technological, and societal challenges.

The doctoral degree is granted to students who demonstrate a thorough knowledge of a broad field of learning and have given evidence of distinguished accomplishment in that field. The degree also signifies that the recipient has critical ability and powers of imaginative synthesis as demonstrated by a doctoral dissertation containing an original contribution to knowledge in his or her chosen field of study. The doctoral student will complete a variety of coursework tailored to his specific area of study. Research and publication efforts will also be a primary focus of the individual doctoral training program. Funding is usually provided for doctoral students in the form of fellowships, training grants, teaching assistantships, or research assistantships.

> UC Merced prepared me both intellectually and emotionally for my career goals of becoming a physician. Most notably, UC Merced helped me appreciate the importance of working within an interdisciplinary group, the value of efficient teamwork and the ability to develop my interest in biomedical research.
>
> —Albert Shih, Bioengineering

PROGRAM LEARNING OUTCOMES

1. Core Knowledge – Graduates will possess the fundamental knowledge needed to understand and critically evaluate current research literature in their chosen field of biological engineering, materials science and engineering, and micro/nanotechnology

2. Research Competency – Graduates will have the skill and knowledge to:

   a. (M.S. graduates) Be proficient in laboratory and/or theoretical techniques necessary to contribute to knowledge in their chosen field, under appropriate supervision and in the context of a M.S. thesis or project

   b. (Ph.D. graduates) Independently identify new research opportunities, plan effective strategies for pursuing these opportunities, and conduct research that makes a new contribution to knowledge in their chosen field

3. Communication Skills - Graduates will be adept at oral and written communication of research results in their field to expert and non-expert audiences

4. Ethics - Graduates will understand and promulgate the importance of research and professional ethics, and maintaining the trust of governmental and non-governmental scientific organizations, professional colleagues, and the public

BEST RESEARCH THEMES INCLUDE:

Tissue Engineering

The area of tissue engineering is, by nature, cross disciplinary in that it employs cell culture methods combined with identification and development of appropriate materials, scaffolding architecture, technologies for cell delivery and nutrient transport strategies while also synergizing with nanobioengineering and bio-inspired materials.

Wei-Chun Chin, *Assistant Professor of Engineering*
Valerie Leppert, *Associate Professor of Engineering*
Jennifer Lu, *Assistant Professor of Engineering*
Kara McCloskey, *Assistant Professor of Engineering*

Biological Materials

Nature's materials, structures, and devices provide stimulating examples of how engineers might optimize materials synthesis, assembly and processing strategies. Our efforts at biomimicry encompass a number of lessons from the natural world.

Wei-Chun Chin, *Assistant Professor of Engineering*
Carlos Coimbra, *Associate Professor of Engineering*
Lilian Davila, *Assistant Professor of Engineering*
Ajay Gopinathan, *Assistant Professor of Natural Sciences*
Kara McCloskey, *Assistant Professor of Engineering*
Christopher Viney, *Professor of Engineering*

Biological Modeling And Control

Biological modeling and control is an interdisciplinary research area combining the fields of engineering, cell biology, and chemistry. Examples include the design of components for biomedical devices and tissue engineering and chemical optimization of molecules with biological properties.

Miriam Barlow, *Assistant Professor of Natural Sciences*
Carlos Coimbra, *Associate Professor of Engineering*
Ajay Gopinathan, *Assistant Professor of Natural Sciences*
Kara McCloskey, *Assistant Professor of Engineering*

Matthew Meyer, *Associate Professor of Natural Sciences*
David Ojcius, *Professor of Natural Sciences*
Meng-Lin Tsao, *Assistant Professor of Natural Sciences*

Physiological Engineering

Physiological Engineering is an area of bioengineering that focuses on the development and implementation of instruments and techniques to evaluate the function of biological systems at the tissue, cellular and molecular level. This area includes bioelectronics, modern non linear optical techniques, molecular biology, spectroscopy, electrophysiology, single molecule detection and genetic engineering techniques to evaluate central paradigms and hypotheses in bioengineering.

Miriam Barlow, *Assistant Professor of Natural Sciences*
Wei-Chun Chin, *Assistant Professor of Engineering*
Ariel L Escobar, *Professor of Engineering*
Jennifer Lu, *Assistant Professor of Engineering*
David Ojcius, *Professor of Natural Sciences*
Jay Sharping, *Assistant Professor of Natural Sciences*

Biosensor Design And Fabrication

Sensors and "bots" that can replace defective physiological counterparts in humans and animals; implants and prosthetics constructed from nanocomposites that closely resemble natural tissue; and biosensors, which can be designed to nanodimensions, mounted on a single chip and used in remote diagnoses.

Wei-Chun Chin, *Assistant Professor of Engineering*
Ariel L Escobar, *Professor of Engineering*
Steve Kang, *Professor of Engineering*
Valerie Leppert, *Associate Professor of Engineering*
Jennifer Lu, *Assistant Professor of Engineering*
Yanbao Ma, *Assistant Professor of Engineering*
Jay Sharping, *Assistant Professor of Natural Sciences*
Jian-Qiao Sun, *Professor of Engineering*
Tao Ye, *Assistant Professor of Natural Sciences*

Micro/Nanoscale Materials

Rational synthesis and self-assembly of complex inorganic nanoscale building blocks using macromolecules, such as block copolymer templates, are being investigated in this highly interdisciplinary research area. Structure and properties are characterized by advanced techniques. Using a multidisciplinary approach, experimental investigation and theoretical simulations, a comprehensive design guideline for creating new materials with novel properties is being established.

Lilian Davila, *Assistant Professor of Engineering*
Sayantani Ghosh, *Assistant Professor of Natural Sciences*
Linda Hirst, *Associate Professor of Natural Sciences*
Valerie Leppert, *Associate Professor of Engineering*
Jennifer Lu, *Assistant Professor of Engineering*
David Ojcius, *Professor of Natural Sciences*
Christopher Viney, *Professor of Engineering*
Tao Ye, *Assistant Professor of Natural Sciences*

Hybrid Materials

New hybrid materials, such as smart materials that can easily recognize and respond to external stimuli, are being designed and synthesized. Innovative devices are being fabricated to harness their unique properties for a myriad of applications ranging from harvesting energy, to monitoring the environment, to detecting diseases.

Lilian Davila, *Assistant Professor of Engineering*
Ariel Escobar, *Professor of Engineering*
Valerie Leppert, *Associate Professor of Engineering*
Jennifer Lu, *Assistant Professor of Engineering*

> YOU CAN'T CONTROL THE ACTIONS AND BEHAVIORS OF OTHERS BUT YOU CAN CONTROL YOUR OWN. MAKE THE MOST OF EVERYTHING YOU DO AND APPLY YOURSELF WHEREVER AND WHENEVER YOU CAN. DO NOT COMPARE YOURSELF TO THE PIONEERING CLASS. INSTEAD, BUILD YOURSELF ON TOP OF WHAT IS OR ISN'T ESTABLISHED AND CONTINUE THE PIONEERING BOBCAT SPIRIT.
>
> —JaeJae Julian, alumnae

■ COGNITIVE AND INFORMATION SCIENCES (CIS)

Contact: Mitch Ylarregui, *Graduate Program Coordinator*
mylarregui@ucmerced.edu

The Cognitive and Information Sciences Ph.D. program offers its students interdisciplinary training in cognitive science with an emphasis on computation, technology and applications. This emphasis distinguishes us from other Cognitive Science graduate programs. We view intelligent behaviors not just as emerging solely from neural processes, but from interactions between brain, body, and environment. Thus intelligent behaviors may also emerge from group and social interactions situated in their economic and technological milieu. The word "information" in CIS denotes our multi-scale perspective on cognition, and our emphases on computational approaches and applications towards developing technologies that foster, and even aspire to emulate, intelligent behavior.

Our award-winning faculty specialize in a variety of areas that intersect at this nexus, including computational modeling, complex systems theory, distributed cognition, categorization, psycholinguistics, cognitive linguistics, visual perception, cognitive engineering, service science, artificial intelligence, reasoning, computer vision, philosophy of mind, cognitive neuroscience, and bioinformatics. With computational, technological, and application-oriented skills in these areas, students who graduate from this Ph.D. program will have career opportunities in both academia and industry.

PROGRAM LEARNING OUTCOMES

1. Understanding foundational concepts in cognitive and information sciences.

2. Skillful use of foundational methods in cognitive and information sciences.

3. Scientific communication skills.

4. Ability to integrate knowledge across the disciplines that compose cognitive and information sciences.

5. Expertise in a specific scientific domain.

PARTICIPATING FACULTY AND RESEARCH AREAS:

David Ardell, *Assistant Professor of Natural Sciences.* Computational Biology and Evolution, Bioinformatics, Genomics

Miguel Carreira-Perpiñan, *Associate Professor of Engineering.* Machine Learning, Computational Neuroscience, Speech Processing, Computer Vision

Stefano Carpin, *Associate Professor of Engineering.* Robotics, Motion Planning, Search and Rescue, Artificial Intelligence

Yihsu Chen, *Assistant Professor of Engineering and of Social Sciences, Humanities, and Arts.* Modeling energy and environmental systems with computational methods

Yarrow Dunham, *Assistant Professor of Social Sciences, Humanities, and Arts.* Social Cognitive Development, Linguistic Influences on Cognitive Development, Stereotyping and Prejudice

Evan Heit, *Professor of Social Sciences, Humanities, and Arts.* Categorization, Reasoning, Memory, Computational Modeling

Marcelo Kallmann, *Associate Professor of Engineering.* Computer Animation, Agents, Robotics, Artificial Intelligence

Christopher Kello, *Associate Professor of Social Sciences, Humanities, and Arts.* Lexical Processing, Complex Systems, Computational Modeling

Paul Maglio, *Associate Adjunct Professor of Social Sciences, Humanities, and Arts.* Distributed cognition, Human-Computer Interaction, Service Science

Teenie Matlock, *Associate Professor of Social Sciences, Humanities, and Arts.* Psycholinguistics, Cognitive linguistics, Spatial Cognition, Human-computer Interaction

Shawn Newsam, *Assistant Professor of Engineering.* Computer Vision, Pattern Recognition, Machine Learning, Data Mining

Steve Nicholson, *Associate Professor of Social Sciences, Humanities, and Arts.* Political behavior, public opinion, voting and elections, political psychology

David Noelle, *Assistant Professor of Engineering and of Social Sciences, Humanities, and Arts.* Computational Cognitive Neuroscience, Cognitive Control, Artificial Intelligence

Michael Spivey, *Professor of Social Sciences, Humanities, and Arts.* Psycholinguistics, Visual Processing, Eye Tracking, Computational Modeling

Peter Vanderschraaf, *Associate Professor of Social Sciences, Humanities, and Arts.* Political Philosophy, Applied Ethics, Game Theory

Anthony Westerling, *Associate Professor of Engineering, Social Sciences, Humanities, and Arts.* Applied Climatology, Computational Modeling, Complex Systems, Spatial Analysis

Jeffrey Yoshimi, *Assistant Professor of Social Sciences, Humanities, and Arts.* Philosophy of Mind, Phenomenology, Neural Networks

■ ELECTRICAL ENGINEERING AND COMPUTER SCIENCE (EECS)

eecs.ucmerced.edu

Graduate studies in Electrical Engineering and Computer Science offers individualized, strongly research-oriented courses of study leading to the M.S. and Ph.D. degrees. The EECS graduate emphasis area is organized to allow students to pursue cutting edge research in modern fields of electrical engineering and computer science, emphasizing research and preparing students for leadership positions in industrial labs, government or academia.

The EECS graduate emphasis area is highly cross-disciplinary with connections to faculty from all three Schools at UC Merced. In particular, strong collaborations with the graduate programs in environmental engineering and cognitive sciences are possible.

Research projects with applications across the full spectrum of science and engineering are encouraged. Opportunities for collaborative projects with scientists at the Lawrence Livermore National Laboratory and with the Center for Information Technology Research in the Interest of Society (CITRIS) are available, particularly with respect to the use of specialized computational equipment.

Prospective applicants must hold the equivalent of a B.S. degree as determined by the university.

The principal requirements for the Ph.D. are (1) coursework, (2) the qualifying exam, and (3) the dissertation. To apply for the graduate studies in EECS, applicants must follow the application procedure of the UC Merced Graduate Division.

PROGRAM LEARNING OUTCOMES

1. Mastery of a broad and working knowledge of the principles of electrical engineering and computer science

2. An ability to apply knowledge of computing, mathematics, science and engineering to solve problems in multidisciplinary research

3. An ability to analyze a problem, and identify and define the hardware and software requirements appropriate to its solution

4. An ability to design and conduct experiments and numerical simulations of complex electrical, electronic and computer systems, to analyze, and interpret general scientific and engineering information

5. An ability to apply design and development principles in the construction and implementation of hardware and/or software systems of varying complexity to meet desired needs

6. An ability to continue to learn and use new techniques, skills, and engineering and scientific tools for research in electrical engineering and computer science

7. A dedication to advance engineering research to discover new knowledge, develop new methodologies, promote innovative thinking and research output in engineering and science

8. A high standard of professional and research ethics

9. An ability to communicate effectively with a range of technical audiences

PARTICIPATING FACULTY AND RESEARCH AREAS

Stefano Carpin, *Associate Professor of Engineering*. Robotics, artificial intelligence; Robotics Lab (robotics.ucmerced.edu/robotics)

Miguel Carreira-Perpinan, *Associate Professor of Engineering*. Machine learning with applications to computer vision and speech; computational neuroscience

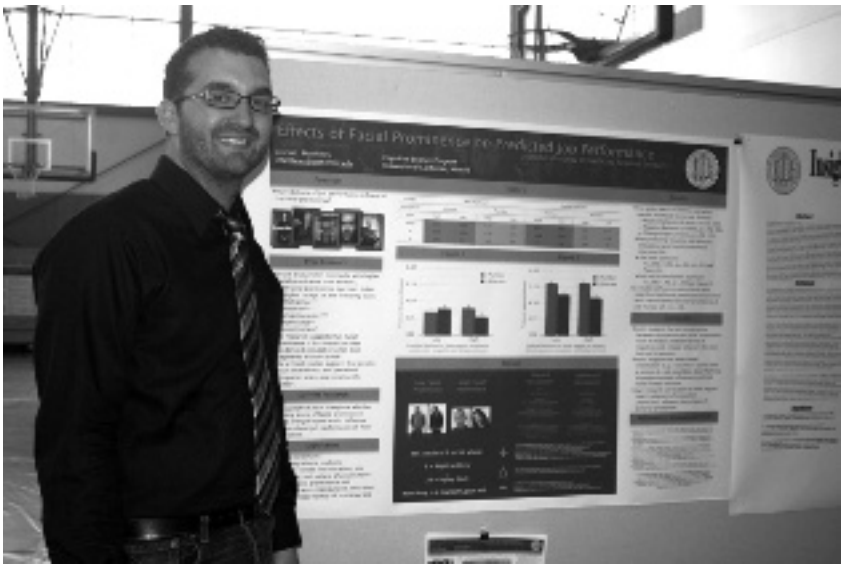
Alberto Cerpa, *Assistant Professor of Engineering.* Embedded networked systems of sensors, computer networks, distributed systems, operating systems

Marcelo Kallmann, *Associate Professor of Engineering.* Computer graphics, animation, robotics; Computer Graphics Lab (graphics.ucmerced.edu/)

Steve Kang, *Professor of Engineering.* Semiconductor devices and circuits, highspeed optoelectronic circuits and optical network systems, and nanoelectronics

Shawn Newsam, *Assistant Professor of Engineering.* Image processing, computer vision, pattern recognition, content-based image retrieval, geoinformatics, data mining

David Noelle, *Assistant Professor of Engineering and Social Sciences, Humanities and Arts.* Computational cognitive neuroscience, artificial neural networks, machine learning, artificial intelligence



Graduate student Justin Mattews winner of the 2009 Student Research Poster competitions, Graduate Student Division.

Florin Rusu, *Assistant Professor of Engineering*. Database Systems, Large Scale Data Management, Data Aggregation and Approximation Methods

Ming-Hsuan Yang, *Assistant Professor of Engineering.* Computer Vision, Pattern Recognition and Machine Learning

■ ENVIRONMENTAL SYSTEMS (ES)

es.ucmerced.edu
Contact: Professor Stephen Hart, *Chair of the Environmental Systems Graduate Program,* shart4@ucmerced.edu

The Environmental Systems graduate group engages in individualized, research-based courses of study leading to the M.S. and Ph.D. This program strives to equip students with the knowledge and skills to improve the scientific understanding of Earth as an integrated system of atmosphere, hydrosphere, lithosphere and biosphere. Courses are designed to provide the scientific principles underlying the function and sustainability of natural and engineered ecosystems, and the policies affecting them. Participating faculty are affiliated with the Schools of Engineering, Natural Sciences, and Social Sciences, Humanities and Arts.

UC Merced's unique geographical location, its relationship with neighboring institutions and its seamless integration of science and engineering render the ES program distinct from similar programs in California and elsewhere. In particular, a substantial part of UC Merced's initial development as a research institution has been the structuring of meaningful relationships with the National Park Service and the Lawrence Livermore National Laboratory, with a particular emphasis on joining scientific inquiry with engineering analysis.

The ES faculty research strengths include Earth systems science, ecology and evolutionary biology, spatial analysis, environmental engineering, air quality, geochemistry, solar energy, climatology, hydrology, policy and economics.

PROGRAM LEARNING OUTCOMES

The overarching goal of the ES program is that its graduates be knowledgeable and professionally competent in one or more areas of environmental systems. The following program learning outcomes are being used to attain this goal:

1. Core Knowledge - Graduates will be knowledgeable, skillful, and self-directed in the observation and analysis of environments systems in terms of their capacity to:

a. (M.S. graduates) Design experiments with appropriate controls and conduct original research, with an appropriate level of supervision, in the context of an M.S. project or thesis

b. (Ph.D. graduates) Independently identify important research questions, formulate experimental plans, data analysis, and formulation of conclusions in the context of a doctoral dissertation

2. Communication Skills - Graduates will be conversant in at least two area(s) of environmental systems, and be adept at oral, written, and visual communication of research results to peers and non-technical decision makers

3. Ethics, Community, and Lifelong Learning - Graduates will understand the importance of research and professional ethics, engagement in the needs of their community, and life long learning

4. Career Placement and Advancement - Graduates will find suitable career placement and achieve advancement in government agencies, non-government organizations, private industry, and academic teaching and research institutions

PARTICIPATING FACULTY AND RESEARCH AREAS

Andres Aguilar, *Assistant Professor of Natural Sciences*. Evolutionary genetics, molecular ecology and conservation biology in aquatic and terrestrial systems; genomic studies of speciation in rockfish

Roger Bales, *Professor of Engineering.* Mountain hydrology, climate and biogeochemistry; polar snow and ice; climate impacts and water resources

J. Michael Beman, *Assistant Professor of Natural Sciences*. Microbial ecology and biogeochemistry in marine, coastal and aquatic systems; microbial controls on marine biogeochemical cycles; biogeochemical and ecological responses to environmental variability and change

Asmeret Asefaw Berhe, *Assistant Professor of Natural Sciences*. Microbial ecology and biogeochemistry in marine, coastal and aquatic systems; microbial controls on marine biogeochemical cycles; biogeochemical and ecological responses to environmental variability and change

Elliot Campbell, *Assistant Professor of Engineering.* Sustainable bioenergy design, life cycle assessment, atmospheric chemical transport modeling, carbon cycle science, carbon-climate feedbacks and environmental data assimilation

Yihsu Chen, *Assistant Professor of Engineering and Social Sciences, Humanities and Arts.* Energy and environmental modeling; analyzing environmental systems using computational modeling, game theory, statistics, operations research, decision analysis and other quantitative techniques; policy and health effect analysis

Wei-Chun Chin, *Assistant Professor of Engineering.* Application of polymer physics and engineering for understanding natural phenomena, including material storage and release mechanisms of living cells and assembly networks in the ocean

Carlos Coimbra, *Associate Professor of Engineering.* Solar energy; stochastic, memory-intense behavior; fractional and variable-order mechanics; fluid-particle interactions in dilute suspensions; unsteady flows

Martha Conklin, P*rofessor of Engineering.* Biogeochemistry, metal cycling, surface water/shallow groundwater interactions, organic chemical distribution in soil and groundwater; chemical processes in snow, K-12 environmental education

Benoit Dayrat, *Assistant Professor of Natural Sciences.* Systematics

and evolution, from species to higher taxonomic levels, with special emphasis in species delineation, biological nomenclature, macro-evolutionary transitions and systematics theory

Michael Dawson, *Assistant Professor of Natural Sciences.* Origins, maintenance and loss of marine biodiversity from molecular to ecosystem levels; how biological diversity shapes, and is shaped by, the physical environment

Gerardo Diaz, *Assistant Professor of Engineering.* Energy conversion systems, dynamic simulation and control of thermal systems

Carolin Frank, *Assistant Professor of Natural Sciences.* Genome-enabled environmental and symbiotic microbiology, microbial genome evolution, community ecology of endophytes

Teamrat Ghezzehei, *Assistant Professor of Natural Sciences.* Development and evolution of soil structure, soil-root interactions, unsaturated flow in soils and fractured rocks; imaging for porous media characterizations (X-ray micro-CT, digital microscopy and SEM)

Qinghua Guo, *Assistant Professor of Engineering.* Geographic information science, remote sensing, spatial analysis, statistical learning methods, environmental modeling, climate change and terrestrial ecosystems

Thomas Harmon, *Professor of Engineering.* Physical and chemical processes in soil, groundwater and aquatic systems; distributed sensing with respect to non-point source pollution and habitat quality

Stephen Hart, *Professor of Natural Sciences and Chair of the Environmental Systems Graduate Program.* Terrestrial microbial and ecosystem ecology with an emphasis on plant-soil interactions and the impacts of fire, management and climatic change on forest ecosystems

Lara Kueppers, *Assistant Professor of Natural Sciences.* Ecological responses and feedbacks to climate change, species composition and ecosystem function, regional climate models, land-cover and land-use change, interdisciplinary research strategies and climate change policy

Valerie Leppert, *Associate Professor of Engineering.* Electron microscopy, nanomaterials for application in technology and the environment

Monica Medina, *Associate Professor of Natural Sciences.* Phylogenetics and organelle genome evolution of marine invertebrate animals, the genomics of coral-zooxanthellae symbioses in Caribbean reefs, molecular and genomic techniques to study marine environments

Peggy O'Day, *Professor of Natural Sciences.* Environmental geochemistry; reaction, cycling, and transport of inorganic contaminants; geochemical applications of spectroscopy and microscopy, particularly synchrotron X-ray methods; novel contaminant remediation methods for soils and sediments

Wolfgang Rogge, *Associate Professor Engineering.* Air pollution engineering and science; release, transport, transformation and fate of air pollutants; determination of specific source contributions using molecular marker methods

Samuel Traina, *Professor of Natural Sciences and Engineering; Vice Chancellor for Research and Dean, Graduate Division.* Chemical transformations of pollutants; linkages between chemical form or speciation of pollutants and their relative toxicities; roles of geoparticle surfaces and bacteria in pollutant fate

Anthony Westerling, *Associate Professor of Engineering and Social Sciences, Humanities and Arts*. Applied climatology, climate-ecosystem-wildfire interactions, statistical modeling for seasonal forecasts; paleofire reconstructions and climate change impact assessments; resource management and policy

Roland Winston, *Professor of Natural Sciences and Engineering*. Solar power and renewable energy, elementary particle physics, non-imaging optics

Jeff Wright, *Professor Engineering.* Advanced modeling and information technologies to improve water resources and environmental management; design and implementation of computer-based spatial decision support systems for engineering and management

■ MECHANICAL ENGINEERING AND APPLIED MECHANICS (MEAM)

meam.ucmerced.edu
Program Chair: Carlos F. M. Coimbra, ccoimbra@ucmerced.edu
Admissions Chair: Jian Q. Sun, jsun3@ucmerced.edu

The Mechanical Engineering and Applied Mechanics (MEAM) graduate emphasis engages in individualized, research-based programs of study leading to the M.S. and Ph.D. degrees. The MEAM faculty members strive to provide students with a comprehensive research experience based on the latest developments of the analytical, numerical and experimental tools available in the field. Mechanical Engineering and Applied Mechanics includes a broad spectrum of research activities that are based on well-defined scientific principles. Judicious application of the fundamental principles of Mechanics allows specialized Mechanical Engineers and Applied Mechanicists to impact virtually all fields of science and technology. The goal of the MEAM emphasis at UC Merced is to provide its graduate students with a very solid foundation in Mechanical Sciences and a strong and comprehensive exposure to modern research techniques.

Courses are designed to provide the mathematical and scientific principles underlying the foundations of Applied Mechanics, with emphasis on applications and novel research developments in diverse topics such as Advanced Dynamics, Modern Control Systems, Continuum Mechanics, Viscous Flows, Rheology, Radiative Transfer, etc. The MEAM graduate program provides a seamless transition for undergraduate students interested in pursuing graduate studies in these areas.

The current MEAM faculty research strengths include:

- Continuum Mechanics
- Thermodynamics (Optimal Design, Low-Entropy Generating Systems)
- Heat Transfer (Radiative Transfer, Evolutionary Design of Thermal Systems)
- Fluid Mechanics (CFD, Sedimentation, Unsteady Viscous Flows, Microfluidics)
- Solid Mechanics and Mechanical Design (Motion Planning, Geometric Modeling)
- Robotics, Mechanisms and Artificial Intelligence
- Bio-Inspired Technologies
- Rheology, Polymers
- Vibration and Control
- Solar and Wind Energy
- Molecular Dynamics

PROGRAM LEARNING OUTCOMES

1. Mastery of a broad and working knowledge of the principles of mechanical engineering and applied mechanics

2. An ability to apply advanced concepts of mathematics, science, and engineering to solve problems in multidisciplinary research

3. An ability to design and conduct experiments and numerical simulations of complex mechanical systems, to analyze, and interpret general scientific and engineering information

4. An ability to design and analyze advanced systems, components, and processes in their professional practice

5. An ability to continue to learn and use new techniques, skills, and

PEOPLE HERE MAKE ME FEEL AT HOME. IT'S FAMILY. FRIENDS I'VE MADE HERE ARE FRIENDS THAT I WILL KEEP THROUGHOUT MY LIFE.

—Jennifer Tseng, Torrance, Management Major

engineering and scientific tools for research in mechanical engineering and applied mechanics

6. A dedication to advanced engineering research to discover new knowledge, develop new methodologies, promote innovative thinking and research output in engineering and science

7. A high standard of professional ethics

8. An ability to communicate effectively

PARTICIPATING FACULTY:

Francois Blanchette, *Assistant Professor of Natural Sciences*
Stefano Carpin, *Associate Professor of Engineering*
Carlos Coimbra, *Associate Professor of Engineering, Chair*
Lilian Davila, *Assistant Professor of Engineering*
Gerardo Diaz, *Assistant Professor of Engineering*
Ajay Gobinathan, *Assistant Professor of Natural Sciences*
Marcelo Kallman, *Associate Professor of Engineering*
Yanbao Ma, *Assistant Professor of Engineering*
Michael F. Modest, *Professor of Engineering*
Jian Qiao Sun, *Professor of Engineering*
Roland Winston, *Professor of Engineering and Natural Sciences*

■ PHYSICS AND CHEMISTRY

physics-chemistry.ucmerced.edu
Contact: Professor Anne Myers Kelley, amkelley@ucmerced.edu (Chemistry); Professor Linda Hirst, lhirst@ucmerced.edu (Physics)

Research in the Physics and Chemistry graduate emphasis area spans the traditional disciplines of chemistry and physics and related interdisciplinary fields. Graduate education within the group is currently divided into three tracks—Physics, Physical Chemistry, and Organic Chemistry—which have different preliminary exams and course work. Thus, students are educated and must demonstrate proficiency in a particular discipline, but have the opportunity to pursue research that is highly interdisciplinary if they so desire. This approach provides our students with both the rigorous training and the broad perspectives needed to address present-day scientific and technological challenges, most of which are not confined to single disciplines. Most students are admitted to the Physics and Chemistry program to work toward a Ph.D. degree, but applications from students whose goal is a terminal M.S. degree will also be considered.

The deadline for receipt of applications is January 15. Late applications are considered as space permits. Normally applications are accepted for Fall semester only. The minimum requirement admission to the Physics and Chemistry program is a bachelor's degree in physics, chemistry, or a related field of science or engineering with a grade point average of at least 3.0. The GRE general test is required and the subject test in physics, chemistry, or mathematics is recommended. Admission decisions are based on undergraduate grades, performance on the GRE, accomplishments in undergraduate research, and letters of recommendation. Students from non-English speaking countries must take the TOEFL exam and are normally interviewed by telephone in order to evaluate English proficiency.

During the first year in residence, students typically take courses and serve as TAs for undergraduate science courses. The heart of the Physics and Chemistry Ph.D. program is the completion of a piece of original scientific research leading to the preparation and defense of a Ph.D. dissertation. Students are encouraged to discuss research interests and possible Ph.D. projects with all of the faculty in the group as early as possible, and select a faculty research advisor (major professor) early during the second semester of study. Research normally occupies a majority of the student's time after the first year in residence.

The Physics and Chemistry group has established the following requirements for the Ph.D. degree:

- Complete at least four semesters of full-time academic residence (12 units minimum) at UC Merced.
- Complete the required courses for one of the three emphasis tracks (physics, physical chemistry, or organic chemistry), with a letter grade of at least "B" in each course ("S" in seminar courses graded S/U).
- Serve as a teaching assistant for at least one semester.
- Pass a preliminary examination testing undergraduate level knowledge of physics, physical chemistry, or organic chemistry.
- Pass an oral Ph.D. qualifying examination, normally taken during the second year in residence.
- Present an open technical seminar at least once each calendar year in residence (organic chemistry and physical chemistry emphasis tracks only).
- Present and successfully defend a doctoral dissertation containing an original contribution to knowledge in the field.

PROGRAM LEARNING OUTCOMES

Chemistry Doctoral Program Learning Outcomes

Graduates of the chemistry Ph.D. program will:

1. Possess the fundamental knowledge needed to understand and critically evaluate current research in their chosen subfield of chemistry.

2. Be proficient in laboratory, theoretical, and/or computational techniques necessary to contribute to knowledge in their chosen subfield of chemistry.

3. Communicate fundamental concepts in their field as well as their own research effectively, in both written and oral form, to expert and non-expert audiences.

4. Identify new research opportunities, plan effective strategies for pursuing these opportunities, and conduct research that makes a new contribution to knowledge in their chosen subfield of chemistry.

Physics Doctoral Program Learning Outcomes

Graduates of the Physics Ph.D. program will:

1. Possess a broad foundation in the fundamentals of Physics, and a deep understanding of their chosen subfield, that will permit them to understand and critically evaluate current research.

2. Have sufficient laboratory, theoretical, and/or computational skills necessary to contribute to knowledge in their chosen subfield.

3. Identify new research opportunities, plan effective strategies for pursuing these opportunities, and conduct research that makes a new contribution to knowledge in their chosen subfield of Physics.

4. Be able to communicate fundamental concepts of Physics as well as details of their own research, in both written and oral form, to expert and non-expert audiences.

PARTICIPATING FACULTY AND RESEARCH AREAS

Raymond Chiao, *Professor Emeritus of Engineering and Natural Sciences*. Nonlinear and quantum optics, experiment and theory; gravitational radiation

Sayantani Ghosh, *Assistant Professor of Natural Sciences.* Experimental condensed matter physics including correlated magnetic systems, quantum information processing, nano-scale self-assembly, and hybrid photovoltaics

Ajay Gopinathan, *Assistant Professor of Natural Sciences.* Theoretical biophysics and soft condensed matter physics

Erin Johnson, *Assistant Professor of Natural Sciences.* Development and applications of density-functional theory

Anne Kelley, *Professor of Natural Sciences.* Linear and nonlinear laser Raman scattering, experiment and theory; organic nonlinear optical materials; nanoplasmonics and surface enhanced spectroscopies

David Kelley, *Professor of Natural Sciences.* Ultrafast dynamics and spectroscopy of semiconductor nanoparticles and solar energy conversion

Valerie Leppert, *Associate Professor of Engineering.* Electron microscopy of technological and environmental nanomaterials

Linda Hirst, *Associate Professor of Natural Sciences.* Experimental soft condensed matter physics, with interests in both biophysics and liquid crystal materials

Andy LiWang, *Associate Professor of Natural Sciences.* Structural and biochemical basis of rhythmicity of the cyanobacterial circadian clock

Jennifer Lu, *Assistant Professor of Engineering.* Synthesis of novel functional nanomaterials employing self-assembled macromolecules as templates; applications in biosensing and renewable energy

Erik Menke, *Assistant Professor of Natural Sciences.* Materials chemistry directed toward solar energy capture and storage as chemical fuels

Matthew Meyer, *Associate Professor of Natural Sciences.* Organic reaction mechanism with a focus on developing new methods for studying pharmaceutically-relevant asymmetric reactions

Kevin Mitchell, *Associate Professor of Natural Sciences.* Nonlinear dynamics and classical/quantum chaos, with applications to atomic and molecular physics

Michael Scheibner, *Assistant Professor of Natural Sciences.* Light-matter interactions, nanostructured materials, coupled quantum systems, quantum information

Jay E. Sharping, *Assistant Professor of Natural Sciences*. Ultrafast laser technology and applications in physics, chemistry, and biology

Lin Tian, *Assistant Professor of Natural Sciences.* Theoretical quantum optics, quantum coherence effects in condensed matter systems, and quantum information

Meng-Lin Tsao, *Assistant Professor of Natural Sciences*. Bioorganic chemistry, chemical biology, protein chemistry and vaccine technology

Christopher Viney, *Professor of Engineering.* Biomolecular materials; physical science and engineering of polymers and liquid crystals

Roland Winston, *Professor of Engineering and Natural Sciences.* Solar power and renewable energy; elementary particle physics; nonimaging optics

Tao Ye, *Assistant Professor of Natural Sciences.* Scanning probe microscopy study of interfaces; nanoscale machines on surfaces; single molecule analysis of biopolymers

■ PSYCHOLOGICAL SCIENCES (PSY)

psychology.ucmerced.edu
Contact: William Shadish, *Chair* (wshadish@ucmerced.edu)

Psychological Sciences cover a broad array of approaches to the study of both basic and applied problems. Psychological Sciences at UC Merced focuses on three of those approaches--Developmental Psychology, Health Psychology, and Quantitative Psychology--culminating in the Doctor of Philosophy degree in Psychological Sciences. Training begins with five core courses, two in statistics, one in methodology, and two in a year-long professional seminar designed to introduce students to the field. Along the way to degree completion, the student will complete at least seven additional courses, an empirical pre-candidacy project (by end of second year), a candidacy portfolio (by end of third year), and a dissertation. Students entering the program with a bachelor's degree are expected to complete the doctoral degree in five years on average. Students entering with prior graduate coursework may take less time. We do not admit students unless we expect to support them with teaching or research assistantships while they are in the program, contingent on acceptable progress.

We accept and train students who wish to pursue careers in research. We do not offer training in clinical psychology or related fields like counseling or school psychology. Graduates of the Psychological Sciences doctoral program will find a wide variety of careers and ongoing study opportunities. Settings will include academia and other university research positions, federal and state government research positions, school systems, hospitals and other medical settings, and private sector employers. Many graduates may pursue postdoctoral fellowships to help prepare them further for employment.

PROGRAM LEARNING OUTCOMES

1. Core Knowledge: Graduate students will demonstrate advanced knowledge in a specialized area of Psychological Sciences of their choosing.

2. Statistics and Methods: Graduate students will demonstrate skills in the use the basic data gathering methods statistical techniques used for typical analyses in conducting research in the Psychological Sciences.

3. Pedagogy: Graduate students will participate in classroom pedagogy used in undergraduate education.

4. Writing: Graduate students will produce written communications of the quality and in the style expected in Psychological Science.

5. Professionalism: Graduate students know and participate in the intellectual and organizational aspects of the profession of psychology.

6. Independent Research: Graduate students will conduct independent research resulting in an original contribution to knowledge in Psychological Sciences, including all steps from generating an original question to writing a manuscript describing all aspects of the study.

PARTICIPATING FACULTY AND RESEARCH AREAS

Linda Cameron, *Professor of Social Sciences, Humanities and Arts.* Self-regulation model of cognition, emotion, and behavior; theoretical and applied issues addressing the dual goals of refining psychological theory and improving health.

Michelle Chouinard, *Assistant Professor of Social Sciences, Humanities and Arts.* The role that adult-child conversation plays in children's cognitive development.

Yarrow Dunham, *Assistant Professor of Social Sciences, Humanities and Arts.* Children's acquisition of social and cultural knowledge, specifically, children's understanding of social groups, social hierarchies, and ritualized aspects of cultural knowledge.

Michael Hoyt, *Assistant Professor of Social Sciences, Humanities and Arts.* Biobehavioral processes related to psychological adjustment and coping in the context of chronic disease and health-related adversity.

Rose Scott, *Assistant Professor of Social Sciences, Humanities and Arts.* Cognitive development, Language acquisition, and Psychological reasoning in infants and young children.

William Shadish, *Professor of Social Sciences, Humanities and Arts.* Experimental and quasi-experimental design and data analysis, meta-analysis.

Anna Song, *Assistant Professor of Social Sciences, Humanities and Arts.* Adolescent and young adult decision-making as it pertains to risk behaviors such as tobacco use or risky sexual behavior.

Jack Vevea, *Associate Professor of Social Sciences, Humanities and Arts.* Meta-analysis, including random- and mixed-effects statistical models and publication bias; item response theory.

Jan Wallander, *Professor of Social Sciences, Humanities and Arts.* Health psychology and developmental psychopathology, interactions between behavior and health in children and adolescents, effects of chronic disease or disability on quality of life in childhood, behavioral interventions to improve health and quality of life in children and adolescents.

Affiliated Faculty

Paul Brown, *Professor.* Health inequalities and health disparities across a broad range of disease states and at-risk populations

Rudy Ortiz, *Associate Professor.* The regulation of kidney function and metabolism in a variety of animal models, including seals and dolphins, with the intent that the data will have translative value to clinical medicine

Evan Heit, *Professor of Social Sciences, Humanities and Arts.* Psychology and cognitive science, focusing on reasoning, memory and categorization

Michael Spivey, *Professor of Social Sciences, Humanities and Arts.* Interaction between language and vision, sentence processing, word recognition, visual attention, visual memory, eye movements, computational modeling

■ QUANTITATIVE AND SYSTEMS BIOLOGY (QSB)

qsb.ucmerced.edu
Contact: Associate Professor Andy LiWang
aliwang@ucmerced.edu

The Quantitative and Systems Biology Program takes advantage of advances in techniques and theory that bridge molecular and ecosystems scales and that have greatly enabled the potential for integration across the life sciences. Biologists' ability to gather and process large amounts of quantitative data in field and laboratory settings, is advancing hand-in-hand with theory and modeling that better explain the diversity of life on Earth. The Quantitative and Systems Biology Graduate Program at UC Merced provides individualized, research-based courses of study leading to M.S. and Ph.D. degrees. Research projects are available on diverse topics including: 1) biomolecular interactions, 2) genomics and proteomics, 3) cellular interactions and signal transduction, 4) organ systems and whole animals (both vertebrate and invertebrate), 5) comparative ecology, evolution, and organismal biology, and 6) computational biology. Because of the interdisciplinary nature of the program and faculty, research projects often span multiple topics to address more complex questions and linkages across levels of biological scale (e.g. molecules, cells, organisms, communities) typical of systems biology and quantitative biology (e.g. measuring individuals to describe populations). Course work in this graduate program provides a background in the tools of modern biology, including computational biology, genomics and advanced instrumentation. The Quantitative and Systems Biology Program offers particular opportunities for students interested in multidisciplinary projects at the interface of biology, computer science and bioengineering. Career opportunities for graduates include exciting research positions in government and industry, as well as academic positions at colleges and universities.

GREAT MINDS THINK ALIKE, THAT'S WHY THEY'RE AT UC MERCED.

—Julia Zhou, San Jose, Cognitive Science Major

Prospective applicants can view instructions on how to apply for graduate studies in QSB at the website, qsb.ucmerced.edu.

Graduate students in the Ph.D. program typically spend the first year taking courses, fulfilling their teaching requirement, and working on their graduate research project. The subsequent years will be primarily devoted to the student's graduate research project. Typically, a graduate student spends five years to complete their research project. Students are supported by Teaching Assistantships during the first year, and by Graduate Student Research Positions in subsequent years.

The Quantitative and Systems Biology graduate program has established the following requirements for the Ph.D. degree. Students must:

- Complete at least four semesters of full-time academic residence (12 units minimum) at UC Merced.
- Complete at least three QSB graduate courses worth at least 3 units (exclusive of research), plus additional coursework described in the QSB Policies & Procedures, with an S or a letter grade of at least B–; at least one course must be chosen among QSB 280, 281, 282 or any other qualifying quantitative biology course as determined by the QSB Educational Policy Committee (EPC), and at least one course must be chosen among QSB 215, 290, 297, or any other qualifying systems biology course as determined by the EPC.
- Maintain an overall GPA of 3.0, and semester GPAs not below 3.0 for two consecutive semesters.
- Serve as a Teaching Assistant (TA) for at least one semester, or equivalent.
- Pass a qualifying exam that includes both a written and oral component.
- Present an open technical seminar at least twice while in residence.
- Submit at least one scientific manuscript for peer-reviewed publication.
- Present and successfully defend a doctoral dissertation containing an original contribution to knowledge in the field.

For the MS degree Track I (Thesis-Based), students must:

- Complete at least two semesters of full-time academic residence (12 units minimum) at UC Merced.
- Complete at least two QSB graduate courses worth at least 3 units (exclusive of research), plus additional coursework described in the QSB Policies & Procedures, with an S or a letter grade of at least B–; at least one course must be chosen among QSB 280, 281, 282 or any other qualifying quantitative biology course as determined by the QSB Educational Policy Committee (EPC), and at least one course must be chosen among

QSB 215, 290, 297, or any other qualifying systems biology course as determined by the EPC.

- Complete at least 24 units of upper-division and graduate coursework with a cumulative grade-point average of at least 3.0, and a semester GPA not below 3.0 for two consecutive semesters. At least 18 units must be graduate-level coursework.
- Prepare an acceptable thesis describing original research in the field and successfully defend thesis to thesis committee.

For the MS degree Track II (Course-Based), students must:

- Complete at least two semesters of full-time academic residence (12 units minimum) at UC Merced.
- Complete at least three QSB graduate courses worth at least 3 units (exclusive of research), plus additional coursework described in the QSB Policies & Procedures, with an S or a letter grade of at least B–; at least one course must be chosen among QSB 280, 281, 282 or any other qualifying quantitative biology course as determined by the QSB Educational Policy Committee (EPC), and at least one course must be chosen among QSB 215, 290, 297, or any other qualifying systems biology course as determined by the EPC.
- Complete at least 32 units of upper-division and graduate course work with a cumulative grade-point average of at least 3.0, and a semester GPA not below 3.0 for two consecutive semesters. At least 24 units must be graduate level, and no more than 4 units may be Graduate Research QSB 295 or equivalent.
- Pass a comprehensive examination with both a written and oral component administered by the faculty committee. This examination will test the student's understanding of the main concepts in the field at the graduate level.

PROGRAM LEARNING OUTCOMES

Doctoral Program Learning Outcomes

1. Quantitative and Systems Biology Skill (QB/SB)–Knowledge and understanding of quantitative (statistical, computational, and model-dependent) and high-throughput experimental systems approaches to biological problems, and demonstrated ability to conceive, plan, execute and/or interpret the applications of these approaches to research questions.

2. Ethics–Knowledge and understanding of ethical standards in proposing and executing professional scientific research.

3. Teaching/Communication–Ability to effectively assist in the teaching of science in a classroom environment, and engage in effective communication of original and existing scientific inquiry and results orally and in writing.

4. Scholarship–Ability to undertake and demonstrate original graduate-level scholarship in specialized areas of biology, including integrative command of historical and current literature and broader scientific context, and identification of open research problems.

5. Research Ability–Ability to propose and defend a feasible research plan to apply scientific techniques to open research problems and execute, complete and defend original research that advances scientific knowledge.

Masters Program Learning Outcomes (Plan 1 – Thesis)

1. Quantitative and Systems Biology Skill (QB/SB)–Knowledge and understanding of quantitative (statistical, computational, and model-dependent) and high-throughput experimental systems approaches to biological problems.

2. Ethics–Knowledge and understanding of ethical standards in proposing and executing professional scientific research.

3. Communication–Ability to effectively engage in effective communication of original and existing scientific inquiry and results orally and in writing.

4. Scholarship–Ability to demonstrate graduate-level scholarship in specialized areas of biology, including command of relevant literature.

5. Research Ability–Ability to execute and defend original research that contributes to knowledge in the relevant field of biology.

Masters Program Learning Outcomes (Plan II – Non-Thesis)

1. Quantitative and Systems Biology Skill (QB/SB)–Knowledge and understanding of quantitative (statistical, computational, and model-dependent) and high-throughput experimental systems approaches to biological problems.

2. Ethics–Knowledge and understanding of ethical standards in proposing and executing professional scientific research.

3. Communication–Ability to engage in effective communication of original and existing scientific inquiry and results orally and in writing.

4. Scholarship–Ability to undertake and demonstrate original graduate-level scholarship in specialized areas of biology, including command of historical and current literature and broader scientific context, identification of open research problems, and identification of feasible techniques to approach those problems.

PARTICIPATING FACULTY AND RESEARCH AREAS

Andres Aguilar, *Assistant Professor of Natural Sciences.* Population genetics and molecular evolution

Keith Alley, *Professor of Natural Sciences.* Developmental neuroscience

David Ardell, *Assistant Professor of Natural Sciences.* Computational biology of gene expression systems

Miriam Barlow, *Assistant Professor of Natural Sciences.* Evolution of bacteria

Michael Beman, *Assistant Professor.* Microbial geochemistry

Wei-Chei Chun, *Assistant Professor of Engineering.* Applying engineering principles to biological systems

Jinah Choi, *Assistant Professor of Natural Sciences.* Molecular biology of hepatitis C virus

Michael Cleary, *Assistant Professor of Natural Sciences.* Determinants of stem cell fate

Michael Colvin, *Professor of Natural Sciences.* Biomolecular simulations

Michael Dawson, *Assistant Professor of Natural Sciences.* Ecology and evolution, marine biodiversity and biogeography

Benoit Dayrat, *Assistant Professor of Natural Sciences.* Evolution of mollusks

Ariel Escobar, *Professor of Engineering.* Cardiac cellular signaling

Henry J. Forman, *Professor of Natural Sciences.* Biochemistry of reactive oxygen species

Carolin Frank, *Assistant Professor of Natural Sciences.* Microbial genome evolution

Marcos Garcia-Ojeda, *Assistant Professor of Natural Sciences.* Stem cell development

Ajay Gopinathan, *Assistant Professor of Natural Sciences.* Modeling of cell motility and biopolymers

BEING AT UC MERCED MAKES ME FEEL LIKE I AM A PART OF UC HISTORY.

—Mary Panos, student

Stephen C. Hart, *Professor of Natural Sciences.* Biogeochemical processes and productivity in managed and wildland terrestrial ecosystems

Linda Hirst, *Associate Professor of Natural Sciences.* Experimental soft condensed matter physics, with interests in both biophysics and liquid crystal materials

Andy LiWang, *Associate Professor of Natural Sciences.* Nuclear magnetic resonance spectroscopy

Patricia LiWang, *Professor of Natural Sciences.* Chemokine structure and function

Gaby Loots, *Assistant Adjunct Professor of Natural Sciences.* Limb and skeletal development, genetics of bone metabolism, and transcriptional regulatory networks in vertebrates

Jennifer Manilay, *Assistant Professor of Natural Sciences.* Mechanisms of lymphocyte development

Kara McCloskey, *Assistant Professor of Engineering.* Tissue engineering

Monica Medina, *Associate Professor of Natural Sciences.* Evolution of marine invertebrate animals

David Ojcius, *Professor of Natural Sciences.* Intracellular pathogens of epithelial cells

Rudy Ortiz, *Associate Professor of Natural Sciences.* Physiology & endocrinology of cardiovascular and renal function and disease, and nutrition

Nestor Oviedo, *Assistant Professor of Natural Sciences.* Tissue regeneration, stem cells, cancer, and planarian biology

Meng-Lin Tsao, *Assistant Professor of Natural Sciences.* Organic synthesis, protein engineering, bioconjugation

Christopher Viney, *Professor of Engineering.* Biomolecular materials

■ SOCIAL AND COGNITIVE SCIENCES

scsgrad.ucmerced.edu
Contact: Mitch Ylarregui, Graduate Program Coordinator
mylarregui@ucmerced.edu

The graduate emphasis in Social and Cognitive Sciences offers individualized, research-based training. In four tracks (described in detail below): anthropology, economics, political science, and sociology. Students are educated in a particular discipline, but have the opportunity to engage in interdisciplinary research and collaboration if they so desire.

The deadline for applications is January 15th. Normally applications are accepted for Fall semester only. Applicants are encouraged to contact SS faculty before applying as fit with existing research programs is integral for admission. Applicants must provide evidence of an undergraduate grade point average no lower than 3.0 on a 4.0 scale. Additionally, GRE scores, letters of recommendation, and a statement of purpose will be evaluated by the admissions committee as determinants of an applicant's potential for success in graduate education. Foreign students from non-English speaking counties must also take the TOEFL and TSE exams. Most students are admitted to SS to work toward a Ph.D. degree, but applications from students whose goal is a terminal M.A. degree may be considered.

PROGRAM LEARNING OUTCOMES

The Social and Cognitive Sciences graduate group has established the following program learning outcomes:

- A comprehensive, graduate-level understanding of processes, theories, and empirical regularities in the student's chosen track (anthropology, economics, political science, or sociology).
- Competency with contemporary social science methods used to conduct rigorous social scientific research.
- Effective scientific communication skills, especially the ability to convey complex concepts and information in a clear and concise manner.
- The ability to initiate and conduct independent research that makes an original contribution to knowledge of a quality that can be published in a peer reviewed outlet.

ANTHROPOLOGY

This track explores contemporary and historical cultures, societies and people by studying the practices and processes that entwine the individual in their natural and cultural environments, social structures, social relations, and power dynamics. Areas of focus include adaptation, health and nutritional status, migration, demography, identity, culture and citizenship, and globalization. Geographical areas of focus include Brazil, California, Great Basin, El Salvador, Himalayas, Mesoamerica.

Faculty: Aldenderfer, DeLugan, Hull, Moyes, Rebhun.

ECONOMICS

This track provides training in such applied microeconomic fields as environmental economics, political economy, industrial organization, public economics, law and economics, and economic history.

Faculty: Innes, Kantor, Neumann, Whalley, Winder.

POLITICAL SCIENCE

This track provides training in quantitative approaches to political science. Students select between two substantive tracks: political cognition and behavior (CAB) and political institutions and political economy (PIPE). In addition, all students are required to take a core methods sequence including research design, introductory regression, and advanced regression analysis as well as a research practicum. Exams are given following the first and third years of course work. The political science track will become a stand-alone PhD program in coming years.

Faculty: Hansford, Hibbing, Huang, Monroe, Nicholson, Trounstine.

SOCIOLOGY

The sociology track offers training in three primary areas of specialization: inequality (race, class, gender and sexuality); political sociology and social movements; and organizations and institutions.

Faculty: Almeida, Beattie, Dodson, Hamilton, Van Dyke, Weffer

PARTICIPATING FACULTY AND RESEARCH AREAS:

Mark Aldenderfer, *Professor of Social Sciences, Humanities and Arts.* Archaeology, origins of settled village life, human adaptation to high altitude environments, hunting and gathering, early plant and animal domestication, Himalayas

Paul Almeida, *Associate Professor of Social Sciences, Humanities and Arts.* Political sociology, social movements, and globalization

Irenee Beattie, *Assistant Professor of Social Sciences, Humanities and Arts.* Sociology of education, racial/ethnic and gender inequality, law and social policy, adolescent transitions to adulthood

Robin Maria DeLugan, *Assistant Professor of Social Sciences, Humanities and Arts.* Collective identity, social memory, the nation-state, migration and transnational practices, hemispheric perspectives on the Americas, Indigenous peoples' issues

Kyle Dodson, *Assistant Professor of Social Sciences, Humanities and Arts.* Political sociology, social movements, quantitative methodology, social change, and social stratification

Laura Hamilton, *Assistant Professor of Social Sciences, Humanities and Arts.* Sociology of gender, education, family, sexuality, and social inequality

Tom Hansford, *Associate Professor of Social Sciences, Humanities and Arts.* Political institutions, judicial politics, campaigns and elections, statistical modeling

Matthew Hibbing, *Assistant Professor of Social Sciences, Humanities and Arts.* Political behavior, public opinion, political psychology, and biology and politics

Haifeng Huang, *Assistant Professor of Social Sciences, Humanities and Arts.* Comparative politics, formal theory, news media, institutions and institutional change, Chinese politics

Kathleen Hull, *Assistant Professor of Social Sciences, Humanities and Arts.* Anthropological archaeology, colonialism, demographic anthropology, identity and ethnogenesis, Indigenous people

Robert Innes, *Professor of Social Sciences, Humanities and Arts.* Microeconomic theory, industrial organization, finance, agricultural policy, environmental economics, and law and economics

Shawn Kantor, *Professor of Social Sciences, Humanities and Arts.* Political economy, law and economics, public economics, U.S. economic history

Nathan Monroe, *Associate Professor of Social Sciences, Humanities and Arts.* American politics, political institutions, legislative politics, legislative elections, research design, positive political theory

Holley Moyes, *Assistant Professor of Social Sciences, Humanities and Arts.* Archaeology, religion, cave archaeology, dynamics of complex societies, spatial cognition, geographic information systems, Mesoamerica

Todd Neumann, *Assistant Professor of Social Sciences, Humanities and Arts.* Applied microeconomics, industrial organization, program evaluation, and economic history with a focus on the history of the American retail industry

Stephen Nicholson, *Associate Professor of Social Sciences, Humanities and Arts.* Political behavior, public opinion, voting and elections, political psychology, and direct democracy

Linda-Anne Rebhun, *Associate Professor of Social Sciences, Humanities and Arts.* Medical anthropology. Maternal and child health; Psychological Anthropology. Emotions, romance; Gender; religion. magic, witchcraft, folk Catholicism; Folklore; Latin America, African Diaspora, Africa

Jessica Trounstine, *Assistant Professor of Social Sciences, Humanities and Arts.* Local politics, elections, political institutions, political parties, mixed-methods

Nella Van Dyke, *Associate Professor of Social Sciences, Humanities and Arts.* Political Sociology/Social Movements; Hate Crime; Gender and Sexuality

Simon Weffer-Elizondo, *Assistant Professor of Social Sciences, Humanities and Arts.* Social stratification, social movements, racial/ethnic relations, political sociology, immigration

Alexander Whalley, *Assistant Professor of Social Sciences, Humanities and Arts.* Public economics, political economy, economics of education, and economic history

Katie Winder, *Assistant Professor of Social Sciences, Humanities and Arts.* Labor economics, applied econometrics, economics of gender, poverty

■ WORLD CULTURES (WC)

wcgrad.ucmerced.edu
Contact: Mitch Ylarregui, *Graduate Program Coordinator*
mylarregui@ucmerced.edu

The interdisciplinary graduate study in World Cultures focuses on the ways in which human beings conceive, express, and enact their situations in and relations to societies from the local to the global. In this endeavor, the World Cultures Graduate Group simultaneously embraces emerging trends in the scholarly world, while it harkens back to the holistic approach to knowledge common in the Renaissance. The interdisciplinary framework reconnects areas of study that have drifted apart even as their critical structures have shared basic tools and areas of inquiry ¬fields ranging from history and literature to art, anthropology, philosophy, and religion. Students will understand and use methods by which historians, literary scholars, anthropologists, artists, philosophers, and other humanists and social scientists examine societies and cultures. At the same time, students will critically examine theories of identity, culture, and society shared by scholars in multiple academic fields that create intellectual bridges for interdisciplinary inquiry. The World Cultures Graduate Group thus provides a broad intellectual context in which to locate societies and cultures over time and space. The objective is to train scholars who are able to work within or beyond the academy in particular disciplines and, simultaneously, to acknowledge and create interdisciplinary frameworks for study of complex human systems and constructs.

The approved emphasis in World Cultures under the Individual Graduate Program (IGP) offers courses of study leading to either a Masters of Arts (M.A.) or Doctor of Philosophy (Ph.D.) degree within the IGP at UC Merced. Drawing on the expertise and interests of affiliated faculty, both M.A. and Ph.D. students develop individualized, research-based courses of study that encompass traditional seminar instruction, individual directed study, and independent research. Students may either define their research around an interdisciplinary problematic or in primarily disciplinary terms with a wider lens. Thus, the World Cultures Graduate Group offers a unique framework in which to approach core disciplines of scholarly study, one that emphasizes an understanding of how similar issues and topics are addressed in multiple fields.

PROGRAM LEARNING OUTCOMES

- Become proficient in research methods appropriate to the study of world cultures.
- Understand and apply critique, analysis, and theory relevant to the study of world cultures.
- Demonstrate proficiency in world cultures research, analysis, and critique through exams, papers, and theses.
- Contribute new knowledge to the study of world cultures.

PARTICIPATING FACULTY AND RESEARCH AREAS:

Virginia M. Adán-Lifante, *Lecturer SOE, Coordinator of Spanish Language Instruction, School of Social Sciences, Humanities and Arts.* Second language acquisition, Spanish and Latin American language, literature and culture, women's literature

Mark Aldenderfer, *Professor of Social Sciences, Humanities and Arts.* Archaeology, quantitative methods, geographic information systems, hunters and gatherers; Andean Preceramic and Formative, Central Asia, Tibet

Susan Amussen, *Professor of Social Sciences, Humanities and Arts.* Early modern English history, early modern Europe, British history, Atlantic history, European women's history, women's studies, history and literature

Gregg Camfield, *Professor of Social Sciences, Humanities and Arts.* Early American Literature (to 1899); Mark Twain; humor (social, ethical and psychological dimensions); neuro-physiology of aesthetics; literary and philosophical sentimentalism

Robin Maria DeLugan, *Assistant Professor of Social Sciences, Humanities*

and Arts. Collective identity, social memory, the nation-state, migration and transnational practices, hemispheric perspectives on the Americas, indigenous peoples' issues

Kevin Fellezs, *Associate Professor of Social Sciences, Humanities and Arts.* US national popular music culture, African American and Asian Pacific American music cultures, aesthetics

Maurizio Forte, *Professor of Social Sciences, Humanities and Arts.* Reconstruction of archaeological and ancient landscapes in a virtual format

Jan E. Goggans, *Associate Professor of Social Sciences, Humanities and Arts.* Regional literatures, environmental literature and movements, protest literature, California and the West, literature and Culture of the 1930s, intersections of visual and textual representations

Nigel Hatton, *Assistant Professor of Social Sciences, Humanities and Arts.* 19th and 20th century American and African American literature and culture, Transnational American studies, literature and philosophy, Søren Kierkegaard, global human rights

Kathleen L. Hull, *Assistant Professor of Social Sciences, Humanities and Arts.* Anthropological archaeology, colonialism, demographic anthropology, identity and ethnogenesis, indigenous people

Ignacio López-Calvo, *Professor of Social Sciences, Humanities and Arts.* Human rights, ethnicity and Latin American literature and culture, Asian diasporas in Latin America, authoritarianism

Sean Malloy, *Associate Professor of Social Sciences, Humanities and Arts.* U.S. diplomatic history, nuclear history, war and morality, 20th century U.S. social movements

Manuel M. Martín-Rodríguez, *Professor of Social Sciences, Humanities and Arts.* Chicano/a and U.S. Latino/a literature and media studies, reading and reception studies, U.S. Hispanic literary past, comparative migration studies

Ruth Mostern, *Associate Professor of Social Sciences, Humanities and Arts.* Chinese and world history, historical geography, environmental history, digital humanities, state power

Holley Moyes, *Assistant Professor of Social Sciences, Humanities and Arts.* Archaeology of religion, Cave archaeology, Mesoamerica, dynamics of complex society, geographic information systems, spatial cognition

Sholeh Quinn, *Associate Professor of Social Sciences, Humanities and Arts.* History of Iran, Safavid Iran, Persian historiography, Mughal India, 19th century Iranian religions

Linda-Anne Rebhun, *Associate Professor of Social Sciences, Humanities and Arts.* Maternal and child health; psychological anthropology. Emotions, romance; gender; religion. Magic, witchcraft, folk Catholicism; folklore; Latin America, African Diaspora, Africa

Cristián Ricci, *Associate Professor of Social Sciences, Humanities and Arts.* 19th and 20th century Spanish literature; 19th and 20th century Spanish-American literature; Portuguese literature; Golden Age and colonial literature

ShiPu Wang, *Assistant Professor of Social Sciences, Humanities and Arts.* 20th century American and Asian art, American modernism and its global impact, Asian-American art, museum collections and curatorial practices, visual culture

Simon Weffer-Elizondo, A*ssistant Professor of Social Sciences, Humanities and Arts.* Social stratification, social movements, racial/ethnic relations, political sociology, immigration

Jeffrey Yoshimi, *Associate Professor of Social Sciences, Humanities and Arts.* Philosophy of mind, philosophy of cognitive science, phenomenology (especially Husserl), and neural networks

GRADUATE STUDENT RESEARCH POSITIONS AND TEACHING ASSISTANTSHIPS

For information on graduate student research positions or teaching assistantships, please see the Graduate Student Financial Support section of this catalog.

> My experience at UC Merced was more valuable than I could ever imagine. I experienced the long nights of studying and endless cramming, but I also had the opportunity to be a phenomenal student leader. UC Merced provided unlimited possibilities via student-run organizations, such as our cheer team.
>
> —Joycelyn Stephens, Psychology

GOVERNANCE OF GRADUATE EDUCATION

Graduate study is administered by the Dean of the Graduate Division and by the Graduate and Research Council, a committee of the Academic Senate. The Coordinating Committee on Graduate Affairs is a system-wide body that assures coordination between the campuses and develops general policies that govern graduate education throughout the University of California.

FINANCIAL SUPPORT

Several forms of financial support are available to facilitate the pursuit of a graduate education at UC Merced. Most forms of support are granted for merit, while others are granted for financial need or for a combination of merit and need. The Graduate Division works closely with the Office of Financial Aid and Scholarships and the academic units to coordinate all forms of financial support.

The Graduate Division and Office of Financial Aid and Scholarships administer need-based financial aid programs for graduate students. We are here to help students understand the financial aid opportunities as well as the criteria utilized in determining eligibility for the various financial aid programs available at UC Merced.

TYPES OF AID

Financial support is available at UC Merced in the form of graduate student research positions, teaching assistantships, fellowships and loans. All students, regardless of income, are encouraged to apply.

Graduate Student Research (GSR) Positions

Research positions afford excellent opportunities to gain invaluable experience in areas of importance to your graduate education while receiving financial support. Information and application materials for GSR positions are available from the academic units.

Teaching Assistantships (TA)

Graduate students working toward advanced degrees are given duties in undergraduate courses that may include conducting discussion or laboratory sections, grading student work and providing students with individual help in the subject. Teaching assistants are chosen for excellent scholarship and promise as teachers. They serve apprenticeships under active tutelage and supervision of regular faculty members. Teaching assistants engage in learning how to teach and work closely with faculty mentors. A limited number of teaching assistantships are available each year. On the recommendation of the academic deans, the academic units make appointments to teaching assistantships.

Fellowships

Fellowships are awarded primarily on the basis of scholarship and the promise of outstanding academic and professional achievement. Consideration is given to the extent and quality of previous undergraduate and graduate work, evidence of ability in research or other creative accomplishment, evidence of intellectual capacity and promise of productive scholarship.

Financial need or the availability of other sources of support in your graduate program is not relevant to the evaluation of academic merit, but may be an additional criterion for some fellowships. Students must establish eligibility for need-based fellowships by filing a Free Application for Federal Student Aid (FAFSA). For faster and more accurate filing, students can complete the FAFSA online at www.fafsa.ed.gov.

Loans

Financial aid awards that require repayment, loans, offer the opportunity to defer the cost of your educational expenses by borrowing now and repaying later. Some loan programs are based on financial need, but there are loan programs available to all students regardless of income. Loan programs available through UC Merced are federally funded, providing long-term, low-interest loans.

Federal Subsidized Stafford Loans: These loans are awarded to students with financial need. This loan is "subsidized" in that the federal government pays the interest while the student is in school and during the grace period (first six months after leaving school or dropping to less than half-time enrollment status).

Federal Unsubsidized Stafford Loans: Not based on financial need, these loans are available to all eligible students, regardless of income. This loan is "unsubsidized" in that the student is responsible for paying all interest due. There is no federal interest subsidy for the loan. Interest accrues immediately upon disbursement. Borrowers may elect to pay accrued interest on a monthly or quarterly basis or have it added back to the principal balance in a process called capitalization.

HOW TO APPLY FOR FINANCIAL AID

Graduate applicants who are US citizens, permanent residents or immigrants are required to file a "Free Application for Federal Student Aid" (FAFSA). Although the FAFSA can be filed at any time, it is strongly suggested that you file by the priority processing date of March 2. However, if the March 2 deadline has passed, you may still submit this form. We process some forms of financial aid throughout the year. For faster and more accurate processing, you may fill out this form online at www.fafsa.ed.gov. This form is used to determine financial need only. Financial need is a component of the eligibility criteria for many forms of financial support. If you need assistance with your application, please contact the Office of Financial Aid and Scholarships.

To be considered for graduate student research or teaching assistant (TA) positions: Graduate students who are interested in obtaining a graduate student research position or a teaching assistant position must submit an application online. From the UC Merced home page, select "Careers" and follow the links to academic student positions. TA positions are listed there.

For Additional Information: Please refer to the Financing Your Education section on the website at gradstudies.ucmerced.edu for additional information and assistance.

H. RAJENDER REDDY HEALTH CENTER

Student health and wellness services are provided at the H. Rajender Reddy Health Center on the 2nd floor of the Joseph Edward Gallo Recreation and Wellness Center. The H. Rajender Reddy Health Center provides quality health care and wellness education focused on the needs of graduate students.

All registered graduate students are eligible to use the services at the H. Rajender Reddy Health Center. These include injury and illness visits with medical providers, appointments with a health educator or nutritionist, laboratory testing, medications, immunizations and injections, and health and wellness education. Most of our core services are covered by student services and health fees and are provided at no additional cost, with the exception of labs, radiology, pharmaceuticals and some immunizations. Hours are posted on the health website at health.ucmerced.edu.

Our mission is to assist you to achieve and maintain maximum wellness to allow you to pursue your academic and personal goals. The campus health center provides basic treatment and prevention services that enhance and maintain your physical, emotional and social well-being. These services are provided by board-certified physicians, certified nurse practitioners and health educators. Our staff and peer counselors also provide information on issues such as alcohol and drug abuse, safety, sexual health, stress management, nutrition and body image and smoking cessation. Through our programs and services, we encourage you to become active participants in your health and wellness.

Health Insurance Plan

All students attending a UC campus are required to have major medical health insurance as a nonacademic condition of enrollment. Graduate students are automatically enrolled in UC Merced's Graduate Student Health Insurance Plan (GSHIP) and billed through their student account. This comprehensive and affordable health insurance plan supplements the campus services available at the H. Rajender Reddy Health Center and provides extended medical care services, including emergency services, when you need them. Graduate students with a TA/GSR appointment of twenty-five percent (25%) or higher may have their medical insurance cost paid by their hiring department.

If you are covered by other health insurance, the GSHIP requirement may be waived if you can demonstrate, by the specified deadline, that your coverage is comparable to that available under the University's plan. If GSHIP is waived, you are still eligible to utilize the campus health center. For further information on insurance, including the Waiver Application, refer to the health services web page at health.ucmerced.edu or contact insurance@ucmerced.edu.

Research At UC Merced

Research is the pioneering work of the intellect, an adventure at the frontiers of knowledge in which faculty engage both their undergraduate and graduate students. It reflects mankind's indomitable spirit of optimism that we can and must do better. Every human pursuit benefits from the ongoing process of evaluation and discovery. As the first research university to be built in the 21st century, UC Merced is positioned for new approaches to research in support of the university's educational mission. As the tenth campus of the University of California, UC Merced joins in the University's unparalleled history of accomplishment. That history also sets the high standards that UC Merced must live up to.

As an undergraduate student at UC Merced, you will find faculty research enriching your education and your ability to analyze and critique information objectively. Exposure to research will help you to begin to define solutions to the weighty problems with which humankind will wrestle during your lifetime. Your courses will be continually enriched and invigorated by faculty discoveries, which reflect an ever-evolving curriculum. You will also have formal opportunities to participate in ongoing faculty projects, joining graduate students and postdoctoral fellows in labs, field work and other research settings. These opportunities will extend your classroom experiences and highlight the process of discovery that is critical to each discipline.

As a graduate student you will plumb the depths of some of the world's most challenging problems through your research and scholarly work. Graduate students work with faculty as apprentice scholars, building the skills needed to create and communicate discoveries in their field. The distinguishing feature of UC Merced's graduate programs is their interdisciplinary nature, which provides a breadth of knowledge that helps put studies into a wider context. You will join a community of scholars and set your course for a career. Part of your research experience will include working closely with your faculty mentor and advisory committee as you build professional expertise and prepare for the future.

To foster discovery that brings faculty insights from many disciplines together, UC Merced is structuring many of its research and graduate educational activities around research institutes composed of faculty from multiple schools.

INTERDISCIPLINARY RESEARCH INSTITUTES AND PROGRAMS

■ Sierra Nevada Research Institute

The mission of the Sierra Nevada Research Institute (SNRI) is to discover and disseminate new knowledge that contributes to sustaining natural resources and promoting social well being in the San Joaquin Valley and Sierra Nevada regions of California, and related regions worldwide, through integrated research in the natural, social and engineering sciences.

The mission of the Sierra Nevada Research Institute is accomplished through:

- Collaborative, multidisciplinary, fundamental research conducted by faculty, students, staff and affiliated scientists in natural sciences, engineering and social sciences.
- Strong interactions with related research units within the UC system and close collaborative relations with scientists and managers at national laboratories, and local, state and federal agencies, including the National Park Service.
- Connecting objective, science-based data and information with public and private stakeholders.

The Sierra Nevada Research Institute is organized around an Environmental Systems model. A particular emphasis is on the

physical and biological connections that exist between the Central Valley and Sierra ecosystems. Through these balanced research efforts, the Sierra Nevada Research Institute serves as a source of objective scientific information for public policy makers as California faces the growing challenge of sustaining the integrity and quality of its resources into the future.

Through the Sierra Nevada Research Institute our students and faculty have access to a variety of biological field stations in Yosemite, Sequoia and Kings Canyon National Parks. In May 2004, Yosemite National Park and the Sierra Nevada Research Institute dedicated the first of these stations, located in Wawona. The Wawona station gives logistical support for academic field research

and outreach activities in Yosemite National Park. In addition, the Virginia Smith Trust Reserve adjacent to the UC Merced campus provides additional sites for research.

UC Merced faculty currently affiliated with the Sierra Nevada Research Institute are working on climate change and ecosystem health, contaminant transformations in soils and aquatic systems, development of environmental sensors, hydrologic processes in the Sierra Nevada, nutrient transport in agricultural and natural systems, water and air quality in the Valley basin and Sierra Nevada Range, and computational ecology and biodiversity.

■ Health Sciences Research Institute

The mission of the Health Sciences Research Institute (HSRI) is to promote all research in the human health sciences at UCM. Research perspectives within the HSRI currently include health psychology, medical anthropology, medical sociology, cognitive science, neuroscience, molecular cell biology, biochemistry, stem cell biology, bioengineering, and computational biology, involving faculty from all three schools.

Human health issues are complex, requiring research from multiple perspectives. The HSRI promotes the organization of its member laboratories into synergistic teams, combining complementary disciplinary expertise to effectively tackle complex problems in human health. The formation of these inter- and multidisciplinary research teams is facilitated by (1) securing funds for compelling research initiatives by HSRI subgroups such as through program projects; (2) actively recruiting the best and brightest graduate students and postdocs by showcasing the resources available to them in the health sciences; (3) hosting various means for members to communicate and interact around their research, such as through an annual HSRI symposium, visiting scholar presentations, seminars, and other regularly scheduled activities that bring members together; and (4) maintaining core facilities that will support research in the health sciences. Research facilitated by HSRI-sponsored activities will solidify UCM as a leader of human health research, which will attract top talent at the faculty, postdoctoral, and student levels.

■ UC Merced Energy Research Institute

The mission of UC Merced Energy Research Institute (UCMERI) is generating knowledge that leads to new and improved renewable and sustainable energy technologies, examining global energy policy, setting the standard for institutional energy efficiency and sustainable energy futures, and educating the next generation of energy scholars and practitioners.

UCMERI conducts cross-disciplinary research that: leads to new and improved renewable and sustainable energy generation technologies, sets the standard for institutional energy efficiency and sustainable energy futures, educates the energy industry and the next generation of energy scholars and practitioners and examines domestic and global energy policy.

UC Merced has prepared me as a leader and scholar more than any other university could.

—Christian Ayeni, Dallas, TX, Bioengineering Major

Currently, more than a dozen UC Merced professors from the Schools of Engineering, Natural Sciences, and Social Sciences, Humanities and Arts are conducting UCMERI-related research.

■ Center of Excellence on Health Disparities

In September 2009, UC Merced was awarded a program grant by the National Institutes of Health's National Center on Minority Health and Health Disparities (NCMHD) to develop a Center of Excellence for the study of health disparities in the Central Valley (coehealth.ucmerced.edul).

The goals of our COE for the Study of Health Disparities in Rural and Ethnic Underserved Populations (COEHD) are to:

1. Increase the number of students who are knowledgeable about health disparities;

2. Improve the numbers of students from under-represented and disadvantaged groups performing research in health disparities; and

3. Expand the capacity and competence of UC Merced in conducting health sciences research that address health disparities in the region.

Consistent with these goals, our activities are focused on:

1. Providing educational opportunities in public health with a focus on health disparities for the campus as well as local community in the form of

    a. Minor in Public Health

    b. Public speaking series

2. Engaging selected undergraduates in intensive health sciences research training

3. Supporting selected graduate students conducting mentored research relevant to health disparities, and

4. Developing community partnerships for health promotion, disease prevention, and health sciences research.

■ University of California Advanced Solar Technologies Institute

The University of California Advanced Solar Technologies Institute (UC Solar) is a multi-campus, multidisciplinary research institute made up of faculty from the University of California's Merced, Berkeley, and Santa Barbara campuses. Headquartered at UC Merced, UC Solar creates technologies that make solar energy systems more efficient, more affordable, and the best choice for the people of California and the world. In addition, UC Solar educates and develops tomorrow's solar energy leaders and entrepreneurs.

Initial UC Solar research areas include advancing the state-of-the-art in solar concentration (for photovoltaic and thermal systems), employing nanotechnology in both collector/concentrator and device structures, and developing new devices that capture usable energy in the UV portion of the solar spectrum.

Through collaboration with industry and other stakeholders, UC Solar researchers are challenged to create solar technologies that can be brought to the marketplace quickly. UC Solar researchers partner with industry participants through the UC Solar Industry Consortium, which attracts companies that design, produce, implement, manage and invest in solar technologies.

The UC Solar director is UC Merced Professor Roland Winston, and the UC Solar co-directors are UC Berkeley Professor Constance

Chang-Hasnian and UC Santa Barbara Professor Umesh Mishra. For more information, contact UC Solar Director of Development Ron Durbin at rdurbin@ucmerced.edu or 209-228-4565, or visit the website at ucsolar.ucmerced.edu.

■ Center for Computational Biology

The UC Merced Center for Computational Biology (CCB) supports multidisciplinary training and research projects in which biological understanding is guided by computational modeling. The CCB runs an annual summer research program in computational biology that is currently sponsored by a 5-year NSF Undergraduate Research and Mentoring grant. The CCB also facilitates the development and dissemination of undergraduate and graduate course materials based on the latest research in computational biology.

■ Center for Research in the Humanities & Arts

The Center for Research in the Humanities & Arts (CRHA), established in 2008, is designed around interdisciplinary approaches to knowledge. The Center seeks to recreate the Renaissance integration of multiple approaches to knowledge, encompassing the humanities, arts and qualitative social sciences. Theses areas of academic study share a concern with the ways in which human beings conceive, express, and enact their situations in and relations to societies, both local and, increasingly, global.

The Center for Research in the Humanities & Arts provides spaces for discussion, conversation, and the extended pursuit of ideas. The shared concerns of various disciplines can be explored in ways that enrich research. By providing a context to challenge the self-validating paradigms of individual disciplines, the Center supports the divergent thinking that is the source of creative scholarship. In addition, we seek to make the significance of the enduring questions addressed by the humanities and arts more visible for both the campus and the community.

The Center is part of the University of California Humanities Network, which incorporates the UC Society of Fellows in the Humanities, the University of California Humanities Research Institute, and the UC Consortium of Humanities Centers.

■ Center for Autonomous and Interactive Systems

The Center for Autonomous and Interactive Systems (CAIS) is a Centralized Research Unit (CRU) established at UC Merced in 2010. CAIS is an interdisciplinary research center promoting research in a variety of topics, including robotics, virtual characters, cognitive science, and human-computer interfaces.

CAIS mission is:

- to foster research aimed to develop next-generation systems exhibiting human-centric autonomous and interactive behaviors;
- to promote interdisciplinary research collaborations at UC Merced and also with other CITRIS campuses and universities nationwide, and companies whose research aligns with CAIS scientific goals;
- to offer hands-on research experiences to undergraduate and graduate students enrolled at UC Merced.

CAIS has two state of the art research labs, the Motion Capture and Visualization Lab and the Humanoid Robotics Labs. These labs were established thanks to extramural funding and with the support of the Center for Information Technology Research in the Interest of Society (CITRIS). Thanks to its connection to CITRIS, CAIS researchers and students benefit from unique opportunities for partnerships and collaborations with other CITRIS campuses and with industrial researchers.

■ Spatial Analysis Research Center

The goal of the Spatial Analysis Research Center (SpARC) Centralized Research Center is to add value and capabilities to UC Merced's existing and planned research, teaching, administrative, and community outreach efforts in the area of spatial analysis and spatial science. Many UC Merced faculty are engaged in spatial sciences including historians and archaeologists, social and cognitive scientists, engineers, computer scientists, environmental scientists, and biologists. SpARC's mission extends across all three academic Schools and has connections with the Sierra Nevada Research Institute, the Great Valley Center, Yosemite National Park, the Center for the Study of Health Disparities, and the Division of Administration. SpARC aims to foster new intellectual collaboration, stimulate new sources of funding, further innovative and original research, supply research techniques and services to faculty groups, perform services and outreach to the public and support student learning.

Course Descriptions

UNDERGRADUATE COURSES

Lower Division Courses

Courses numbered 1–99 are designed primarily for freshmen and sophomores but are open to all students for lower division credit. (Graduate students requesting to enroll in lower-division undergraduate courses will not receive unit credit nor will the course fulfill degree requirements.)

Upper Division Courses

Courses numbered 100–199 are open to all students who have met the necessary prerequisites as indicated in the catalog course description. Preparation should generally include completion of one lower division course in the given subject or completion of two years of college work.

GRADUATE COURSES

Courses numbered 200–299 are open to graduate students. (Undergraduate students must obtain the signature of the instructor, School Dean, and the Dean of Graduate Studies. Graduate level units will count towards the required 120 units for graduation; however students are urged to meet with their academic advisor in order to determine if graduate course units may be used to fulfill a graduation requirement.)

CROSS-LISTED/CONJOINED COURSES

Cross-listed courses are the same course offered under different course subjects at the same level (either undergraduate or graduate) that share the same meeting time, requirements, units, etc.

Conjoined courses are the same course but one is undergraduate and one is graduate.

COREQUISITE COURSE

A corequisite course is a course that must be taken at the same time as another course.

PREREQUISITES

Prerequisites for courses should be followed carefully; the responsibility for meeting these requirements rests on the student. If you can demonstrate that your preparation is equivalent to that specified by the prerequisites, the instructor may waive these requirements for you. The instructor also may request that a student who has not completed the prerequisites be dropped from the course. Note: For all courses a "C-" or better grade is required for a course to be used as a prerequisite for another course. If a course was taken for a "P/NP" grade then a "P" grade is required. If the prerequisite for a course is not satisfied, students must obtain the approval of the instructor (or school designee) of the course they wish to take.

COURSE SUBSTITUTIONS

Students may petition the appropriate dean to substitute a suitable course in place of a required course (for a general education course: petition the Vice Provost for Undergraduate Education; for a major course: petition the dean of the School in which the major resides). Petition forms are available on the following websites: Office of the Registrar, the Student Advising & Learning Center, and Schools.

GRADING OPTIONS

Unless otherwise stated in the course description, each course is letter graded with a P/NP or S/U option (unless required for your major or graduate program).

COURSE MATERIALS AND SERVICES FEES

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials and services fees may cover the cost of chemicals and glassware for a science laboratory or art supplies for a studio class. They also might cover film rentals, field trips or the purchase/rental of specific equipment. Course materials fees are displayed on the Course Schedule each term

ANTHROPOLOGY

ANTH 001: Introduction to Sociocultural Anthropology [4]
Introduction to human culture and cultural diversity, including the methods by which anthropology—via the study of social institutions, shared practices, and collective meanings—seeks to understand how people adapt to, make sense of, and transform their worlds.

Discussion included.

ANTH 003: Introduction to Anthropological Archaeology [4]
Survey of theory, field and analysis methods, and objectives of anthropological archaeology. Examines how intellectual perspectives guide the ways in which archaeologists undertake their work and the types of materials they collect and analyze to study issues such as technology, exchange, subsistence, settlement, social organization, and ideology.

Discussion included.

ANTH 005: Introduction to Biological Anthropology [4]
Introduction to evolution and how natural selection has shaped modern human variation. Examination of non-human primate behavior and how analogous it might be to that of early humans. Discussion of culture, the fossil evidence, genetics, and inheritance.

Laboratory included.

ANTH 092: Internship in Anthropology [1-4]
Provides oversight and structure for a student's internship in a field related to anthropology in community organizations, professional research projects, etc. connected to the study of anthropology. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of anthropology.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

ANTH 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ANTH 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 100: History of Anthropological Thought and Practice [4]
Historical overview of key individuals and central ideas influencing the practice of anthropology and the production of anthropological knowledge. Topics may include the disciplining of anthropology into related subfields; social evolutionism, historical particularism, British structural-functionalism; French structuralism; cultural ecology; sociobiology; symbolic and

interpretive anthropology; feminist and other critiques of anthropology.

Prerequisite: ANTH 001 and (ANTH 003 or ANTH 005) or consent of instructor. Discussion included.

ANTH 110: Migration, Diaspora and Transnational Belonging [4]
Exploration of modern, global movements of people with a focus on the conditions, processes, and practices of contemporary national and transnational belonging. Topics include globalization, migration, immigration, Diaspora, the nation-state, national identities and cultural citizenship.

Prerequisite: Junior standing and ANTH 001.

ANTH 112: Political Anthropology [4]
Political anthropology involves the study of formal political institutions as well as the manifestations of power in everyday life. Topics may include anthropological perspectives on: the state and other forms of political authority; social inequality; conflict; indigenous responses to colonialism and the nation-state; social movements; citizenship; governmentality; and globalization.

Prerequisite: Junior standing and ANTH 001 or consent of instructor.

ANTH 114: Social Memory [4]
Introduction to the practices, spaces, artifacts and media through which social memory is formed, maintained and reproduced. Topics may include: how societies remember; how the past and its representation is bound up with national and other collective identities; commemoration; heritage; and the link between history, memory, and social justice.

Prerequisite: Junior standing and ANTH 001.

ANTH 116: Indigenous Activism in the Americas [4]
Focusing on the contemporary struggles of Indigenous peoples for rights; self-determination; social, political, and environmental justice and/or increased nation-state participation. Examines how the mobilization of indigenous peoples is strengthened through regional, hemispheric and global solidarities; and how international law, media, and technology support indigenous actions for change.

Prerequisite: Junior standing and ANTH 001.

ANTH 120: Introduction to Medical Anthropology [4]
Provides knowledge about medical anthropology, how different cultures understand human physiology and health, definitions of sickness, types of medical systems and practitioners, how cultural practices affect health, issues in gender environmental health, and how medical anthropology influences health policy.

Prerequisite: ANTH 001 or ANTH 005. Letter grade only.

ANTH 121: Ethnomedicine [4]
Provides knowledge of medical systems cross culturally including the three ancient literary systems (Chinese, Ayurvedic, Greco-Arabic), shamanism, folk medicine, and biomedicine. Readings focus on the beliefs and organization of each system, types of practitioners, types of sicknesses treated, and how anthropologists research and understand these phenomena.

Prerequisite: ANTH 001 or ANTH 120.

ANTH 124: Ethnopsychology [4]
Anthropological perspectives on mental states, experience of emotions, and concepts of mental normality in a variety of cultural settings. Lectures and readings will focus especially on the relationship between individual and society, the role of emotions, and the definition of psychological phenomena cross culturally.

Prerequisite: ANTH 001 or ANTH 120.

ANTH 126: Anthropological Approaches to Gender [4]
Examines gender and sexuality cross-culturally: cultural aspects of gender, sexuality, reproduction, and gender identity. Readings will explore definitions of male and female roles, sexual mores, issues in human reproduction, variations in definitions of sexual identity, and cultural, economic and religious aspects of gender, marriage, and family.

Prerequisite: ANTH 001 or ANTH 120.

ANTH 130: Material Culture [4]
Examines the role that material objects play in human social relations, identity, and economy, including archaeological application of such knowledge to past societies. We explore the range of production and use of material objects, including theories of material culture, technology, style, meaning, memory, and agency.

Prerequisite: ANTH 003 or junior standing or consent of instructor.

ANTH 134: Dynamics of Small-scale Societies [4]
Examines ethnographic and archaeological literature on small-scale hunter-gatherer-fisher and horticultural societies, and explores how these data contribute to study of subsistence and settlement strategies, technology, exchange, demography, and social relations in the past and present.

Prerequisite: ANTH 003 or junior standing or consent of instructor.

ANTH 140: Cultural Heritage Policy and Practice [4]
Critical examination of the legal, practical, and ethical aspects of cultural heritage management in the United States and abroad. Topics include cultural resource management in public and private contexts, participation of stakeholders, the application of anthropological knowledge, and public outreach.

Prerequisite: ANTH 003 or WH 001 or junior standing or consent of instructor.

ANTH 141: Writing Narrative for Archaeology [4]
Integrates archaeological knowledge with narrative and analytical writing. Students develop research and writing skills while learning to use and disseminate knowledge gained by producing creative, culturally sensitive, and factually supported texts. Cross-listed with WRI 141.

Prerequisite: ANTH 003 and WRI 010 or consent of instructor. Letter grade only.

ANTH 142: Archaeology of Colonialism [4]
Examines theoretical perspectives, issues, and interpretations in archaeological study of the interaction between indigenous peoples, European colonists, and enslaved Africans. Topics include disease, power, resistance, colonial institutions, multi-ethnic communities, and gender relations in diverse native engagements with colonists and others from a variety of homelands.

Prerequisite: ANTH 003 or junior standing or consent of instructor.

ANTH 144: Archaeology of Religion [4]
Examines ritual, religion, and cosmology in the archaeological record and explores theories that inform research and contribute to archaeological inferences. Takes a broad comparative approach and holistic perspective for the investigation of their historical, environmental, and social contexts.

Prerequisite: ANTH 003 or junior standing or consent of instructor.

ANTH 146: Topics in Small-scale Societies [4]
In-depth exploration of archaeological thought or data on one or more anthropological topics relevant to small-scale societies of North America, South America, Europe, Africa, and/or Asia.

Prerequisite: ANTH 003 or junior standing or consent of instructor. Topics vary and course may be repeated for credit if topics differ.

ANTH 148: Topics in Complex Societies [4]
Exploration of a special topic or problem in the archaeology of complex societies.

Prerequisite: ANTH 003 or junior standing or consent of instructor. May be repeated for credit three times.

ANTH 150: Race and Human Variation [4]
Investigation of how human biological variation is studied and how the definition of such variation differs between the scientific community and the public. Topics include historical perspectives on race and eugenics, how scientific racism has shaped national policy, and how genetic diversity and the Human Genome Project have informed such issues.

Prerequisite: ANTH 005 or junior standing.

ANTH 151: Human Adaptability [4]
Examination of how humans live in marginal environments, such as extremely hot, extremely cold, or high altitude areas. Evolutionary, genetic ecological, demographic, and cultural explanations for human biological adaptability are explored. Students consider case studies from the high Andes, Siberia, equatorial South America, and the International Space Station.

Prerequisite: ANTH 005 or junior standing or consent of instructor.

ANTH 152: Dying, Death, and Dead Persons [4]
Examination of the multiple cultural meanings of death and the dead person, including hospice, reactions to death, memorial gestures, rights to and constructions of the dead body in the U.S. legal system, cadavers in education and research, dead persons in mass disasters and human rights cases, archaeological examples, and repatriation issues.

Prerequisite: ANTH 005 or junior standing or consent of instructor.

ANTH 155: Paleodemography [4]
Exploration of human population growth and decline, fertility and mortality, and population age and sex structure in the past without benefit of written records. Topics include the interplay of demography and hominid evolution, migration,

environmental stress, the transition to agriculture, and the rise and fall of complex societies.

Prerequisite: Junior standing and ANTH 003 and ANTH 005 or consent of instructor.

ANTH 160: Human Origins [4]
Explores the biological heritage of humans by providing students with a rigorous grounding in modern evolutionary theory and undertaking detailed Study of the phylogeny, morphology, and paleoecology of the Hominini. In addition, this course uses the fossil record to reveal the truly unique features of Homo sapiens.

Prerequisite: ANTH 005. Discussion included.

ANTH 162: Growth, Development, and Human Evolution [4]
Applies modern life history theory to understand how evolution of growth patterns contributed to divergence in adult morphology among human ancestors, as revealed by the fossil record of hominin species. We also examine the uniquely human phenomenon of childhood, and the geographic diversity observed among modern human beings.

Prerequisite: ANTH 005.

ANTH 169: Trends in Biological Anthropology [4]
Explores current trends in biological anthropology. Course material will vary. Possible topics may include: isotopic analysis of human nutrition; genetic studies of human variation and adaptability; life history and population studies of health and disease; studies of the interaction of the environment, human behavior, and human biology; and ethics.

Prerequisite: ANTH 005. May be repeated for credit once.

ANTH 170: Ethnographic Methods [4]
Training in how to conduct field based qualitative research including learning about ethics, training in human subjects protection, skills of participant-observation, interviewing, taking field notes, and the analysis and presentation of research results.

Prerequisite: ANTH 001 or junior standing.

ANTH 172: Ethnohistory [4]
Examines the critical use of historical documents, journals, and visual images; archives; and oral history to understanding past cultures and culture change. Analysis of case studies and original archival research demonstrate how these sources complement data collected through ethnographic, archaeological, or biological methods.

Prerequisite: ANTH 001 or ANTH 003 or junior standing or consent of instructor.

ANTH 174: Lithic Artifact Analysis [4]
Systematic consideration and practical application of analytical laboratory and data recording techniques used to study stone tools and manufacturing debris. Topics include procurement; production and reuse; style and function; the organization of technology with respect to settlement and gender; and craft specialization.

Prerequisite: ANTH 003 or consent of instructor. ANTH majors/minors given priority. Laboratory included.

ANTH 176: Archaeological Field Methods [4]
Introduction to the goals and methods of archaeological surface survey, excavation, and various forms of field documentation. The integration of research issues and methods is addressed through both classroom and field activities.

Prerequisite: ANTH 003 or junior standing in the major. Fieldwork included.

ANTH 178: Human Osteology [4]
Students develop a basic familiarity with human skeletal remains, including the identification of the bones of the skull, dentition, and axial and appendicular skeletons. Identification of side (i.e., left, right) and element of both intact and fragmentary remains are considered.

Prerequisite: ANTH 005 or consent of instructor. ANTH majors/minors given priority. Laboratory included.

ANTH 179: Bioarchaeology [4]
In-depth consideration of methods used to identify sex, age at death, stature, and ancestry from human skeletal remains. Anthropometrics, disease, trauma, and basic demographic techniques are also considered, preparing students for anthropological study of both individual remains and skeletal populations.

Prerequisite: ANTH 005 and ANTH 178 or consent of instructor. ANTH majors/minors given priority. Laboratory included.

ANTH 190: Topics in Anthropology [4]
Exploration of a special topic or problem within or between fields in anthropology.

Prerequisite: ANTH 001 or ANTH 003 or ANTH 005 or junior/senior standing or consent of instructor. May be repeated for credit three times.

ANTH 192: Internship in Anthropology [1-4]
Provides oversight and structure for a student's internship in a field related to anthropology in community organizations, professional research projects, etc. connected to the study of anthropology. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of anthropology.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

ANTH 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ANTH 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ANTH 090X: Freshman Seminar [1]
Examination of a topic in anthropology.

May be repeated for credit.

ARTS

ARTS 001A: Learning to See: Beginner Drawing [4]
Develops cognitive skill of drawing by teaching the ability to see accurately. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening one's perceptions and creative abilities finds this course useful.

ARTS 002A: Learning to Vocalize: Beginning Vocal Instruction [4]
Vocal instruction for students with a beginning level of music proficiency.

ARTS 002B: Introduction to Choral Music [4]
Introduction to choral group singing focusing on the study and performance of choral literature chosen from all major eras and genres. Emphasis on part-singing, ensemble blend, diction, and vocal development. The course work includes written assignments, research, and analysis of the music, composers, and music fundamentals.

ARTS 002C: Introduction to Vocal Jazz Repertoire [4]
The study and performance of Jazz vocal repertoire with continued instruction in correct singing techniques, posture and breathing, diction, and anatomy of the singing instrument. In addition to vocal instruction, includes written assignments requiring research and analysis of the music, composers, style, and music fundamentals.

Prerequisite: ARTS 002A or ARTS 002 or consent of instructor.

ARTS 002D: Introduction to Musical Theater Vocal [4]
The study and performance of Musical Theater/ Broadway repertoire. Instruction in correct singing techniques, posture and breathing, diction, correct use of the chest and "theater" voice. Special attention to character development and stage movement. Includes written assignments requiring research and analysis of music, composers, style, and music fundamentals.

Prerequisite: ARTS 002A or ARTS 002 or consent of instructor.

ARTS 003: Learning to See: Painting [4]
Development of the skill of painting in watercolor to develop the complex process of color vision to enhance one's perceptive powers. The use of this skill is not limited to those planning to be artists. This is a studio class that will include drawing and painting from nature.

ARTS 003B: Learning to See: Intermediate Painting [4]
Intermediate level techniques in acrylic, watercolor or oil painting, concentrating on enhancing the technique necessary to develop mastery of individual expression.

Prerequisite: ARTS 003.

ARTS 004A: Learning to See in Three Dimensions [4]
Development of cognitive skill of seeing in three dimensions. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening his or her perceptions and creative capabilities finds this course useful.

ARTS 004B: Introduction to Sculpture [4]
Introduces students to the traditional additive and subtractive sculptural methods along with contemporary sculptural processes. Students are taught to explore conventional media, such as clay, soft stone, wood, wax, plaster and paper pulp as well as unconventional materials. Emphasis is placed on successful union of technique and personal expression.

ARTS 005A: Learning to Listen: Beginner Music [4]
Cognitive skill of listening to music to enhance perceptive powers. The use of this skill is not limited to those planning to be artists.

ARTS 007: ArtScore: Introduction to Global Arts Studies Program [4]
Survey of arts around the globe, with an integrated and comparative approach to studying the history and ideas of arts from antiquity to the twentieth century. This is the foundation course for all students pursuing an arts major.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only. Discussion included.

ARTS 008A: Learning to Perform: Beginner Acting [4]
Develops cognitive skill of physical and vocal performance by teaching the ability to act on stage. Material covered is not limited to skills required for becoming an artist. Anyone interested in sharpening one's abilities to perform finds this course useful.

ARTS 009: Learning to See: Beginning Photography [4]
Beginning level course stressing technical and critical photographic skills. The class aims to develop the student's capacity to produce well-wrought, effectively structured photographs utilizing in camera exposure, depth-of-field, and composition with either a digital or film camera.

ARTS 010: Substances of Arts [4]
Introduces students to substantive characteristics of the arts, with emphasis on cultural and social significance. Each student learns to develop his/her own understanding of what is art, what makes individual works of art significant and how art enriches human existence. Course work includes research, writing and art event attendance.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent.

ARTS 011: Substances of Music [4]
Introduces students to substantive characteristics of the art of music, with emphasis on cultural and social significance. Each student learns to develop his/her own understanding of what the art of music entails, what makes individual works of music art significant and how music enriches human experience.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent.

ARTS 012: Substances of Architecture [4]
Introduces students to substantive characteristics of architecture, with emphasis on cultural and social significance. Each student learns to develop his/her own understanding of what is architecture and why individual works of architecture become significant. Emphasizes the interrelatedness of architecture and socioeconomic history.

ARTS 013: Substances of Visual Arts [4]
Introduces students to substantive characteristics of visual arts, with an emphasis on developing students' own critical skills in studying our contemporary and historical visual culture. Topics include artworks from the Renaissance to Neoclassicism to Pop, as well as issues in television, video, fashion, magazine, pop culture, computer art.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent.

ARTS 015: History of Western Art Music [4]
Introduction to the art music of western culture, including music from Medieval, Renaissance, Baroque, Classical, Romantic, and 20th Century eras, featuring study of selected masterworks in relation to the periods which they represent. Emphasis is placed upon developing awareness of musical style and structure through lectures and directed listening.

ARTS 020: Fundamentals of Two Dimensional Design [4]
Introduces students to two-dimensional design fundamentals as they apply to all aspects of the visual arts with emphasis on application in drawing, painting, film, digital art, and photography. Design is essential to all visual arts; it is where the thought process begins. Assignments include hands-on projects, research and writing.

ARTS 021: Fundamentals of Three Dimensional Design [4]
Introduces concepts and methods designers use to order form in space in visually exciting way. Students acquire understanding of fundamental design theory, building processes and the ability to communicate through the use of design elements that can be utilized in diverse fields. Assignments include hands-on projects, reading, and writing.

ARTS 023: Multimedia Studio [4]
Introduces students to conventional and unconventional techniques in two dimensional and three dimensional arts. Variety of techniques are covered such as screen printing, block printing, acrylic transfer, encaustic, casting, jewelry design, carving and construction, mixed media photography, illustration, and fiber art. Course work includes hands-on projects, research and writing.

ARTS 026A: Fundamentals of Music [3]
For beginners and those who learned to sing and/or play instrument without training in music fundamentals, including principals and procedures of rhythm and pitch, notation, scales (major, minor), key signatures, intervals, chord structures, and symbols as well as some harmonic analysis of chords and simple part writing is included.

ARTS 027B: Introduction to Music Technology [3]
Introduces music technology through standard computer-based project workstation, audio interface, MIDI keyboard and computer software. Instruction includes recording and processing of digital audio, MIDI technology to encode and sequence computer-generated musical content, computer-assisted music notation programs, software-based editing, mixing, mastering techniques in producing notation, recordings of student's original music.

ARTS 032: Introduction to Jazz Studies: History of Jazz [4]
Introduces students to the history of jazz, including its key developments, innovators and styles.

Letter grade only. Discussion included.

ARTS 036: Introduction to Art Song [4]
Course in the study and performance of vocal repertoire known as "art song" for students with some prior singing experience. Students will select repertoire appropriate to their own vocal ability and continue development in character study, stage movement and performance delivery to be put in practice in performance.

Prerequisite: ARTS 002A or audition or consent of instructor.

ARTS 042A: Introduction to Photographic Techniques and Practices [4]
Strengthens understanding of photographic techniques and principles by providing in depth study of technical aspects such as proper exposure of film or digital photos, effective usage of shutter speeds and apertures, concept and application of depth of field, creating perception of motion, camera perspective, composition and analysis of imagery.

Prerequisite: ARTS 009 or portfolio or consent of instructor.

ARTS 070: Techniques of Contemporary Artists [4]
Students have opportunity to study with a contemporary artist. Open to any student interested in learning how acquisition of technique supports creative processes. Emphasis is put on process instead of result. Techniques taught vary depending on the instructor artist's medium of expression.

Permission of instructor required. May be repeated for credit four times.

ARTS 071: Techniques of Interdisciplinary Research in Arts [4]
Explores differences between research conducted by artists and by academics, and examines how artists process information, as well as how various forms of artistic expression influence content and meaning. The role of cliché and stereotypical representation in the creation of works of art is also explored.

May be repeated for credit three times.

ARTS 090X: Freshman Seminar [1]
Examination of a topic in the arts.

ARTS 092: Internship in the Arts [1-4]
Provides oversight and structure for a student's internship in a field related to arts in community organizations, professional research projects, etc. connected to the study of art. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of art.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

ARTS 095: Lower Division Undergraduate Research [1-6]
Supervised research.

Permission of instructor required. May be repeated for credit.

ARTS 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS 100: History of World Art [4]
Introduces students to significant examples of world art through analysis of selected works from a number or different geographical regions of the world. Emphasis is placed upon the influence of religious, economic, political and aesthetic factors. Course work includes research and writing.

Prerequisite: ARTS 010 or consent of instructor.

ARTS 101: History of Clothing, Costume and Fashion: Euro-centric Pre-History to 1800 [4]
Survey of history of Euro-centric clothing, costumes and fashion from pre-history to 1800. Emphasizes the intrinsic connection between clothing and all aspects of human existence from politics, economics, sociology, cultural history, to climate, psychology and art. Each student is encouraged to pick research topics connected to his or her major.

ARTS 102: History of Clothing, Costume and Fashion: Euro-centric 1800 to 1980 [4]
Survey of history of Euro-centric clothing, costumes and fashion from 1800 to 1980. Emphasizes the intrinsic connection between clothing and all aspects of human existence from politics, economics, sociology, cultural history, to climate, psychology and art. Each student is encouraged to pick research topics connected to his or her major.

ARTS 103: History of Ethnic Costume [4]
Survey of ethnic costume across the globe. Covers indigenous clothing, emphasizing the intrinsic connection between clothing and cultural history. Each student is encouraged to pick research topics connected to his or her major.

Prerequisite: Junior standing or consent of instructor.

ARTS 104: History of Costume Design [4]
Survey of history of costume design with emphasis on costumes for the stage. Examines the practice of costume design across world cultures as well as the relationship between costumes and prevailing cultural values. Course work concentrates on research but may include a creative component.

Prerequisite: Junior standing or consent of instructor.

ARTS 115: Twentieth Century Drama: Theatre and Social Responsibility [4]
Examination of ways in which the works of selected 20th century playwrights contribute to awareness of social responsibility. Explores correlation between dramaturgy and political activism. Includes staged readings of plays, research and writing.

ARTS 120: Critical Popular Music Studies [4]
Investigate popular music and the various meanings it has held for musicians, critics and audiences. What, exactly, is popular music? This course will explore this and related questions in order to complicate our notions of what constitutes popular music.

Prerequisite: Junior standing and ARTS 011 or consent of instructor.

ARTS 121: Music of the Twentieth Century [3]
A critical investigation of various music trends in the 20th century with an emphasis on the musicians who have bridged or blurred the distinctions between art music and popular music.

Prerequisite: ARTS 007.

ARTS 121A: Music Ensemble [3]
Course for students who are proficient in playing and have access to an instrument of their choice. Course gives students opportunity to play in ensembles with professional coaching, instruction, and supervision. Content is dedicated to explore numerous genres from the baroque, classical, romantic, and contemporary repertoire.

Prerequisite: Audition during semester prior to enrollment or consent of instructor. May be repeated for credit four times.

ARTS 125: African American Music of the 20th Century [4]
Focuses on a central question: how do we locate African American music, i.e., how can we define African American music? In attempting to answer this question, we think through concepts such as authenticity, representation, recognition, cultural ownership, appropriation, and origin(s).

Prerequisite: Junior standing or consent of instructor.

ARTS 129: Advanced Musicianship [4]
Intended for students with foundational knowledge of music, and some proficiency in singing or playing an instrument who wish to further their musical understanding. Among other content, course seeks to enhance students' understanding of musical symbols, their physical execution, and the ability to translate them into practice.

Prerequisite: Audition or the consent of the instructor.

ARTS 130: History of World Architecture [4]
Introduces students to significant examples of world architecture, concentrating on characteristics of structure, materials, and use. Course work includes research and writing.

Prerequisite: ARTS 012 or consent of instructor.

ARTS 141: History and Practice of Photography [4]
Examines critical texts on the history and theory of photography, study the work of photographers from diverse backgrounds, and investigate cultural and sociopolitical issues in photographic practice and production. Students will also learn some basic techniques of taking photographs through various in-class exercises and assignments.

Prerequisite: Sophomore standing and any lower division ARTS or GASP course. Letter grade only.

ARTS 150: Assemblage Sculpture [4]
Assemblage sculpture, a unique three dimensional art form that consists of creating works of art that are assembled rather than modeled, carved or cast. The elements are pre-formed, natural or manufactured materials or objects. Course work includes research into the history and uses of assemblage, and writing.

Prerequisite: ARTS 004A and ARTS 004B or portfolio or consent of instructor.

ARTS 159: Advanced Projects in Acrylic Painting [4]
Application of acrylic medium techniques for the purpose of creating original works. Course advances each student's understanding and application of color, composition, proportion, and principles of artistic creativity.

Prerequisite: ARTS 001 or (ARTS 003A and ARTS 003B) or portfolio or consent of instructor. May be repeated for credit twice.

ARTS 170: Techniques of Contemporary Artists [4]
Students have opportunity to study with a contemporary artist. Open to any student interested in learning how acquisition of technique supports creative processes. Emphasis is put on process instead of result. Technique taught varies depending on instructor artist's medium of expression.

May be repeated for credit four times.

ARTS 171: Techniques of Interdisciplinary Research in Arts [4]
Explores differences between research conducted by artists and by academics. Examines how artists process information, as well as how various forms of artistic expression influence content and meaning. The role of cliché and stereotypical representation in the creation of works of art is also explored.

May be repeated for credit three times.

ARTS 180: Architecture Design Studio: Modern Houses [4]
Introduces students to issues of complex form making in architecture through the study of important works of Modern domestic architecture. Tools of exploration will include research and writing, drawing, three dimensional model-making and computer modeling.

Prerequisite: ARTS 001 or (ARTS 004A and ARTS 004B) or portfolio or consent of instructor.

ARTS 181: Architecture Design Studio: Urban Architecture and Sustainability [4]
Introduces students to issues of sustainability in urban architecture. Tools include analyzing and diagramming modern and pre-modern urban form, in-depth study of specific regional and urban issues around the city of Merced, and design projects created to address these subjects. Course work includes research, writing, drawing, and model-making.

Prerequisite: ARTS 001 or (ARTS 004A and ARTS 004B) or portfolio or consent of instructor.

ARTS 183: 3-Dimensional Computer Modeling for Architecture [4]
Introduces students to 3-dimensional computer modeling in architecture. The software platform used is free version of Google Sketchup, a powerful and intuitive 3-dimensional modeling program widely used by architects. Digital media represent substantive shift in representational possibilities when compared with traditional methods. Assignments include hands-on projects, research and writing.

Letter grade only.

ARTS 190: UC Merced Chorus [2]
Selected mix of 50 to 80 voices performing choral music appropriate for a choral ensemble designed to provide singers and audiences with stimulating musical experience. Chorus will perform concert(s). Previous singing experience and sight reading skills are required. Acceptance into chorus is by audition only.

Prerequisite: Audition and proof of previous singing experience and sight reading skills. May be repeated for credit.

ARTS 192: Internship in the Arts [1-4]
Provides oversight and structure for a student's internship in a field related to the arts in community organizations, professional research projects, etc. connected to the study of art. Students required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of art.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

ARTS 195: Upper Division Undergraduate Research [1-6]
Group or individual research projects.

Permission of instructor required. May be repeated for credit.

ARTS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ARTS 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOENGINEERING

BIOE 030: Introduction to Bioengineering [4]
Presents students with an overview of the creative synergies between engineering and life sciences that define the scope of bioengineering. Examples of successful bioengineering endeavors (devices, materials, processes, models) are provided. Discussion of current frontiers and future direction of Bioengineering, with an emphasis on information technology and nanotechnology.

Prerequisite: MATH 021 and PHYS 008 and BIO 001 and CHEM 002, which may be taken concurrently. Letter grade only. Laboratory included.

BIOE 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit. Laboratory included.

BIOE 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOE 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOE 100: Physiology for Engineers [4]
Using the conceptual, analytical, modeling and design tools of engineering to achieve quantitative insights into physiological systems. Transport mechanisms, energy transduction, feedback and feed forward control, optimization, and materials selection principles in the context of cells, tissues, and organs. How muscles, nerves and biological fluids interact to allow you to read this course description.

Prerequisite: BIO 002 and MATH 021 and PHYS 008 and CHEM 008. Letter grade only. Laboratory included.

BIOE 101: Modeling of Nanoscale Process in Biology [3]
Advanced mathematical modeling, simulation and data analysis applied to biological problems at the molecular level; probabilistic models. Scope and limitations of these techniques. Molecular conformations and folding, protein structure, molecular interactions, binding sites, formation of aggregates and complexes, phase changes, membrane transport, physiological control systems in cells.

Prerequisite: MATH 021 and PHYS 008 and MATH 023 and BIO 001. Letter grade only. MATH 024 recommended. Laboratory included.

BIOE 102: Biosensors [4]
Design of natural and artificial devices for characterizing the physical and chemical environment inside and outside living cells. Detection of metabolites, toxins, pathogens and cancers. Molecular and nanoparticle probes. Immunosensors. Nucleic acid sensors and DNA chips. Enzyme-based biosensors. Organism and whole cell-based biosensors. Natural and synthetic receptors for biosensors. Remote diagnosis.

Prerequisite: BIO 001 and MATH 021 and PHYS 008. Letter grade only. Course cannot be taken after obtaining credit for BIOE 103. Laboratory included.

BIOE 103: Biosensors and Bioinstrumentation [4]
Intended for the last-year engineering student to facilitate the student's development into bioengineering investigation. Designed to introduce fundamental principles of circuit theory, analog and digital electronics and biological instrumentation techniques commonly used in biomedical research.

Prerequisite: MATH 021 and (PHYS 008 or PHYS 018) and BIO 001 and ENGR 166. Letter grade only.

BIOE 104: Biotransport [3]
Biological Transport Phenomena is the quantitative description of momentum transport (viscous flow) and mass transport (convection and diffusion) in living systems. We explore the similarities between the fundamental principles of momentum, heat, and mass transfer, develop analogies between the fundamentals that apply at microscopic and macroscopic scales, and use the fundamentals in conjunction with conservation laws to develop mathematical descriptions of physiological and engineering systems.

Prerequisite: Junior standing and MATH 021 and PHYS 018 and BIO 002 and CHEM 002 and ENGR 120. Letter grade only.

BIOE 110: Self-Assembling Molecular Systems [3]
Preparation, characterization, and applications of supramolecular structures. Factors that promote controlled molecular assembly at interfaces and in 3-D. Hydrophobic bonding and the role of water. Liquid crystalline phases. In vivo and in vitro examples of self-assembly. Biomimetic materials: the quest for adaptive responses to changes in environment, and self-healing. "Green" processing routes via biotechnology. Limitations of biomimetic materials.

Prerequisite: MATH 021 and PHYS 008 and BIO 002. Letter grade only.

BIOE 111: Biomembranes [3]
The molecular and physical chemistry of membranes formed from natural and synthetic amphiphiles. Relationships between surfactant molecular structures, chemical and physical environment, and membrane assembly. Solubility of proteins in biomembranes. Pore formation and structure. Transport through biomembranes. Biomembranes as catalysts and reaction vessels. Characterization of membrane structure and properties.

Prerequisite: MATH 021 and PHYS 008 and BIO 002. Letter grade only.

BIOE 112: Biomolecule-Substrate Interactions [3]
Cell receptor biology in the context of cell interactions with materials. Biomolecule adsorption to solid materials. Relevance to catalysis, adhesion, and responses to implanted biomaterials. Interactions between nanoparticles and biological tissue. Coagulation and thrombosis, infection, acute inflammation, chronic inflammation and the foreign body response, immune and tumorgenic mechanisms. Surface and interface characterization methods.

Prerequisite: MATH 021 and PHYS 008 and BIO 002 and ENGR 045. Letter grade only.

BIOE 113: Bioinstrumentation [4]
Signals and interactions that are useful in characterizing biomolecules and small-scale biological structures. Principles of 2-D and 3-D image formation. Resolution limits of imaging and non-imaging characterization techniques. Integration of mechanical, sensor and control technologies into devices that can perform diagnoses and repairs at cellular and subcellular length scales.

Prerequisite: BIO 001 and MATH 021 and PHYS 008. Letter grade only. Course cannot be taken after obtaining credit for BIOE 103. Laboratory included.

BIOE 114: Tissue Engineering Design [3]
Fundamental topics include: issues related to the cell source (including stem cells, plasticity, transdifferentiation, therapeutic cloning vs. reproductive cloning, bone marrow transplants, and cell differentiation and purification), cell culture and tissue organization, gene therapy delivery methods, cell adhesion and migration, issues in construct design, tissue preservation, and immunoisolation and/or modulation. We also cover current case studies and issues for FDA approval of tissue engineered products.

Prerequisite: MATH 021 and PHYS 008 and BIO 002. Letter grade only.

BIOE 117: Lab on a Chip: Developing 3rd World Diagnostics for Global Health [3]
Innovative campus course between UC San Francisco, UC Berkeley, UC Santa Cruz, and UC Merced which aims to 1) raise awareness and knowledge about global health issues 2) teach students critical engineering skills such as nano/micro-fabrication 3) enable students to design, build, and test their own diagnostics

and 4) develop entrepreneurial skills. Students learn about tuberculosis from leading experts at UCSF and then address the death of sensitive diagnostics by designing and testing their own nano/micro-systems. Taught at UC Merced with teleconferencing to the other campuses. Two field trips also are required.

Prerequisite: Junior standing and MATH 021 and PHYS 008 and BIO 001 and CHEM 002. Letter grade only. Laboratory included.

BIOE 120: Physiology for Engineers: Lab Only [1]
Human physiological functions in organ systems. Labs emphasize functional aspects of organs systems through experimentation. This lab should help you gain practical lab skills, scientific reasoning, understanding of physiology subject matter, and teamwork skills. Physiology laboratory is intended for transfer students that have completed the lecture portion of Physiology at another institution.

Prerequisite: MATH 021 and PHYS 008 and BIO 002. Letter grade only.

BIOE 126: Nanodevice Fabrication: Bridging Research and Education [3]
Teaches basic properties of nanomaterials and their applications as transducers (the lecture part). Nanomaterial synthesis using both solution and vapor-based approaches will be performed and a transducer will be fabricated and tested (the lab part). The interactive and experiential education will be blended with theoretical concepts.

Prerequisite: Junior standing and CHEM 002 and (PHYS 009 or PHYS 019). Letter grade only. ENGR 065 is highly recommended but not required. Laboratory included.

BIOE 150: Bioengineering Design [3]
Students work in teams on bioengineering problems requiring design solutions. Students define the problem, propose a viable solution, acquire approval for the design, and build and test the designed device.

Prerequisite: CHEM 008 and ENGR 045 and ENGR 120 and ENGR 130 and MATH 021 and (PHYS 008 or PHYS 018) and BIO 002 and ENGR 065 and ENGR 166 and BIOE 103 and BIO 161. Letter grade only. Discussion and laboratory included.

BIOE 195: Upper Division Undergraduate Research [1-5]
Research credit is designed to give credit to students that elect to conduct research in a laboratory on campus. Credits are proportional to the hours spent in the laboratory (1-5 credits).

Permission of instructor required. Letter grade only. May be repeated for credit.

BIOE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOE 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIOLOGICAL ENGINEERING AND SMALL-SCALE TECHNOLOGIES

BEST 200: Special Topics in Bioengineering [3]
Special Topics in Bioengineering cover background principles of cutting-edge research directions in the field of biological engineering. Includes three hours of lecture and discussion per week and significant out-of-class reading and study. The course format also emphasizes student-led presentation, analysis and discussion of reading assignments from the current and recent scientific literature.

Prerequisite: MATH 021 and BIO 002. Letter grade only.

BEST 201: Special Topics in Materials [3]
Special Topics in Materials covers background principles of cutting-edge research directions in the field of material science. Includes three hours of lecture and discussion per week and significant out-of-class reading and study. The course format also emphasizes student-led presentation, analysis and discussion of reading assignments from the current and recent scientific literature.

Prerequisite: BIO 002 or equivalent. Letter grade only.

BEST 210: Structure and Properties of Materials [4]
Structure and bonding of materials and their relationship to the mechanical, thermal, electrical, optical, and magnetic properties of materials within the context of structure-properties-processing performance relationships. Non- and quasi-crystalline materials and the role of defects. Processing and device applications.

Letter grade only. Discussion and laboratory included.

BEST 214: Tissue Engineering Design [3]
Fundamental topics include: issues related to the cell source (including stem cells, plasticity, transdifferentiation, therapeutic cloning vs. reproductive cloning, bone marrow transplants, and cell differentiation and purification), cell culture and tissue organization, gene therapy delivery methods, cell adhesion and migration, issues in construct design, tissue preservation, and immunoisolation and/or modulation. We also cover current case studies and issues for FDA approval of tissue engineered products.

Letter grade only.

BEST 217: Lab on a Chip: Developing 3rd World Diagnostics for Global Health [3]
This is the first-ever four campus course between UC San Francisco, UC Berkeley, UC Santa Cruz, and UC Merced which aims to 1) raise awareness and knowledge about global health issues 2) teach students critical engineering skills such as nano/micro-fabrication 3) enable students to design, build, and test their own diagnostics and 4) develop entrepreneurial skills. Students learn about tuberculosis from leading experts at UCSF and then address the dearth of sensitive diagnostics by designing and testing their own nano/micro-systems. Taught at UC Merced with teleconferencing to the other campuses and two field trips.

Letter grade only. Laboratory included.

BEST 219: Materials Simulations [3]
This course will cover computational methods in materials research and their applications in theoretical studies. Among such methods are ab initio, molecular dynamics (MD), Mesoscale, Multiscale modeling and Finite element methods. Nanostructure evolution and materials properties will also be included. A computational MD project will be developed (lab).

Letter grade only. Discussion and laboratory included.

BEST 224: Polymeric Materials [4]
Relationships between molecular characteristics, thermodynamics, kinetics, microstructure and properties in the context of polymeric materials. Students will apply their knowledge of physics, chemistry, mathematics and biology to develop a proficient understanding of how structure and processing affect the properties and performance of biological and synthetic polymers.

Prerequisite: Graduate standing in Engineering or Natural Sciences. Letter grade only. Discussion included.

BEST 226: Nanodevice Fabrication [3]
Teaches basic properties of nanomaterials and their applications (the lecture part). A nanoscale transducer will be chosen as a sensing element and sensors will be fabricated and tested (the lab part). The interactive and experiential education will be blended into theoretical concept teaching.

Letter grade only. Laboratory included.

BEST 291: Research Seminar [1]
Seminar series covering various topics in quantitative and systems biology, bioengineering, biomaterials and nanotechnology hosted by combined BEST and QSB Graduate Group.

May be repeated for credit.

BEST 292: Group Meeting [1]
Meetings to describe current research progress and future research plans lead by BEST faculty.

May be repeated for credit.

BEST 293: Journal Club [1]
Student-led presentation, analysis and discussion of reading assignments from the scientific literature.

May be repeated for credit.

BEST 294: Responsible Conduct in Research [1]
Seminar covering responsibilities and expectations for researchers as well as advice for success in graduate school and science careers, required for NIH-funded graduate students.

Satisfactory/Unsatisfactory grading only.

BEST 295: Graduate Research [1-12]
Supervised research with BEST faculty.

Permission of instructor required. May be repeated for credit.

BEST 298: Directed Group Study [1-6]
Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

BEST 299: Directed Independent Study [1-6]
Supervised course study with BEST faculty.

Permission of instructor required. Letter grade only. May be repeated for credit three times. Laboratory included.

BIOLOGICAL SCIENCES

BIO 001: Contemporary Biology [4]
Introduction to the major concepts in biology including origin of life, evolution, DNA, genes and genomes, principles and patterns of inheritance, genotype to henotype, gene, environment and disease relationships, biotechnology, ecosystem structure and function, nutrient cycles and pollution, biodiversity, earth systems.

Letter grade only. Discussion included.

BIO 001L: Contemporary Biology Lab [1]
BIO 1L is the laboratory component of BIO 1 Contemporary Biology BIO 001 must be taken concurrently.

Letter grade only.

BIO 002: Introduction to Molecular Biology [4]
Introduction to the molecules and molecular processes underlying life. Overview of structures and chemical properties of biological macromolecules.

Prerequisite: BIO 001. Letter grade only. Discussion included.

BIO 002L: Introduction to Molecular Biology Lab [1]
Laboratory exercises demonstrating and reinforcing topics covered in BIO 2. BIO 002 must be taken concurrently.

Letter grade only.

BIO 003: To Know Ourselves: Molecular Basis of Health and Disease [4]
Introduction to the molecular basis of a number of human diseases and molecular-based therapies for disease treatment.

Discussion included.

BIO 005: Concepts and Issues in Biology Today [4]
Fundamental biological concepts in the areas of genetics, evolution and ecology are explored in the context of current issues enabling students to understand the relevance of biology to their lives both as individuals and as voting citizens.

Course cannot be taken after obtaining credit for BIO 001. Not recommended for BIO majors. Discussion and laboratory included.

BIO 010: Genetics, Stem Cells and Development [4]
Issues associated with genes, stem cells and embryonic development increasingly impact our lives. Integrates an overview of biologic topics such as genetic testing, stem cells and the use of animal models with their bioethical considerations. It places science in the context of personal decisions and ethics.

BIO 034: Introduction to Marine Science [4]
An introduction to biological, chemical, and physical oceanography, marine geomorphology, and their synthesis in the study of marine life; also including relationships with atmospheric, freshwater, and terrestrial systems. Areas of emphasis include ecosystems (from the deep sea to saltwater ponds), the integrated coastal zone, resource management, and global change.

Discussion included.

BIO 043: Biodiversity and Conservation [4]
Introduction to the study of biodiversity and conservation. Patterns, origin, and importance of biodiversity are discussed. An introduction to the major biological groups and the conservation efforts used to preserve contemporary biodiversity.

Laboratory included.

BIO 046: Paleobiology: Age of Dinosaurs [4]
Dinosaurs are used to explore the development of science and fundamental concepts of geology, evolution, and biodiversity. Students are also introduced to basic anatomy and the underlying unity of animal form. Current controversies such as mass extinctions are explored, and students weigh evidence in coming to their own interpretations.

Discussion and laboratory included.

BIO 050: Human Development [4]
Male and female reproductive systems, hormonal control of egg-sperm interactions, fertilization, venereal disease, embryonic development, fetal physiology.

Discussion and laboratory included.

BIO 051: Cancer and Aging [4]
Introduction to the biology of cancer and aging, including discussions of the biological and molecular basis of aging and cancer, novel and conventional cancer treatments, cancer prevention, and prospects for new approaches to increase longevity and health.

Discussion and laboratory included.

BIO 060: Nutrition [4]
Introduction to nutrition science that integrates basic concepts of nutrients, human physiology, microbiology, biochemistry, and the psychology of wellness.

Discussion and laboratory included.

BIO 090X: Freshman Seminar [1]
Examination of a topic in the biological sciences.

May be repeated for credit three times.

BIO 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

BIO 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 101: Biochemistry I [4]
Advanced study of proteins, enzymes, enzyme kinetics, and carbohydrates metabolism in living organisms.

Prerequisite: CHEM 100. Letter grade only. Discussion included.

BIO 102: Advanced Biochemistry and Molecular Biology [4]
Mechanisms of amino acid, nucleic acid, and lipid metabolism plus advanced mechanisms of gene expression, signal transduction, and regulation of gene expression.

Prerequisite: BIO 101. Letter grade only. Discussion and laboratory included.

BIO 104: Biophysics [4]
Aims to give students an understanding of relevant physical principles for biological systems, introduce them to experimental and theoretical techniques of biophysics and to communicate the excitement of cutting-edge biophysics research. Topics include diffusion, fluids, entropic forces, motor proteins, enzymes, nerve impulses, networks and evolution.

Prerequisite: (PHYS 018 or PHYS 008) and (PHYS 019 or PHYS 009). Letter grade only. Discussion included.

BIO 104L: Biophysics Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 104. BIO 104 must be taken concurrently.

Prerequisite: (BIO 101 or BIO 002) and (ENGR 130 or CHEM 010) or consent of instructor. Letter grade only.

BIO 105: Enzymology [4]
Advanced study of enzyme mechanisms and regulation.

Prerequisite: BIO 002 and CHEM 010. Discussion included.

BIO 105L: Enzymology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 105. BIO 105 must be taken concurrently.

Prerequisite: BIO 002 and CHEM 010.

BIO 106: Introduction to Molecular and Cell Biology [4]
Advanced study of the mechanisms of nucleic acid replication, transcription and translation as well as gene regulation and expression.

Prerequisite: BIO 001. Letter grade only. Discussion and laboratory included.

BIO 107: Physical Biochemistry [4]
Physical Biochemistry is the study of Biochemistry via properties that can be quantitatively assessed to provide specific molecular information. Such properties include macromolecular folding, multimerization, structure, and ligand binding. Instruct students on these properties of macromolecules and on the experimental techniques that can quantitatively probe these properties.

Prerequisite: BIO 101 and (MATH 021 or MATH 011). Letter grade only. Discussion included.

BIO 110: The Cell [4]
Introduction to the structure and function of bacterial, plant and animal cells, with an emphasis on universal cellular systems, including regulation of subcellular organization, control of cellular processes by internal and external signaling, energy capture, storage and usage, and cell cycle.

Prerequisite: BIO 002 and BIO 101, which may be taken concurrently. Discussion and laboratory included.

BIO 111: Cells, Tissues, and Organs [4]
Introduction to principles of cell structure and the organization of cells into tissues, organs, and organ systems. Both the cellular and extracellular components of the primary tissues and their compilation into the major organic systems are covered. Emphasis on understanding the link between cellular architectures and organ function.

Prerequisite: BIO 110. Discussion included.

BIO 120: General Microbiology [4]
Molecular basis for diversity in bacteria and archae. Students explore the significance of molecular diversity in microbial biology and gain an understanding of the genetic, physiologic, and structure-function relationships that underlie the remarkable ability of these organisms to adapt to the environment.

Prerequisite: BIO 110. Discussion included.

BIO 120L: General Microbiology Laboratory [2]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 120. BIO 120 must be taken concurrently.

Prerequisite: BIO 110.

BIO 121: Introduction to Ecological and Environmental Microbiology [4]
Fundamentals of microbiology in ecological and environmental systems, including the distribution of microbial diversity throughout terrestrial, 'extreme,' and marine environments; microbial control of global biogeochemical cycles; and environmental services provided by microorganisms. Both classical and contemporary biochemical, molecular, and genomic approaches to microbial physiology, metabolism, and ecology will be discussed.

Prerequisite: CHEM 010 and (ESS 001 or BIO 001 or ENVE 020) or consent of instructor. Discussion included.

BIO 122: Microbial Pathogenesis [4]
Genetic and biochemical features of infectious agents including identification and characterization of pathogens and the epidemiology of infectious diseases.

Prerequisite: BIO 120. Discussion included.

BIO 123: Human Parasitology [4]
Introduction to protozoan, worm, and insect parasitism in animals and humans and resultant diseases. Emphasis on epidemiology, diagnosis, and immunology of parasitic infections.

Prerequisite: BIO 120. Discussion included.

BIO 124: Microbial Evolution [4]
Evolution of microbes. Concepts covered include horizontal exchange, genome evolution, dispersal of microbes, population size, cryptic genes, mutagenesis and mutagenic pathways, phylogenetics, experimental evolution, metabolic evolution and antimicrobial resistance evolution.

Prerequisite: BIO 120 and BIO 141, which may be taken concurrently. Letter grade only. Discussion included.

BIO 125: Emerging Public Health Threats [4]
Multidisciplinary study of the historical, sociological, medical, and biological issues underlying new public health threats and the scientific and policy-based approaches to responding to these new threats.

Prerequisite: WRI 010 and BIO 001 and BIO 002. Discussion included.

BIO 127: General Virology [4]
Introduction to biology of bacterial and animal viruses, focusing on structure, infective cycle, interactions with host, transmission and methods of detection and control. Discusses scientific literature and current topics in virology.

Prerequisite: BIO 110, which may be taken concurrently. Letter grade only. BIO 140 strongly recommended. Discussion included.

BIO 130: Plant Biology [4]
An introduction to the biology of plant life, including plant cell physiology, plant growth and development, and plant evolution and adaptation.

Prerequisite: BIO 110. Discussion included.

BIO 133: Flora of California [5]
Introduces students to the plant diversity of California. It consists of lectures, discussions, and field trips. The field trips focus on plant identification in the foothills of the Central Sierra Nevada and help illustrate concepts presented in lecture such as endemism, plant/soil interactions, and vegetation types.

Prerequisite: Junior standing and BIO 001 or ESS 001 or BIO 148 or ESS 050 or consent of instructor. Discussion and fieldwork included.

BIO 134: Marine Sciences Theory and Practice [4]
Integrative studies of ocean and coastal ecosystems, including current issues. Also referencing relationships with atmospheric, freshwater, and terrestrial systems. Areas of emphasis include practical field study in the coastal zone in any area of marine science.

Prerequisite: Junior standing and BIO 034 and (BIO 141 or BIO 148). Letter grade only. Discussion and fieldwork included.

BIO 140: Genetics [4]
Includes concepts of inheritance, structure and function of genes and genomes, recombination, genetic mapping, gene regulation, mutations, and recombinant DNA technology including labs and discussions.

Prerequisite: BIO 002 and (MATH 012 or MATH 022, which may be taken concurrently) and (MATH 018 or MATH 032 or ENVE 105 or PSY 010, which may be taken concurrently) or equivalent course accepted by the Biology major. Letter grade only. Discussion included.

BIO 141: Evolution [4]
Natural Selection and Darwinian evolution, includes concepts of population and quantitative genetics, speciation, neutral theory and molecular evolution, phylogenetics, comparative genomics, and macroevolution including labs and discussion.

Prerequisite: BIO 101 or BIO 002. Letter grade only. Laboratory included.

BIO 142: Genome Biology [5]
Introduction to the concepts behind genome biology and a detailed overview of the many tools used in comparative genomics. Specific topics include genome assembly, gene modeling and comparative genomics, transcriptomics, and proteomics of prokaryotic and eukaryotic organisms. Students carry out real scientific projects in collaboration with course faculty and produce new genomic data of publishable quality. Includes mandatory weekly three hour lab.

Prerequisite: BIO 110. Letter grade only. Discussion and laboratory included.

BIO 143: Biodiversity and the Tree of Life [4]
Introduction to the biological diversity in the three domains of the Tree of Life (Archaebacteria, Eubacteria, and Eukaryotes): overview of species diversity as well as diversity in the deep characteristics (e.g., reproduction, metabolism, structure) of plants, animals, fungi, and microbes. Illustrated by complementary field trips and labs (part of BIO 143F).

Prerequisite: BIO 001. Letter grade only. Discussion included.

BIO 143F: Biodiversity and the Tree of Life [1]
Field trips and labs reinforcing topics covered in BIO 143. Five field trips illustrate the biodiversity of different regions of California (seashore, Central Valley, foothills, and Sierra Nevada). Wet labs serve to examine the organisms collected during field trips, and participate in a long-term DNA Barcoding project of the field sites visited. BIO 143 must be taken concurrently.

Prerequisite: BIO 001. Letter grade only. Laboratory included.

BIO 144: Phylogenetics [4]
Theory behind phylogenetic reconstruction and an introduction to the diverse methods for phylogenetic inference. How to deal with morphological and molecular characters is discussed as well as the comparative method.

Prerequisite: BIO 140 and (MATH 032 or MATH 018). Discussion included.

BIO 144L: Phylogenetics Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 144. BIO 144 must be taken concurrently.

Letter grade only.

BIO 145: Introduction to Population and Community Ecology [4]
Comprehensive introduction to the ecology of populations, communities and ecosystems. Examines the dynamics of single-species populations, and then moves to species interactions including competition, predation, parasitism, and mutualism. Structure and dynamics of entire communities and food webs also are examined. Discusses conservation biology applications throughout.

Prerequisite: BIO 001 and MATH 021. Discussion included.

BIO 146: Paleobiology [4]
An introduction to the major geological factors that have affected the evolution and the diversity of organisms. We also present how the fossil record can help us understand evolution of Life through time, with an emphasis on macro-evolutionary events (e.g., mass extinctions, transitions between habitats, radiations).

Prerequisite: BIO 140. Discussion included.

BIO 147: Astrobiology [4]
Astrobiology refers to the study of the origin and evolution of life in the cosmos. It is an integrative, multidisciplinary field that includes areas of biology, astronomy, geology, chemistry and physics. Students in the class face some of the most fundamental topics addressed by science today such as who we are, where we came from, and where we might go. We cover three main themes: How did life begin and evolve? Does life exist elsewhere in the universe? What is life's future on Earth and beyond?

Prerequisite: CORE 001 and (BIO 001 or BIO 005 or PHYS 006 or PHYS 008 or CHEM 002 or ESS 001) or consent of instructor. Letter grade only. Discussion included.

BIO 148: Fundamentals of Ecology [4]
Introduction to the principles of ecology at population, community, ecosystem, landscape, and global scales.

Prerequisite: BIO 001 or BIO 005 or ESS 001 or ESS 005 or consent of instructor. Letter grade only. Discussion and fieldwork included.

BIO 149: Conservation Biology [4]
Detailed examination of the evolutionary, ecological, management, and policy issues related to the conservation of ecosystems, species, and genetic diversity. Theory and practical aspects of biological conservation are also presented, with special reference to case studies from California.

Prerequisite: BIO 001 and (MATH 018 or MATH 032). Letter grade only. BIO 148 recommended. Discussion included.

BIO 149F: Conservation Biology Laboratory [1]
Field and laboratory exercises reinforcing material presented in BIO 149/ESS 149.

Prerequisite: BIO 149, which may be taken concurrently. Letter grade only. Laboratory included.

BIO 150: Embryos, Genes, and Development [4]
Principles of developmental biology as revealed through analysis of invertebrate and vertebrate systems. Animal models are used to examine the molecular and cellular mechanisms that influence cell fate. Cell signaling is studied in the context of embryonic pattern formation and the development of body plans and organ systems.

Prerequisite: BIO 110. Discussion included.

BIO 151: Molecular Immunology [4]
Emphasis on development and function of hematopoietic and immune systems and their roles in responding to environmental change, maintenance of health, and disease pathogenesis.

Prerequisite: BIO 110. Discussion included.

BIO 151L: Molecular Immunology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 151. BIO 151 must be taken concurrently.

Prerequisite: BIO 110. Letter grade only.

BIO 152: Cancer Genetics and Tumor Biology [4]
Topics include viral and hormonal carcinogenesis, molecular aberrations in cancer, tumor development, epigenetics and cancer, tumor immunology, oncogenes.

Prerequisite: BIO 101 or BIO 110. Discussion included.

BIO 153: Evolution and Development [4]
Comparison and contrast of the development and developmental cues of a variety of animals and emphasizes how conserved developmental pathways have been manipulated through evolutionary processes to produce different physical features. The effects of regulatory region mutations, gene duplication, and genetic co-opting are investigated.

Prerequisite: BIO 110. Letter grade only. Discussion included.

BIO 154: Developmental Immunology [4]
An in-depth exploration of the development of the immune system. Topics include the biology of primary lymphoid organs (particularly the thymus and bone marrow) and early development of lymphoid and myeloid cells. Emphasis is on the temporal, microenvironmental, genetic and molecular control of immune cell development.

Prerequisite: Junior standing and BIO 151. Letter grade only. Discussion included.

BIO 160: Comparative Physiology [4]
Covers the function of the major organ systems by studying species-specific adaptations across the vertebrate subphylum, emphasizing physiological adaptations to environmental challenges. Locomotion, reproduction, cardiovascular, renal, and pulmonary function serve as the models for assessing the cellular basis for physiologic adaptation across the spectrum of vertebrates.

Prerequisite: BIO 101 or BIO 002. Discussion included.

BIO 160L: Comparative Physiology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 160. BIO 160 must be taken concurrently.

Prerequisite: BIO 110. Pass/No Pass grading only.

BIO 161: Human Physiology [5]
Understanding the mechanisms underlying function of major human organs. Emphasis includes neural transmission and action potential, cardiovascular, renal and gastrointestinal physiology, metabolism, and endocrinology. Laboratory experiments demonstrating and reinforcing topics covered in lecture with an emphasis on scientific method.

Prerequisite: Senior standing and BIO 101 and (PHYS 009 or PHYS 019). Letter grade only. Laboratory included.

BIO 162: Evolutionary Constraints of Physiology [4]
An introduction to the materials upon which evolution acts. We study the structure of animals, the materials from which living organisms are made and the limitations that those materials impose upon evolution.

Prerequisite: BIO 160. Discussion included.

BIO 163: Endocrinology [4]
Basic principles of endocrinology; structure and functions of endocrine glands primarily in mammals with reference to other vertebrates for comparison; hormonal control of kidney function, metabolism, neural transmission, and reproduction; mechanisms of hormone actions.

Prerequisite: BIO 110 and BIO 160 and CHEM 008 or consent of instructor. Letter grade only. May be repeated for credit once. Discussion included.

BIO 163L: Endocrinology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 163 with an emphasis on analytical techniques in endocrinology. BIO 163 must be taken concurrently.

Letter grade only. May be repeated for credit once.

BIO 164: Human Anatomy [5]
Introduction to the basic concepts of human anatomy at the cell, tissue, and organ levels, through a system-based approach (e.g., skeletal, muscular, nervous, cardiovascular, respiratory, digestive, urinary, reproductive). Laboratories include dissection of mammal organs (cat, sheep, cow), observation of human models and histological slides of human tissues, and interactive computer based exercises.

Prerequisite: Junior standing and BIO 110. Letter grade only. Discussion and laboratory included.

BIO 170: Neurobiology [4]
Examination of the general operations of the central and peripheral nervous system. Covers cellular neuroscience, including the molecular basis of excitability, synaptic transmission, and neuronal signal transduction, as well as the organization and operations of the major neural systems associated with sensation, locomotion, and higher brain function.

Prerequisite: BIO 110. Discussion included.

BIO 170L: Neurobiology Laboratory [1]
Laboratory experiments demonstrating and reinforcing topics covered in BIO 170. BIO 170 must be taken concurrently.

Prerequisite: BIO 110. Letter grade only.

BIO 175: Biostatistics [4]
Advances in statistical techniques to investigate experimental data generated in molecular, cellular, and evolutionary biology, and health sciences research.

Prerequisite: (MATH 018 or MATH 032) and (MATH 012 or MATH 022 or MATH 030). Discussion included.

BIO 180: Mathematical Modeling for Biology [4]
Statistical analysis and mathematical modeling skills for life scientists. The first half of this course is about building statistical models of complex data sets and the second half is about using population models to describe demographic change, ecosystems and epidemics. Extensive computer laboratories using the "R" statistical language.

Prerequisite: (MATH 018 or MATH 032) and (BIO 101 or BIO 002) and (MATH 012 or MATH 022 or MATH 030). Math prerequisites must be completed with a B- or better. Letter grade only. Discussion included.

BIO 181: Introduction to Biomolecular Simulation [4]
Lectures and laboratory exercises teach the principles and practice of molecular modeling with a focus on simulations of biological macromolecules. Topics covered include classical molecular dynamics, molecular mechanics, docking, and visualization. The computational laboratories involve simulations of systems including water, micelles, DNA, and proteins.

Prerequisite: (MATH 021 or MATH 011) and BIO 002 and CHEM 008 and (PHYS 008 or PHYS 018) or consent of instructor. Discussion and laboratory included.

BIO 182: Bioinformatics [5]
Detailed introduction to the tools, algorithms, statistics and databases used in bioinformatics, emphasizing an open-source, command-line toolbox approach. Topics may include: alignments, search, gene/motif classification, phylogenetics, genomics, gene expression, ontologies, structure and networks. Course includes a mandatory computer laboratory. Prior programming experience recommended, but not assumed.

Prerequisite: (BIO 002 or BIO 101) and (BIO 140, which may be taken concurrently) and (MATH 018

or MATH 032). Letter grade only. Fieldwork and laboratory included.

BIO 183: Population Genetics [4]
A study of the various factors that affect gene flow and frequency within a population. Theories of selection, neutrality, drift, hitchhiking, recombination, mutation, isolation, in-breeding, and selfish genetic elements are taught along with statistical tests and experimental methods for detecting these forces.

Prerequisite: BIO 140 and (MATH 021 or MATH 011). Discussion included.

BIO 185: Biomedical Ethics [3]
Ethical issues associated with contemporary biology and the complex relationships among medicine, science, and society. Topics include genetic engineering, cloning, and stem cell research.

Prerequisite: BIO 001 or BIO 003.

BIO 190: Research Seminar [1]
Student-led presentations of current topics in biological sciences, including independent research presentations.

Prerequisite: Junior standing. Permission of instructor required.

BIO 192: Communicating Science [1-2]
Development of skills to effectively communicate scientific topics to broad audiences.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit four times.

BIO 195: Upper Division Undergraduate Research [1-5]
Group or individual research projects in the biological sciences under the direction of a BIO faculty member.

Permission of instructor required. May be repeated for credit.

BIO 198: Upper Division Directed Group Study [1-5]
Group directed study in the biological sciences under the guidance of a BIO faculty member.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

BIO 199: Upper Division Individual Study [1-6]
Independent study in the biological sciences under the direction of a BIO faculty member.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEMISTRY

CHEM 001: Preparatory Chemistry [3]
Preparation for general chemistry. Units of measurement, dimensional analysis, significant figures; elementary concepts of volume, mass, force, pressure, energy, density, temperature, heat, work; fundamentals of atomic and molecular structure; the mole concept; acids and bases; stoichiometry; properties of the states of matter; gas laws; solutions, concentrations.

NOTE: CHEM 001 satisfies no requirements other than contribution to the 120 units required for graduation. Designed for students who need additional help prior to enrollment in General Chemistry.

Course cannot be taken after obtaining credit for CHEM 002. Discussion included.

CHEM 002: General Chemistry I [4]
First semester of a two-semester general chemistry sequence. Stoichiometric calculations, types of chemical reactions, properties of gases, thermochemistry, introduction to chemical equilibrium, basic atomic structure and atomic orbital theory, periodic properties, and chemical bonding. The concepts and quantitative skills introduced in lecture are reinforced by a laboratory section.

Prerequisite: CHEM 001 or passing score on the Chemistry Placement Exam or equivalent. Laboratory included.

CHEM 008: Principles of Organic Chemistry [4]
Molecular shapes and charge distributions; resonance; electron delocalization; organic structures, nomenclature and isomerism, stereochemistry; optical activity; organic reactions; IR spectroscopy; intermolecular forces. Rational approaches to organic mechanism are emphasized.

Prerequisite: CHEM 002, with grade of A- or better, or CHEM 010. Laboratory included.

CHEM 010: General Chemistry II [4]
Second semester of a two-semester general chemistry sequence. Chemical kinetics, acid-base, ionic, and gaseous equilibria, chemical thermodynamics, electrochemistry, main-group and transition-metal chemistry, nuclear chemistry. The concepts and quantitative skills introduced in lecture are reinforced by a laboratory section.

Prerequisite: CHEM 002. Laboratory included.

CHEM 090X: Freshman Seminar in Chemistry [1]
Examination of a topic in chemistry.

Pass/No Pass grading only.

CHEM 095: Lower Division Undergraduate Research [1-5]
Laboratory, field, theoretical, and/or computational research under the supervision of a faculty member on a topic of mutual interest. A written report is required.

Permission of instructor required. Grading option is instructor preference. May be repeated for credit.

CHEM 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 100: Organic Synthesis and Mechanism [3]
Reactions, syntheses, purification and characterization of all of the major classes of organic compounds. Includes standard organic reaction mechanisms and bioorganic mechanism. A retrosynthetic approach to synthetic design is emphasized.

Prerequisite: CHEM 008 and CHEM 010.

CHEM 100L: Organic Chemistry Laboratory [1]
Laboratory experiments in synthetic methods and chemical and spectroscopic characterization of organic compounds. Emphasis is on microscale techniques.

Prerequisite: CHEM 100, which may be taken concurrently.

CHEM 101L: Advanced Synthetic Laboratory [2]
Laboratory experiments in synthetic methods and chemical and spectroscopic characterization of organic and inorganic compounds. Emphasis is on microscale techniques.

Prerequisite: CHEM 100, which may be taken concurrently.

CHEM 111: Biochemistry I [4]
Advanced study of proteins, enzymes, enzyme kinetics, and carbohydrates metabolism in living organisms.

Prerequisite: CHEM 100. Letter grade only. Discussion included.

CHEM 112: Quantum Chemistry and Spectroscopy [3]
Theory and practical application of molecular quantum mechanics. Schrodinger equation and matrix representations of quantum mechanics; simple exactly solvable model problems; calculation of observable properties; vibrational and electronic wave functions; approximation methods; quantum mechanics of spectroscopy.

Prerequisite: CHEM 010 and MATH 024 and PHYS 009. Letter grade only.

CHEM 113: Chemical Thermodynamics and Kinetics [3]
Statistical mechanics, thermodynamics, and chemical kinetics, taught from a perspective that develops the behavior of bulk matter from molecular properties.

Prerequisite: CHEM 112. Letter grade only.

CHEM 115: Instrumental Analysis and Bioanalytical Chemistry [3]
Spectroscopic, electrochemical, and separation methods of chemical analysis including bioanalytical techniques.

Prerequisite: CHEM 112, which may be taken concurrently.

CHEM 120: Inorganic Chemistry [3]
Descriptive inorganic chemistry, reactivity, inorganic spectroscopy, group theory, and crystallography.

Prerequisite: CHEM 008 and CHEM 010. Letter grade only.

CHEM 122: Advanced Biochemistry and Molecular Biology [4]
Mechanisms of amino acid, nucleic acid, and lipid metabolism plus advanced mechanisms of gene expression, signal transduction, and regulation of gene expression.

Prerequisite: BIO 101 or CHEM 111. Letter grade only. Discussion and laboratory included.

CHEM 130: Organic Spectroscopy and Computation [3]
Modern methods and tools employed for the determination of organic molecular structure including NMR [1D and 2D FT], IR, and UV spectroscopy. Applications of quantum mechanical concepts and methods to understand and predict organic structures and reactivities. Computational modeling methods, including force field and quantum mechanical computer calculations.

Prerequisite: CHEM 100 and CHEM 112. Laboratory included.

CHEM 131: Molecular Spectroscopy [3]
Time-dependent quantum mechanics; interaction of radiation with matter; electronic spectra of atoms and molecules; vibrational, rotational, and Raman spectra; magnetic resonance spectroscopy; X-ray, neutron, and electron diffraction.

Prerequisite: CHEM 112. Letter grade only.

CHEM 133: Biophysical Chemistry [3]
Biochemical kinetics, solution thermodynamics of biochemical systems, multiple equilibria, hydrodynamics, energy levels, spectroscopy, and bonding. Three-dimensional structure of proteins, forces that stabilize protein structures, protein folding, prediction of protein structure from sequence. Three-dimensional structure of DNA and RNA, sequence-specific recognition of DNA and RNA, RNA-catalyzed processes.

Prerequisite: CHEM 113 and (CHEM 111 or BIO 101). Letter grade only.

CHEM 140: Nanoscale Materials Chemistry [3]
An introduction to the properties of matter on size scales intermediate between atoms or molecules and bulk matter, with emphasis on metallic and semiconductor nanoparticles. Synthesis, characterization, physical and chemical properties, and applications of these materials.

Prerequisite: CHEM 100 and CHEM 113 and CHEM 120, all of which may be taken concurrently. Letter grade only.

CHEM 150: Inorganic and Materials Chemistry Laboratory [2]
Laboratory experiments focusing on the synthesis and characterization of inorganic compounds.

Prerequisite: CHEM 120, which may be taken concurrently. Letter grade only. Laboratory included.

CHEM 153: Physical Chemistry Laboratory [2]
Introduces students to modern laboratory instrumentation and experimental techniques in physical chemistry. It consists of a number of experiments that use different techniques to explore fundamental concepts in spectroscopy, kinetics, and chemical thermodynamics.

Prerequisite: CHEM 112, which may be taken concurrently. Letter grade only. Laboratory included.

CHEM 155: Instrumental Analysis Laboratory [2]
Introduces students to the major concepts of instrumental analysis and to some of the instrumental techniques most commonly used in analytical and bioanalytical chemistry. It emphasizes the use of modern, commercial instrumentation to perform quantitative and qualitative analyses of the physical properties and chemical composition of samples.

Prerequisite: CHEM 115, which may be taken concurrently. Letter grade only.

CHEM 190: Advanced Topics in Chemistry [3]
In-depth treatment of a timely advanced topic in chemistry as selected by the faculty. More than one section covering different topics may be offered.

Permission of instructor required. Letter grade only. May be repeated for credit.

CHEM 194: Ethics and Communication in Chemistry [1]
Addresses two key competencies that all professional chemists need: scientific ethics and oral communication skills. Scientific and professional ethics are taught through lectures, readings, and discussion of case studies. Oral communication skills are addressed through lectures and by having each student present a scientific seminar.

Prerequisite: Senior standing and Chemical Sciences (major or minor). Pass/No Pass grading only. Discussion included.

CHEM 195: Upper Division Undergraduate Research [1-5]
Laboratory, field, theoretical, and/or computational research under the supervision of a faculty member on a topic of mutual interest. A written report is required.

Permission of instructor required. Grading option is instructor preference. May be repeated for credit.

CHEM 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CHEM 200: Advanced Organic Synthesis [3]
Logical approaches to designing syntheses of target organic compounds. Introduction to retrosynthetic analyses and background on the reactions needed to achieve common syntheses; protecting groups and stereoselective methodologies. Classic syntheses are discussed in the context of modern methods. Introduction to literature search tools, a practical estimate of the reliability of published protocols, and references on chemical purification.

Prerequisite: One year of organic chemistry. Letter grade only.

CHEM 201: Organic and Organometallic Reaction Mechanisms [3]
Thermodynamics, statistical mechanics, and molecular orbital theory are used to explain reactivity, product distributions, the stability of intermediates, and transition state structure. Elements of computational chemistry, kinetic methods of interrogation, linear free energy relationships, kinetic isotope effects, and other methods for empirically constructing plausible reaction mechanisms.

Prerequisite: One year of organic chemistry and one year of physical chemistry. Letter grade only.

CHEM 202: Bioorganic Chemistry [3]
The molecular basis of biological processes. Methods by which enzymes catalyze organic reactions; experimental methods by which the mechanisms of enzyme-catalyzed reactions are elucidated; chemistry of disease states and drug action.

Prerequisite: One year of organic chemistry and one semester of biochemistry. Letter grade only.

CHEM 212: Molecular and Solid State Quantum Chemistry [3]
Theory and practical application of molecular quantum mechanics. Schrödinger equation and matrix representations of quantum mechanics; simple exactly solvable model problems; calculation of observable properties; vibrational and electronic wave functions; approximation methods; quantum mechanics of spectroscopy. Graduate requirements include computer laboratory and a computational project.

Letter grade only.

CHEM 213: Chemical Thermodynamics and Kinetics [3]
Statistical mechanics, thermodynamics, and chemical kinetics, taught from a perspective that develops the behavior of bulk matter from molecular properties; modern experimental and theoretical methods in kinetics.

Prerequisite: CHEM 212. Letter grade only.

CHEM 215: Chemical Kinetics [3]
The rates and mechanisms of elementary reactions, unimolecular reactions, reactions in the gas phase, in solutions and on surfaces. Energy and charge transfer phenomenon. Kineitics of surface and enzyme catalysis. Kinetic modelling of multistep reactions.

Prerequisite: CHEM 112 and CHEM 113 or graduate standing in Chemistry or Physics. Letter grade only.

CHEM 231: Molecular Spectroscopy [3]
Time-dependent quantum mechanics; interaction of radiation with matter; electronic spectra of atoms and molecules; vibrational, rotational, and Raman spectra; magnetic resonance spectroscopy; X-ray, neutron, and electron diffraction. Modern experimental and theoretical methods in spectroscopy. Graduate requirements include a term paper critically evaluating a recent technique in spectroscopy.

Prerequisite: CHEM 212.

CHEM 251: Microstructures Processing and Properties of Materials [3]
Relationships between material properties and their molecular and higher-level organization; control of these properties by the environment to which the material is subjected during processing.

CHEM 290: Current Topics in Physics and Chemistry [3]
Exploration of current research directions, problems, and techniques in molecular and materials chemistry, physics, and engineering. Course format emphasizes student-led presentation, analysis, and discussion of reading assignments from the current and recent scientific literature. Topics are determined by the instructor and change each semester.

May be repeated for credit.

CHEM 291: Physics and Chemistry Seminar [1]
Graduate seminar in physics and chemistry.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHEM 295: Graduate Research [1-15]
Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHEM 298: Directed Group Study [1-6]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

CHEM 299: Directed Independent Study [1-6]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

CHINESE

No credit is allowed for completing a less advanced course after successful completion (C- or better) of a more advanced course in the foreign languages. This applies only to lower division foreign language courses, not upper division courses.

CHN 001: Elementary Chinese I [4]
Introduction to speaking, reading, writing and understanding modern Chinese (Mandarin).

Letter grade only.

CHN 002: Elementary Chinese II [4]
Introduction to speaking, reading, writing and understanding modern Chinese (Mandarin).

Prerequisite: CHN 001 or three years of Chinese in high school or consent of instructor. Letter grade only.

CHN 003: Intermediate Chinese I [4]
Review of modern standard Chinese (Mandarin) pronunciation and grammar as well as pinyin and simplified characters. Emphasizes speaking and writing skills. Readings are utilized to build cultural understanding.

Prerequisite: CHN 002.

CHN 004: Intermediate Chinese II [4]
Review of modern standard Chinese (Mandarin) pronunciation and grammar as well as pinyin and simplified characters. Emphasizes speaking and writing skills. Readings are utilized to build cultural understanding.

Prerequisite: CHN 003.

CHN 092: Internship in Chinese [1-4]
Provides oversight and structure for a student's internship in a field related to Chinese in community organizations, professional research projects, etc. connected to the study of Chinese. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Chinese.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

CHN 192: Internship in Chinese [1-4]
Provides oversight and structure for a student's internship in a field related to Chinese in community organizations, professional research projects, etc. connected to the study of Chinese. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Chinese.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

COGNITIVE SCIENCE

COGS 001: Introduction to Cognitive Science [4]
An introduction to the interdisciplinary field of cognitive science. Basic issues related to cognition, including perception, memory, language, learning, problem solving, spatial cognition, attention, mental imagery, consciousness, brain damage, development, and artificial intelligence, are considered from the perspectives of psychology, philosophy, computer science, and neuroscience.

Discussion included.

COGS 005: Introduction to Language and Linguistics [4]
An introduction to the scientific study of language. Topics include phonology, phonetics, syntax, semantics, pragmatics, sociolinguistics, psycholinguistics, historical linguistics, language acquisition, and natural discourse.

Discussion included.

COGS 090X: Freshman Seminar [1]
Examination of a topic in the cognitive sciences.

May be repeated for credit.

COGS 092: Internship in Cognitive Science [1-4]
Provides oversight and structure for a student's internship in a field related to cognitive science connected to the study of cognitive science. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of cognitive science.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

COGS 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

COGS 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 101: Mind, Brain and Behavior [4]
Further explores the issues covered in COGS 001, but with greater emphasis on computation, brain structure, neurological deficits, and the connection between mind and brain.

Prerequisite: COGS 001 or PSY 001.

COGS 102: Introduction to Cognitive Modeling [4]
An introduction to the use of computer programs in modeling and cognitive phenomena. Some proficiency in a high level programming language [C, Java, Lisp, etc.] is assumed. Topics include symbolic artificial intelligence, neural networks, genetic algorithms, and computer graphics.

Prerequisite: (COGS 001 or PSY 001) and (CSE 001 or CSE 002 or CSE 020) or consent of instructor.

COGS 103: Introduction to Neural Networks in Cognitive Science [4]
Introduction to the use of neural networks in the study of cognitive phenomena. Topics include perception, attention, language, memory, and biologically realistic model neurons.

Prerequisite: COGS 001 or PSY 001 or consent of instructor.

COGS 105: Research Methods for Cognitive Scientists [4]
Methods used for conducting interdisciplinary research in cognitive science. Topics range from identifying interesting problems, applying methods and theory to everyday cognitive tasks, designing projects, collecting data, analyzing and interpreting data, modeling data, and writing up results. Lab work and group projects are included.

Prerequisite: (COGS 001 or PSY 001) and PSY 010. Laboratory included.

COGS 110: Philosophy of Cognitive Science [4]
Consideration of philosophical and foundational issues in cognitive science, including the Turing Test, the Chinese Room argument, the nature of cognitive architecture, animal cognition, connectionism vs. symbolic artificial intelligence, and the possibility of thinking machines.

Prerequisite: PHIL 001 and (COGS 001 or PSY 001).

COGS 121: Cognitive Psychology [4]
Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving and computer simulation.

Prerequisite: COGS 001 or PSY 001. Laboratory included.

COGS 123: Computational Cognitive Neuroscience [4]
Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Prerequisite: (COGS 001 or PSY 001) and one upper division COGS course or consent of instructor. Laboratory included.

COGS 125: Introduction to Artificial Intelligence [4]
Provides an overview of the main concepts and algorithms underlying the understanding and construction of intelligent systems: agents, problem solving, search, representation, reasoning, planning, communication, perception, robotics, neural networks. Includes practical experimentation of algorithms in computer labs.

Prerequisite: (CSE 020 and CSE 021) or (CSE 001 and CSE 002) or (CSE 020 and CSE 021) or (CSE 030 and CSE 031) or consent of instructor. COGS 001 recommended. Laboratory included.

COGS 128: Cognitive Engineering [4]
This survey provides an introduction to cognitive engineering, with an emphasis on cognitive science. Topics include human computer interaction, human robot interaction, speech recognition systems, animated characters, virtual

reality systems, ubiquitous computing, computer supported cooperative work, and the implications of cognitive science research on the design and use of electronic devices and user interfaces in the 21st century.

Prerequisite: COGS 001 or PSY 001 or consent of instructor. Laboratory included.

COGS 130: Cognitive Neuroscience [4]
Brain systems involved in mental processes including perception, attention, language, reasoning, spatial cognition, memory, and decision-making. Neurobiological evidence for functional subsystems within these processes and the evolution of specialized systems are considered through examining findings from animal studies, human behavior and development research, and brain imaging studies.

Prerequisite: COGS 001 or BIO 001 or PSY 001.

COGS 140: Perception [4]
An introduction to key theoretical constructs and experimental procedures in visual and auditory perception. Topics include psychophysics; perception of color, space, shape and motion; pattern recognition; perceptual attention; and brain areas engaged in perception.

Prerequisite: COGS 001 or PSY 001.

COGS 141: Visual Perception [4]
A survey of central topics in the psychological study of vision: neurophysiological structure and function of the visual system; psychophysical methods for studying visual perception; color, motion, and form perception; three dimensional space perception; visual attention and oculomotor behavior; evolutionary advantages of vision; psychological and philosophical theories of visual consciousness.

Prerequisite: PSY 001 or COGS 001.

COGS 144: Animal Cognition [4]
Focuses on how different species of animals process, organize, and retain information. Topics such as learning and memory, sensation and perception, navigation and migration, and communication, are discussed from ethological, experimental, behavioral, and neuroscientific perspectives. Contemporary issues in the comparative study of the evolution of human cognition are also addressed.

Prerequisite: Junior standing and PSY 001 or COGS 001 or consent of instructor.

COGS 150: Language, Cognition, and Interaction [4]
Examines the interactive nature of language. Discussion focuses on the extent to which perception, memory, and other non-linguistic processes interact with language and the way people use language to interact in everyday situations. Topics include conversational language, gesture, speech disfluencies, figurative language, spatial language, child-parent interaction, speech recognition, and human-computer processing. Integrates research from psychology, linguistics, sociolinguistics, and human-computer interaction. Research project required.

Prerequisite: (COGS 001 or PSY 001) and COGS 005 or consent of instructor.

COGS 152: Services Science and Management [4]
Services, e.g., restaurants, hotels, lawyers, information technology operations, business consulting—account for more than 70% of the US economy. Through case studies of businesses and scientific studies of people in real service settings, we focus on how to align people and technology effectively to generate value.

Prerequisite: ECON 001. Letter grade only.

COGS 153: Judgment and Decision Making [4]
An introduction to the study of human judgment and decision making. Topics include decision making under uncertainty, financial choices, health decision making, group decisions, rational theories of choice behavior, and improving decision making. The material is related to cognitive science, psychology, economics, and other social sciences.

Prerequisite: COGS 001 or PSY 001 or ECON 001.

COGS 154: Cognitive Science Applications for Management [4]
Covers thought, behavior, and interaction in modern businesses, where knowledge workers interact with one another and with technology. Topics include business decision making, risk behavior, attitudes toward risk, planning, communication, information management, information systems, human-computer interaction, neuroeconomics, and organizational behavior.

Prerequisite: COGS 001 or PSY 001 or consent of instructor.

COGS 155: Language Acquisition [4]
A comprehensive survey of the theories, methods and findings on first and second language acquisition.

Prerequisite: (COGS 001 or PSY 001) and COGS 005 or consent of instructor.

COGS 159: Metaphor and Thought [4]
An interdisciplinary survey of metaphor with links to linguistics, literature, philosophy, psychology, and other areas. The focus is on the use and understanding of metaphor in everyday thought and communication, art, politics, literature, and technology. Popular theories and approaches to studying metaphor are included.

Prerequisite: COGS 001.

COGS 171: Memory and Cognition [4]
Advanced study of recent research on human memory such as systems of memory, memory disorders, the neural basis of memory, memory and consciousness, memory and emotion, representation of knowledge, computer models of memory.

Prerequisite: COGS 121 or PSY 121 or consent of instructor. Letter grade only.

COGS 172: Thinking and Reasoning [4]
Advanced study of recent research on thinking and reasoning such as inductive and deductive reasoning, concepts and categorization, problem solving, creative thinking, expertise, cognition in groups, relations to philosophy of science.

Prerequisite: COGS 121 or PSY 121 or consent of instructor. Letter grade only.

COGS 173: Advanced Judgment and Decision Making [4]
Advanced study of recent research on judgment and decision making, such as behavioral economics, rationality and intelligence, health and medical decision making, decision neuroscience.

Prerequisite: COGS 153 or MGMT 153.

COGS 175: Spatial Cognition [4]
Topics include navigation, perception of space and motion, spatial attention, spatial language, neurological deficits related to spatial cognition, spatial mental models, motion path planning in humans and computers, and visual representation in the arts and new media.

Prerequisite: COGS 001 or PSY 001.

COGS 180: Topics in Cognitive Science [4]
A variety of topics in cognitive science are offered.

Prerequisite: COGS 001 or PSY 001 or consent of instructor. May be repeated for credit twice.

COGS 190: Advanced Seminar in Cognitive Science [4]
Intensive treatment of a special topic or problem within cognitive science.

Prerequisite: Junior standing. Permission of instructor required. May be repeated for credit once.

COGS 192: Internship in Cognitive Science [1-4]
Provides oversight and structure for a student's internship in a field related to cognitive science connected to the study of cognitive science. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of cognitive science.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

COGS 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

COGS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

COGS 201: Cognitive Science Foundations I [4]
Solidification and expansion of students' existing knowledge of the fundamental theoretical frameworks and methodological tools of cognitive science. Connections among philosophy of mind, cognitive neuroscience, theoretical linguistics, artificial intelligence, and cognitive psychology, are emphasized. Required of all first-year Cognitive Science graduate students.

COGS 202: Cognitive Science Foundations II [4]
Continuation of COGS 201, with more emphasis placed on recent developments and applications in Cognitive Science, and tools needed to conduct cognitive science research in a variety of domains. Also includes practical career information, such as tutorials in grant-writing, effective presentation, writing techniques, and professional development. Required of all first-year Cognitive Science graduate students.

COGS 203: Introduction to Neural Networks in Cognitive Science [4]
Introduction to the use of neural networks in the study of cognitive phenomena. Topics include perception, attention, language, memory and biologically realistic model neurons. This graduate level version of the course includes a sizeable final project that simulates data from cognitive research.

COGS 223: Computational Cognitive Neuroscience [4]
Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Permission of instructor required. Laboratory included.

COGS 250: Cognitive Science Graduate Seminar [4]
Covers broad issues in cognitive science, with an emphasis on computation, and the connections among mind, technology, and society. Each semester will feature guest speakers and topics such as artificial intelligence, design, human-computer interaction, perception, language, high-level cognition, reasoning, philosophy of cognitive science, neuroscience, and the role of echnology in society.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

COGS 269: Topics in Cognitive Science [4]
Seminar on a specific topic in cognitive science. May be repeated for credit on a different topic.

Permission of instructor required. May be repeated for credit.

COGS 285: Topics in Philosophy of Cognitive Science [4]
Detailed study of special topics in the philosophy of cognitive science, including (but not limited to): Animal Cognition, Cognitive Architecture, Consciousness, Mental Representation, Modularity, Nativism vs. Empircisim, and Self.

May be repeated for credit three times.

COGS 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

COGS 298: Directed Group Study [1-6]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

COGS 299: Directed Independent Study [1-6]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

COMPUTER SCIENCE AND ENGINEERING

CSE 005: Introduction to Computer Applications [4]
This project-based experience presents the use of computers to control information flow: data collection, management, analysis, and presentation. Basic programming skills, selection of appropriate computer-based tools and languages, and data security are covered. Emphasis is placed on computer knowledge necessary for non-CSE majors to successfully use and manage data and information.

Letter grade only. Laboratory included.

CSE 020: Introduction to Computing I [2]
Intended to present the basics of programming to a student with no prior experience. Basic concepts of input/output, data types, variables and arrays will be introduced in the context of solving problems. Elementary programming skills such as conditional and loops execution will be emphasized.

Letter grade only. Laboratory included.

CSE 021: Introduction to Computing II [2]
Object-oriented programming, methods, recursion and data manipulation will be introduced. Students are expected to solve problems using different programming paradigms.

Prerequisite: CSE 020. Letter grade only. Laboratory included.

CSE 030: Introduction to Computer Science and Engineering I [4]
The main focus of this course is on the design, analysis, and implementation of fundamental data structures, design patterns, and algorithms used throughout computer science, including linked lists, stacks, queues, trees, hash tables, graphs, recursion, and methods for searching and sorting.

Prerequisite: CSE 021. Letter grade only. Laboratory included.

CSE 031: Introduction to Computer Science and Engineering II [4]
Exposes students to the underlying structure of machines. Starting from C programming, pointers, data representation, MIPS instruction-set, compilation process and down to hardware implementation.

Prerequisite: CSE 030. Letter grade only. Laboratory included.

CSE 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

CSE 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 100: Algorithm Design and Analysis [4]
Introduction to the design and analysis of computer algorithms. Topics will include concepts of algorithm complexity, and various algorithmic design patterns like divide and conquer, dynamic programming and greedy algorithms. Course will also cover major algorithms and data structures for searching and sorting, graphs and some optimization techniques.

Prerequisite: CSE 031. Letter grade only. Laboratory included.

CSE 106: Exploratory Computing [4]
Our ability to manipulate data depends on and is limited by our familiarity with computing technologies. We study tools for exploratory computing, emphasizing programming and scripting languages over point-and-click interfaces. We cover the Unix basics and common utilities, regular expressions, Perl and R languages. Development of a problem solving ability to learn languages independently and cull online documentation.

Letter grade only. Laboratory included.

CSE 111: Database Systems [4]
Principles of database design and operation. Relational data model. High-level data modeling representations. SQL database language. Active databases with constraints and triggers. Query optimization with views and indexes. Exploiting database servers within programming languages for web application development. Other topics include transaction processing and recovery, user-defined functions, and data warehousing.

Prerequisite: CSE 031. Letter grade only. Laboratory included.

CSE 115: Discrete Mathematics [4]
Covers the basic concepts of discrete mathematics used in computer science and other disciplines that involve formal reasoning. The topics include logic, proof, counting, discrete probability, relations, graphs, trees, and Boolean algebra.

Prerequisite: Junior standing and MATH 021 and MATH 022. Letter grade only. Laboratory included.

CSE 120: Software Engineering [4]
Modern engineering techniques for developing reliable, efficient, re-usable, and maintainable computer software. Primary software design models, including functional, structured, and object-oriented programming. Other topics include software validation, revision control, project management, and documentation.

Prerequisite: CSE 111 or CSE 150 or CSE 160 or CSE 170. Laboratory included.

CSE 140: Computer Architecture [4]
Fundamental concepts of digital computer design, including instruction sets, memory systems and registers, logic and mathematics units, modern CPUs and their architectural features are discussed along with the motivation for each design choice.

Prerequisite: CSE 031. Letter grade only. Laboratory included.

CSE 150: Operating Systems [4]
Concepts of computer operating systems including concurrency, memory management, file systems, multitasking, performance analysis, and security. Offered spring only.

Prerequisite: CSE 031. Letter grade only. Laboratory included.

CSE 160: Computer Networks [4]
Design concepts and implementation features of computer networks. Concepts of network robustness, scalability, addressing, routing, and

security. Several contemporary networking protocols are analyzed.

Prerequisite: CSE 031. Laboratory included.

CSE 165: Introduction to Object Orientated Programming [4]
Topics include object-oriented programming concepts, such as classes, objects, methods, interfaces, packages, inheritance, encapsulation, and polymorphism.

Prerequisite: CSE 020 and CSE 021. Letter grade only. Laboratory included.

CSE 170: Computer Graphics [4]
Basic algorithms in computer graphics enabling students to understand and experience the process of implementing modern computer graphics applications. The topics covered are: rasterization, clipping, hidden surface removal, transformations, rendering pipeline, scene graphs, graphics libraries, interpolation, curves and surfaces, constructive solid geometry, boundary representation, spatial partition methods, texture mapping, color models, illumination and shading.

Prerequisite: CSE 031. Letter grade only. Laboratory included.

CSE 171: Programming Interactive 3D Graphics and Games [4]
Covers the main algorithms and techniques used in the implementation of interactive 3D graphics, such as in computer games, robotics simulators and virtual reality. Topics covered are: key frame animation, articulated figures, direct and inverse kinematics, physically-based simulation, path planning, behavior-based animation, scripting behaviors, and other advanced topics.

Prerequisite: CSE 170. Letter grade only. Laboratory included.

CSE 173: Computational Cognitive Neuroscience [4]
Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Prerequisite: COGS 001 and one upper division COGS course or consent of instructor. Laboratory included.

CSE 175: Introduction to Artificial Intelligence [4]
An overview of the main concepts and algorithms underlying the understanding and construction of intelligent systems: agents, problem solving, search, representation, reasoning, planning, communication, perception, robotics, neural networks. Includes practical experimentation of algorithms in computer labs.

Prerequisite: CSE 020 and CSE 021 or consent of instructor. Letter grade only. COGS 001 recommended. Laboratory included.

CSE 176: Machine Learning [4]
Survey of techniques for the development and analysis of software that learns from experience. An introduction to computational learning theory. Bayesian approaches to learning. Instance-based methods and case-based learning. Decision tree learning. Inductive logic. Artificial neural networks. Kernel methods. Reinforcement learning. Learning from demonstrations and explicit instruction.

Prerequisite: MATH 032 and CSE 175 or consent of instructor. Laboratory included.

CSE 180: Introduction to Robotics [4]
Covers the basic of robotics focusing on the algorithmic side, rather than technology. Students will be introduced to basic computational techniques concerning spatial modeling, planning, and sensor processing. The course has a strong hands-on component. Implementation of different techniques in simulation will complement the theoretical lectures.

Prerequisite: CSE 031. Letter grade only. Laboratory included.

CSE 185: Introduction to Computer Vision [4]
Overview of fundamental image processing and pattern recognition techniques including image formation, edge detection, image segmentation, optical flow, recovery of three-dimensional structure from shading or stereo information, shape representations, and issues in object recognition.

Prerequisite: Junior standing and CSE 031 or equivalent programming skills. Mathematical background commensurate with upper division engineering students. Letter grade only. Laboratory included.

CSE 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

CSE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CSE 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

CORE

CORE 001: The World at Home: Planning for the Future in a Complex World I [4]
A foundation for UC Merced's general education program with a strong emphasis on writing, quantitative literacy, critical thinking, and understanding events in their historical and cultural contexts. The inaugural theme is a study of how individuals and societies can make the best choices in preparing for an uncertain future. The unifying theme in these modules is contemporary California which acts as a common reference point highlighting the regional implications of global events or the global consequences of seemingly local choices. A wide range of interdisciplinary perspectives from the arts, humanities, social sciences, life and physical sciences, and engineering are brought to bear on the course topics.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only. Discussion included.

CORE 090X: Freshman Seminar [1]
Examination of a topic.

Pass/No Pass grading only. May be repeated for credit.

CORE 100: The World at Home: Planning for the Future in a Complex World II [4]
Second half of the Core course sequence, building on the foundation of UC Merced's general education program and has a strong emphasis on writing, quantitative literacy, critical thinking, and understanding events in their historical and cultural contexts. The inaugural theme is a study of how individuals and societies can make the best choices in preparing for an uncertain future. The unifying theme in these modules is contemporary California which acts as a common reference point highlighting the regional implications of global events or the global consequences of seemingly local choices. A wide range of interdisciplinary perspectives from the arts, humanities, social sciences, life and physical sciences, and engineering are brought to bear on the course topics. Upper-division-level quantitative literacy skills and writing ability is expected.

Prerequisite: Junior standing and CORE 001. Letter grade only. Discussion included.

EARTH SYSTEMS SCIENCE

ESS 001: Introduction to Earth Systems Science [4]
An introduction to basic principles of earth systems for non-science majors and prospective majors. A multidisciplinary approach that draws from geology, chemistry, physics, and biology to understand how the Earth functions as a complex system, and the role and impact of human beings on Earth systems.

Discussion included.

ESS 002: Sustainability Science [4]
Explores the scientific basis for a rigorous definition of the concept of sustainability and its implementation in society. Using "back-of-the-envelope" style calculations it explains major magnitudes and trends of environmental impacts and sustainable activities. It will also employ assignments and discussions that encourage communication across disciplinary barriers.

Letter grade only. Discussion included.

ESS 005: Introduction to Biological Earth Systems [4]
An introduction to basic principles of coupled biological and earth systems for non-science majors and prospective majors. An interdisciplinary approach that combines concepts from biology and earth science to understand how the Earth functions as a biological incubator, the origin and evolution of molecular life, the rise of complex biological and ecological earth systems, human impacts, and the sustainable Earth.

Laboratory included.

ESS 010: Earth Resources [4]
We are users and changers of our planet. This course discusses the materials and resources our planet supplies to societies, and the environmental consequences that result from consumption. We will examine the origin and use of food, water, energy, and mineral resources, and consider challenges to management and sustainability.

Discussion included.

ESS 012: Geology of California [4]
Introduction to the geology of California for non-science majors. A tour of the major geologic features of our state, its geologic hazards, and its natural earth resources in the context of basic plate tectonics and earth science principles.

Discussion included.

ESS 020: Fundamentals of Geology [4]
Introduction to geology with emphasis on physical and chemical processes that have shaped the Earth through time. Topics include Earth history, plate tectonics, mineral and rock formation, mountain building and landscape evolution, and interior and surface geologic processes.

Laboratory included.

ESS 025: Introduction to Ecosystem Science [4]
Fundamentals of ecosystem science; organization, function and development of ecological systems; energy and mass flow; biogeochemical cycling; biodiversity, population dynamics, and sustainability.

Prerequisite: (ESS 001 or ESS 005 or BIO 001) and (MATH 021 or MATH 011) and (PHYS 008 or PHYS 018). Laboratory included.

ESS 034: Introduction to Marine Science [4]
An introduction to biological, chemical, and physical oceanography, marine geomorphology, and their synthesis in the study of marine life; also including relationships with atmospheric, freshwater, and terrestrial systems. Areas of emphasis include ecosystems (from the deep sea to saltwater ponds), the integrated coastal zone, resource management, and global change.

Discussion included.

ESS 040: Air Quality, Air Resources and Environmental Health [4]
A survey of principles and issues related to air quality and resources from global to regional scales, including evolution of the earth's atmosphere, urban smog formation, visibility, acid rain, stratospheric and tropospheric ozone, effects of meteorology on air pollution, air pollution transport across political boundaries, and health effects of exposure to air pollution.

Discussion included.

ESS 050: Ecosystems of California [4]
An introduction to ecological principles and processes through the examination of California's varied ecosystems; discussion of native and invasive species, land use, human impacts, and biodiversity; two Saturday field trips to a variety of California habitats.

Discussion included.

ESS 060: Global Environmental Change [4]
History, causes, and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial ecosystems; geologic evidence for glacial cycles and climate changes, modern marine and atmosphere circulation, greenhouse gases, deforestation and species extinctions, and human population growth and impacts on climate and resources.

Discussion included.

ESS 070: Soil Foundations of Terrestrial Ecosystems [4]
Examines the physical, chemical and biological properties of soils that influence terrestrial and freshwater ecosystems. Topics include processes that control soil formation, evolution, development, and chemical properties. Particular emphasis is placed on the quantitative descriptions of energy nutrient and contaminant fluxes into, out of and through soils.

Prerequisite: (ESS 001 or BIO 001) and CHEM 002. Discussion and fieldwork included.

ESS 090X: Freshman Seminar [1]
Examination of a topic in earth systems science.

Pass/No Pass grading only.

ESS 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ESS 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ESS 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ESS 100: Environmental Chemistry [4]
Chemical principles of Earth and environmental systems focusing on environmental processes in water, soil, and air. Emphasis on acid-base chemistry, aqueous speciation, mineral and gas solubility, oxidation and reduction, and isotopes.

Prerequisite: CHEM 010 and (MATH 022 or PHYS 008 or MATH 012). Letter grade only. Laboratory included.

ESS 102: Chemical Processes in the Soil Environment [3]
Thermodynamics and kinetics of chemical process in soil systems. Topics include the formation and identification of common minerals, absorption/desorption, precipitation/dissolution, and electrochemical reactions in soils.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 103: Geochemistry of Earth Systems [3]
Quantitative analysis of earth systems using principles of thermodynamics, kinetics, and isotope geochemistry; solution-mineral equilibrium and phase relations; equilibrium and reactive transport approaches to modeling geochemical processes at ambient and elevated temperatures.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 104: Organic Geochemistry [3]
Focus on organic chemical reactions in soils and sedimentary environments. Topics include the formation and weathering of natural organic matter and reactions of natural organic matter with pollutants.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 105: Biogeochemistry [3]
Movement, storage, and transformation of elements in the atmosphere, biosphere, hydrosphere, lithosphere, and pedosphere, with an emphasis on nutrients, human impacts, and global change.

Prerequisite: (ENVE 100 or ESS 100) and (ENVE 110 or ESS 110). Letter grade only.

ESS 106: Instrumental Methods in Environmental Systems [3]
Instrumental analytical methods and quantitative analysis applied to the study of environmental materials, including inorganic, organic, and biological substances.

Prerequisite: ENVE 100 or ESS 100 or CHEM 010. Laboratory included.

ESS 108: Surface and Colloid Chemistry of Earth Materials [3]
Surface, colloid, and interfacial chemistry related to soil, environmental, and microbial applications; properties, energetics, and reactivity of surfaces and interfaces of Earth materials; the role of mineral surfaces in promoting and catalyzing chemical phenomena at phase boundaries.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ESS 109: Inorganic Chemistry of Earth's Materials [3]
Chemical principles, structure, and bonding of minerals and Earth materials, including crystallography (symmetry, space groups, group theory), coordination chemistry, bonding models (valence bond, crystal field, and MO theories), and electronic and magnetic properties.

Prerequisite: ESS 100 or ENVE 100 or CHEM 010.

ESS 110: Hydrology and Climate [4]
Basics of the hydrological cycle and the global climate system. Fundamentals of surface water hydrology, hydrometeorology, evaporation, precipitation, statistical and probabilistic methods, unit hydrograph, and flood routing.

Prerequisite: (ENVE 020 or MATH 015) and (MATH 022 or MATH 012). Letter grade only.

ESS 112: Subsurface Hydrology [4]
Hydrologic and geologic factors controlling the occurrence and use of groundwater on regional and local scales. Physical, mathematical, geologic and engineering concepts fundamental to subsurface hydrologic processes. Introduction to ground-water flow and transport modeling, with emphasis on model construction and simulation.

Prerequisite: ENVE 110 or ESS 110. Letter grade only.

ESS 120: Introduction to Ecological and Environmental Microbiology [4]
Fundamentals of microbiology in ecological and environmental systems, including the distribution of microbial diversity throughout terrestrial, extreme, and marine environments; microbial control of global biogeochemical cycles; and environmental services provided by microorganisms. Both classical and contemporary biochemical, molecular, and genomic approaches to microbial physiology, metabolism, and ecology will be discussed.

Prerequisite: CHEM 010 and (ESS 001 or BIO 001 or ENVE 020) or consent of instructor. Discussion included.

ESS 124: Terrestrial Ecosystem Ecology [3]
Ecosystem ecology is the study of interactions between organisms and their environment. Focus on energy, water and nutrient flows through the

living (plants, animals, microbes) and nonliving (soils, atmosphere) components of ecosystems. Examines both natural and human-modified terrestrial ecosystems.

Prerequisite: BIO 148 or ESS 025 or consent of instructor. Letter grade only.

ESS 125: Microbial Ecology [4]
Advanced study of microbiological systems and techniques.

Prerequisite: ESS 120. Letter grade only. Laboratory included.

ESS 126: Environmental Genomics [4]
Introduction to the principles and methods of genomics as applied to the understanding of ecosystems. Topics include population genetics, adaptation to environmental change, and genomic analysis of environmental microbial communities; experimental and computational methods relevant to environmental genomics.

Prerequisite: BIO 141 or ESS 120. Letter grade only. Laboratory included.

ESS 128: Theoretical Ecology [4]
Advanced study of the application of theoretical and quantitative methods for the analysis and interpretation of populations, communities and ecosystems.

Prerequisite: BIO 145 and (MATH 012 or MATH 022 or MATH 030). Letter grade only. Discussion included.

ESS 131: Atmospheric Chemistry and Physics [4]
Chemistry and physics of the troposphere and stratosphere, including atmospheric aerosols.

Prerequisite: (ESS 020 or ENVE 020) and CHEM 008 and PHYS 009. Discussion included.

ESS 132: Applied Climatology [3]
Spatial and temporal patterns in climate and their association with land surface characteristics and processes. Methods for exploiting these for hypothesis testing, modeling, and forecasting. Applications include seasonal forecasting, ecological modeling, and analysis of processes such as flooding and wildfire.

Prerequisite: ENVE 110 or ESS 110 or consent of instructor. Laboratory included.

ESS 133: Flora of California [5]
Introduces students to the plant diversity of California. It consists of lectures, discussions, and field trips. The field trips focus on plant identification in the foothills of the Central Sierra Nevada and help illustrate concepts presented in lecture such as endemism, plant/soil interactions, and vegetation types.

Prerequisite: Junior standing and BIO 001 or ESS 001 or BIO 148 or ESS 050 or consent of instructor. Discussion and fieldwork included.

ESS 134: Air Pollution and Resources [3]
Chemistry and physics of atmospheric pollutants, urban air pollution, visibility, mitigation, and resource economics.

Prerequisite: ESS 100 or ENVE 100.

ESS 141: Environmental Science and Policy [4]
In depth-analysis of environmental case studies. Focus on science critical to policy development and implementation, the policy-making process, and policy outcomes. Special emphasis on interaction between scientific information and policy-making. Example topics include Western water resources, biodiversity conservation, and global warming. Emphasis on written and oral communication and critical analysis.

Prerequisite: WRI 010 and any course in BIO, ECON, ENVE, ESS, or POLI. Discussion included.

ESS 147: Astrobiology [4]
Astrobiology refers to the study of the origin and evolution of life in the cosmos. It is an integrative, multidisciplinary field that includes areas of biology, astronomy, geology, chemistry and physics. Students in the class face some of the most fundamental topics addressed by science today such as who we are, where we came from, and where we might go. We cover three main themes: How did life begin and evolve? Does life exist elsewhere in the universe? What is life's future on Earth and beyond?

Prerequisite: CORE 001 and (BIO 001 or BIO 005 or PHYS 006 or CHEM 002 or ESS 001) or consent of instructor. Letter grade only. Discussion included.

ESS 148: Fundamentals of Ecology [4]
Introduction to the principles of ecology at population, community, ecosystem, landscape, and global scales.

Prerequisite: BIO 001 or BIO 005 or ESS 001 or ESS 005 or consent of instructor. Letter grade only. Discussion and fieldwork included.

ESS 149: Conservation Biology [4]
Detailed examination of the evolutionary, ecological, management, and policy issues related to the conservation of ecosystems, species, and genetic diversity. Theory and practical aspects of biological conservation are presented, with special reference to case studies from California.

Prerequisite: BIO 001 and (MATH 018 or MATH 032). Letter grade only. BIO 148 recommended. Discussion included.

ESS 150: Geomorphology and Surface Processes [4]
Observation and analysis of earth surface processes and the development of landforms and landscape. The interaction between surficial processes and tectonic, biologic, hydrologic, climatic, and atmospheric processes. Evaluation of environmental hazards and engineering solutions.

Prerequisite: ESS 020 or ENVE 020. Laboratory included.

ESS 170: Fundamentals of Soil Science [3]
Examines the soil as a natural resource and soils as ecosystems. Soil science explores the major physical, chemical, and biological properties of soils, and fundamental processes that regulate interaction of the terrestrial biosphere with other components of the earth system. ESS 170L must be taken concurrently.

Prerequisite: CHEM 002 and (BIO 001 or ESS 001). Letter grade only.

ESS 170L: Soil Science Laboratory [1]
ESS 170L aims to introduce students to common laboratory methods used in soil science. ESS 170 must be taken concurrently.

Letter grade only.

ESS 180: Field Methods in Earth Systems [4]
Field techniques in chemistry, hydrology, geology, ecology, and microbiology, emphasizing principles of measurement, observation, and interpretation; integration of diverse data sets.

Prerequisite: CHEM 010 and (MATH 022 or MATH 012) and (PHYS 008 or PHYS 018). Fieldwork and laboratory included.

ESS 190: Undergraduate Seminar [1]
Weekly seminar of current topics in earth and environmental systems.

Prerequisite: Junior standing.

ESS 192: Topics in Environmental Systems [1-6]
Treatment of a special topic or theme in Environmental Systems. May be repeated for credit in a different subject area.

Prerequisite: Junior standing or consent of instructor. May be repeated for credit four times.

ESS 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ESS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit once.

ESS 199: Upper Division Individual Study [1-5]
Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECONOMICS

ECON 001: Introduction to Economics [4]
Introduction to economics principles and methods, including microeconomics (operation of the economy at the individual and firm level) and macroeconomics (nature and functions of the national economy in a global context).

ECON 010: Statistical Inference [4]
Introduction to the application of social scientific methods to the study of economics, politics, and management. Covers research design, random sampling, descriptive and inferential statistics, hypothesis testing, and the linear regression model with an emphasis on applications.

Prerequisite: MATH 005 or equivalent score on the Math Placement Exam. Laboratory included.

ECON 011: History of Economic Thought [4]
A survey of the theories of major economists from Adam Smith to Keynes.

Prerequisite: ECON 001.

ECON 090X: Freshman Seminar [1]
Examination of a topic in economics.

May be repeated for credit.

ECON 092: Internship in Economics [1-4]
Provides oversight and structure for a student's internship in a field related to economics in community organizations, professional research projects, etc. connected to the study of economics. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of economics.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

ECON 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ECON 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 100: Intermediate Microeconomic Theory [4]
Price determination and resource distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics.

Prerequisite: ECON 001 and (MATH 021 or MATH 011). Letter grade only. Discussion included.

ECON 101: Intermediate Macroeconomic Theory [4]
Analysis of output, employment, interest rates, and the price level. The effects of these on changes in monetary and fiscal variables.

Prerequisite: ECON 001 and (MATH 021 or MATH 011). Letter grade only. Laboratory included.

ECON 111: American Economic History [4]
Analysis of output, employment, interest rates, and the price level. A survey of trends in the American economy; emphasis on factors explaining economic growth and on the changing distribution of the gains and losses associated with growth.

Prerequisite: ECON 100 or MGMT 100.

ECON 115: Economics of Industrial Organization [4]
The organization and structure of industrial production in the United States economy.

Prerequisite: ECON 100 or MGMT 100.

ECON 116: Organizational Strategy [4]
Discussion of critical issues in the design and functioning of effective organizations. Topics covered include: the boundary of the firm, firm structure, arrangements within the firm, alliances and contracts between firms, and trust and culture in the firm.

Prerequisite: ECON 001.

ECON 117: Marketing Strategy [4]
Marketing Strategy examines how to create customer value, target the correct market, and build customer relationships. Topics include customer behavior, creating brand loyalty, advertising strategy, new product development, media strategy, pricing strategy, the industrial organization of retail markets, and the social, ethical and regulatory environment for marketing.

Prerequisite: ECON 001. Letter grade only.

ECON 120: Economics of the Environment and Public Policy [3]
Provides a systematic analysis of environmental policy issues using microeconomic theory. Topics covered include elements of welfare economics, theories of environmental policy instruments, the law and economics of environmental regulation, economics of recycling, and international environmental issues.

Prerequisite: ECON 001 or ESS 001. Letter grade only.

ECON 121: The Economics of Money, Banking, and Financial Institutions [4]
Addresses issues of money, banking, and financial institutions. Topics covered include: the structure of central banks and the Federal Reserve system, theories of money demand and money supply, the relationship between money supply and overall economic activity, and the role the Federal Reserve plays in economic stabilization.

Prerequisite: ECON 001. Letter grade only.

ECON 130: Econometrics [4]
Introduction of problems of observation, estimation, and hypotheses testing in economics through the study of the theory and application of linear regression models, critical evaluation of selected examples of empirical research, and exercises in applied economics.

Prerequisite: (ECON 010 or POLI 010) and MATH 021. Letter grade only. Laboratory included.

ECON 140: Labor Economics [4]
Analysis of the economic forces that shape labor markets, institutions, and performance in the United States and other countries, with special attention to the determinants of labor supply and demand, human capital investment, and government policy.

Prerequisite: ECON 100 or MGMT 100.

ECON 141: Human Resource Economics [4]
Examination of how firms make decisions involving human resources. Topics covered include employee hiring and recruitment, compensation and use of incentives, and employee motivation and teamwork. Builds on both economic theory and practical examples to illuminate key concepts.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

ECON 142: The Economics of Gender and Poverty [4]
Analysis of the economic issues pertaining to gender with an emphasis on studying and evaluating U.S. policy. Topics include work-life balance, occupational choice, the gender earnings/wage gap, housework, and changing social norms. The intersection between gender and poverty is also discussed, particularly as it pertains to U.S. welfare policy.

Prerequisite: ECON 001.

ECON 145: Health Economics [4]
An economic analysis of policies and institutions in the U.S. health care sector: supply and demand for health services, conceptual and policy issues relating to health insurance, and economic analysis of efficient regulatory policies toward the health care sector.

Prerequisite: ECON 100 or MGMT 100.

ECON 150: Economic Development [4]
Problems of underdevelopment and poverty, policy issues, and development strategy.

Prerequisite: ECON 100 or MGMT 100.

ECON 151: Public Economics [4]
The influence of governmental revenue and expenditure decisions on economic performance. Examines such issues as public goods and externalities, as well as specific expenditure and taxation programs.

Prerequisite: ECON 100 or MGMT 100.

ECON 152: Law and Economics [4]
The economic analysis of legal rules and institutions, including property, contract, and tort law. We also consider issues surrounding crime and punishment.

Prerequisite: ECON 100 or MGMT 100.

ECON 153: Judgment and Decision Making [4]
An introduction to the study of human judgment and decision making. Topics include decision making under uncertainty, financial choices, health decision making, group decisions, rational theories of choice behavior, and improving decision making. The material will be related to cognitive science, psychology, economics, and other social sciences.

Prerequisite: COGS 001 or ECON 001 or PSY 001.

ECON 155: Political Economics [4]
Tools of political economics: preferences and institutions, electoral competition, agency, partisan politics. Redistributive politics: general interest politics, special interest politics. Comparative politics: electoral rules, separation of powers, political regimes. Dynamic politics: fiscal policy, growth.

Prerequisite: ECON 100 or MGMT 100.

ECON 156: Urban and Regional Economics [4]
Discussion of urban and regional economies focusing on the interactions of individuals and firms in markets. Topics include the size and distribution of cities, location decisions of households and firms, housing, labor, and real estate markets, transportation, environment, and regional growth and development.

Prerequisite: ECON 100. Letter grade only.

ECON 160: International Microeconomics [4]
Examination of international microeconomics at the intermediate level. Standard microeconomics is the study of decision-making by various types of agents under various constraints and in various environments. International microeconomics examines such decision-making in a world of many different decision-makers, objectives, outputs, and countries.

Prerequisite: ECON 100 or MGMT 100.

ECON 161: International Macroeconomics [4]
Macroeconomic theory of an open economy. Balance of payments adjustment mechanism, international monetary economics issues, international financial institutions and their policies.

Prerequisite: ECON 101 or MGMT 101.

ECON 162: Corporate Finance [4]
Explores corporate decision making in allocating investment funds to capital projects and alternative methods of raising capital from financial markets. Related topics include asset pricing, capital budgeting, capital structure,

dividend policy, valuation of bonds, stocks, and options. Particular attention is paid to how managers maximize shareholder wealth.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

ECON 163: Economics of Investments, Futures, and Options [4]
Covers the investment environment for financial securities. Price formation in commodity and financial futures and options markets will be examined. Additional topics include: the theory of inter-temporal price formation, common approaches used to forecast prices, statistical analysis of historical price behavior, and futures and options market regulation.

Prerequisite: ECON 100. Letter grade only.

ECON 170: Game Theory [4]
Consideration of non-cooperative games in the strategic and extensive form as well as applications of game theory to issues in social science and philosophy. Topics may include: solution concepts for non-cooperative games; epistemic foundations for solution concepts; indefinitely repeated games; theories of equilibrium selection; experimental game theory.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

ECON 190: Topics in Economics [4]
Intensive treatment of a special topic or problem in economics.

Prerequisite: Senior standing and ECON 100 or MGMT 100 or consent of instructor. Management and Economics majors only. May be repeated for credit three times.

ECON 192: Internship in Economics [1-4]
Provides oversight and structure for a student's internship in a field related to Economics in community organizations, professional research projects, etc. connected to the study of Economics. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Economics.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

ECON 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ECON 196: Senior Thesis in Economics I [4]
First part in a year-long capstone seminar that culminates in the presentation of a senior thesis in economics. In this semester, students study research methods in economics, formulate a theoretical or empirical question for their thesis, and conduct a literature review.

Prerequisite: Senior standing and (ECON 100 or MGMT 100) and (ECON 130 or MGMT 130). Economics majors only. Letter grade only.

ECON 197: Senior Thesis in Economics II [4]
Second part in a year-long capstone seminar that culminates in the presentation of a senior thesis in economics. In this semester, students develop and conduct the research proposed in the first semester, write the thesis, and present their work to faculty and peers.

Prerequisite: Senior standing and ECON 196. Economics majors only. Letter grade only.

ECON 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ECON 240: Advanced Labor Economics I [4]
Covers recent developments in research on labor economics and provide a basis for students to develop a research program in this area. We discuss human capital investment, the wage structure and inequality, labor demand, labor market institutions, internal and local labor markets.

Permission of instructor required. Letter grade only. May be repeated for credit twice.

ECON 290: Quantitative Labor Studies Seminar [3]
Research presentations by visiting scholars in the area of quantitative labor studies.

May be repeated for credit three times.

ECON 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

ECON 298: Directed Group Study [1-6]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ECON 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

EDUCATION

EDUC 010: The Essentials of Educational Practice and Policy [4]
Introduction to key elements in education: teaching and learning, school organization, education policy, politics, and philosophical goals of education. Topics include: educational reform, testing and accountability, school finance, student diversity, and bilingual education. Focus is on California's education system, with comparative perspectives from other states and countries.

Discussion included.

EDUC 090X: Freshman Seminar [1]
Examination of a topic in education.

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

EECS 205: Probability and Stochastic Processes [4]
Introduction of probability theory and stochastic processes. Topics: discrete-tim Markov chains, conditional expectation and martingales, limiting behavior of sequences of random variables, Poisson process and continuous-time Markov chains, renewal processes and queuing theory, detection and estimation, wide-sense stationary processes and spectral density, Kalman filter and Wiener filter, and Brownian motion.

Prerequisite: MATH 032 and MATH 141 or consent of instructor. Discussion included.

EECS 207: Digital Image Processing [4]
The fundamentals of digital image processing theory and techniques. Topics include two-dimensional linear system theory, image enhancement, image restoration, wavelet-based analysis, image compression and image reconstruction from projections. Undergraduate level math; undergraduate course on signals and systems is strongly recommended for successful completion of this course.

Laboratory included.

EECS 250: Advanced Topics Computer Systems [4]
Computer systems research, including operating systems, database systems, internet infrastructure systems and sensor networks systems. The goal of the course is to cover a broad array of research topics in computer systems, and to engage you in top-flight systems research. The first part is devoted to basic thematic issues and underlying techniques in computer systems, while the second part goes deeper into topics related to scalable, parallel and distributed systems. The class is based on a discussion of important research papers, and a research project.

Letter grade only. May be repeated for credit five times. Laboratory included.

EECS 252: Embedded Computer Systems [4]
Concentration on methodologies and technologies for design of embedded systems. Topics include hardware and software platforms for embedded systems, techniques for modeling and specification of system behavior, software organization, real-time operating system scheduling, real-time communication and packet scheduling, low-power battery and energy-aware system design, timing synchronization, fault tolerance and debugging, and techniques for hardware and software architecture optimization. We cover theoretical foundations as well as practical design methods.

Letter grade only. May be repeated for credit five times. Laboratory included.

EECS 260: Optimization [4]
Introduction of theory and numerical methods for continuous multivariate optimization (unconstrained and constrained), including: line-search and trust-region strategies; conjugate-gradient, Newton, quasi-Newton and large-scale methods; linear programming; quadratic programming; penalty and augmented Lagrangian methods; sequential quadratic programming; and interior-point methods.

Prerequisite: MATH 023, MATH 024, MATH 141 or consent of instructor. Letter grade only. Laboratory included.

EECS 262: Networking of Embedded Sensor Systems [4]
Wireless and sensor systems have achieved significant maturity in the past five years. Experimental systems research in this area has developed a wide range of innovative solutions to practical problems. There is also a fairly large literature on practical experience with

these systems. In this class, we sample a wide range of current research on experimental networked wireless and sensor systems. Our exploration ranges from low-level systems and components (self-configuration, localization, time-synchronization), to networking (medium access, routing, transport), and higher-level systems issues (programming, deployment, and management).

Permission of instructor required. Letter grade only. May be repeated for credit five times. Laboratory included.

EECS 270: Robot Algorithms [4]
In depth study of algorithmic techniques to solve fundamental robotic problems, with a particular emphasis on probabilistic aspects. Sensor fusion, mission planning, and other selected topics are covered as well. Theory is complemented by a personal semester long project assigned to every student. Permission of instructor required.

Permission of instructor required. Letter grade only. Laboratory included.

EECS 271: Theory of Computation [4]
Introduces the main computational model defining the theory of computation and illustrates fundamental theorems defining the limits of what can be computed. Topics include: finite and pushdown automata; nondeterministic models; regular languages and context free grammars; Turing machines; and decidability problems. Senior level math knowledge and the fundamentals of computer algorithms are necessary for successful completion of this course.

Letter grade only. Laboratory included.

EECS 273: Computational Cognitive Neuroscience [4]
Design and analysis of computational simulations of human behavior and brain function. Techniques for modeling active membranes, individual neurons, the dynamics produced by recurrent excitation and lateral inhibition, synaptic plasticity, and the computational role of neurotransmitters. Formal models of perception, attention, learning, memory, language, categorization, and cognitive control.

Permission of instructor required. Laboratory included.

EECS 274: Computer Vision [4]
Introduces algorithms and techniques for understanding contents in single and multiple images. It covers low-level, mid-level, high-level vision and recent research developments.

Prerequisite: CSE 185 or consent of instructor, linear algebra, vector calculus, basic knowledge in probability and statistics, as well as programming skills. Letter grade only. May be repeated for credit three times. Laboratory included.

EECS 275: Matrix Computation [4]
Numerous engineering problems can be formulated and solved via matrices. This course covers advanced algorithms for matrix computation and analysis. The introduced algorithms and numerical techniques are also important for solving linear/nonlinear systems and optimization problems.

Prerequisite: Linear algebra, programming skills. Letter grade only. May be repeated for credit twice. Laboratory included.

EECS 276: Machine Learning [4]
Survey of techniques for the development and analysis of software that learns from experience. An introduction to computational learning theory. Bayesian approaches to learning. Instance-based methods and case-based learning. Decision tree learning. Inductive logic. Artificial neural networks. Kernel methods. Reinforcement learning. Learning from demonstrations and explicit instruction.

Permission of instructor required. Laboratory included.

EECS 280: Advanced Topics in Computer Networks and Distributed Systems [4]
Overview of Internet development history and fundamental principles underlying TCP/IP protocol design. Discussion of current networking and distributed systems research topics, including latest research results in routing protocols, transport protocols, network measurements, network security protocols, and clean-slate approach to network architecture design. Fundamental issues in network protocol design and implementations applied to a variety of different applications and environments.

Permission of instructor required. Letter grade only. May be repeated for credit five times. Laboratory included.

EECS 281: Advanced Topics in Robotics [4]
Contemporary issues in mobile robotics, Topics include but are not limited to: cooperative mobile robotics, mathematical models for complex tasks (e.g. manipulation), humanoid robotics, human-robot interfaces, robot hardware and middleware.

Letter grade only. May be repeated for credit three times. Laboratory included.

EECS 282: Advanced Topics in Machine Learning [4]
Reviews advanced topics in machine learning. Each edition of the course will focus on a different topic. It will consist of formal lectures, presentation and discussion of papers, and implementation of algorithms in Matlab or C.

Permission of instructor required. Letter grade only. May be repeated for credit. Laboratory included.

EECS 283: Advanced Topics in Intelligent Systems [4]
Research in intelligent systems is multi-disciplinary and its foundation can be found from fields such as estimation, communication, and control. Other areas such as artificial intelligence, machine learning, networking, robotics, security, and signal processing are also highly related. This class will review the most current results in intelligent systems and help students prepare for research in intelligent systems. Topics will vary from semester to semester.

May be repeated for credit. Discussion included.

EECS 284: Large Scale Data Management [4]
Aims to familiarize students with techniques for processing large amounts of data. Starting with the latest innovations in hardware, data processing architectures are presented as well as algorithms for managing large quantities of data. Although the main focus is data analytics, significant attention is dedicated to transactional databases.

Letter grade only. Laboratory included.

EECS 285: Advanced Topics in Motion Planning [4]
Advanced algorithms in the motion planning research domain and reviews selected topics in applications to robotics, computer animation, cognitive science and bioinformatics. Includes development of a significant programming project and student-lead seminars. Consolidated programming skills, notions of computer graphics and robotics are recommended for successful completion of the course.

Permission of instructor required. Letter grade only. May be repeated for credit.

EECS 286: Advanced Topics in Computer Vision [2-4]
Current and advanced topics in computer vision. Students develop verbal and written presentation skills through critical evaluation of seminal works.

Prerequisite: CSE 185 or consent of instructor. Letter grade only. May be repeated for credit.

EECS 287: Computer Animation and Simulation [4]
Reviews the main topics in computer animation, including: key frame animation and motion capture, direct and inverse kinematics, physics-based animation, particle systems and deformable surfaces, rigid body simulation, collision detection and motion planning. The course includes development of programming projects and student-lead paper presentations.

Prerequisite: Consolidated programming skills, notions of computer graphics and instructor approval. Permission of instructor required. Letter grade only. Laboratory included.

EECS 290: Electrical Engineering and Computer Science Seminar [1]
The topics include the entire range of body knowledge within the electrical engineering and computer science domain areas. It is primarily intended to give electrical engineering and computer science graduate students breadth exposure to all the areas in the field, not just their specific individual areas of research. Students are required to attend eighty percent (80%) of the seminars scheduled in the semester unless they are excepted by written authorization of the student advisor. Attendance is registered by the faculty delivering the seminar, hosting the distinguished guest, or advising the Ph.D. graduate student presenting an advance topic.

Satisfactory/Unsatisfactory grading only. May be repeated for credit three times.

EECS 295: Graduate Research [1-12]
Supervised research in computer science.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

EECS 298: Directed Group Study [1-12]
Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

EECS 299: Directed Independent Study [1-12]
Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ENGINEERING

ENGR 040: History of Technology in Society I [4]
Starting from the Paleolithic period and moving forward to the end of the 18th century and the dawn of the Industrial Revolution this course will

examine the process of technological change and its relationship to societal change.

Letter grade only. Discussion included.

ENGR 041: History of Technology in Society II [4]
Starting from the Industrial Revolution at the end of the 18th century and moving to the present, this course will examine the process of technological change and its relationship to societal change.

Letter grade only. Discussion included.

ENGR 045: Introduction to Materials [4]
Relationship between the structure, processing, properties, and performance of materials. The application of physical and chemical principles in the context of engineering materials: atomic bonding, crystal structure, defects, thermodynamics, and kinetics.

Prerequisite: CHEM 002 and MATH 021 and PHYS 008 or consent of instructor. Letter grade only. Laboratory included.

ENGR 050: Statics [2]
Fundamental concepts of mechanics, including statics, dynamics, and kinetics of particles and rigid bodies.

Prerequisite: MATH 021 and PHYS 008. Letter grade only.

ENGR 052: Computer Modeling and Analysis [3]
Basic tools needed for the design and analysis of engineering systems, including data collection, basic algorithm design, implementation and testing, and systems simulation.

Prerequisite: CSE 001 and MATH 010. Letter grade only. Laboratory included.

ENGR 053: Materials and the Environment [3]
Impact of materials mining, processing, synthesis, use, and disposal on the environment, including cost-benefit analyses of environmentally "friendly" vs. "unfriendly" materials. Energy properties, cost, durability, disposal, and other considerations in materials selection. Materials challenges in fuel cell, battery, solar, and water filtration applications. Environmental costs and benefits of emerging nanotechnologies.

Prerequisite: MATH 021 and PHYS 008 and CHEM 002 or consent of instructor. Letter grade only.

ENGR 057: Statics and Dynamics [4]
Fundamentals of statics. Kinematics and equations of motion of a particle for rectilinear and curvilinear motion. Planar kinematics of rigid bodies. Kinetics for planar motion of rigid bodies, including equations of motion and principles of energy and momentum.

Prerequisite: MATH 021 and (PHYS 008 or PHYS 018). Letter grade only. Discussion included.

ENGR 065: Circuit Theory [3]
Intended for the lower division engineering student to facilitate the student's development into bioengineering investigation. The course has been designed to introduce fundamental principles of circuit theory commonly used in biomedical research.

Prerequisite: MATH 024 and PHYS 009. Letter grade only.

ENGR 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ENGR 097: Engineering Projects in Community Service [1-3]
Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process.

Letter grade only. May be repeated for credit. Fieldwork included.

ENGR 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 108: BioEntrepreneurship [3]
Introduces upper division undergraduate and graduate students to entrepreneurship. We start with a history of biotechnology and medical devices which hopefully inspires them to integrate entrepreneurship with engineering and/or life sciences. We work through case studies of start-up companies (including Genetech) brainstorm ideas about new inventions, and walk them through the requisite steps to start a new business venture (IP issues, team formation, raising capital).

Letter grade only. Discussion included.

ENGR 120: Fluid Mechanics [4]
Introduction to and application of the mechanics of fluids and fluid flow in natural and engineered systems.

Prerequisite: ENGR 057 and MATH 024, which may be taken concurrently. Letter grade only. Laboratory included.

ENGR 130: Thermodynamics [3]
Fundamentals of equilibrium, temperature, energy, and entropy. Equations of state and thermodynamic properties, with engineering applications.

Prerequisite: CHEM 002 and MATH 023 and MATH 024 and (PHYS 009 or PHYS 019). Letter grade only.

ENGR 135: Heat Transfer [4]
Study of conduction, convection, and radiation heat transfer, with applications to engineering problems.

Prerequisite: ENGR 120 and ENGR 130. Letter grade only. Offered fall only. Laboratory included.

ENGR 140: Introduction to Object Oriented Programming [4]
Topics include object-oriented programming concepts, such as classes, objects, methods, interfaces, packages, inheritance, encapsulation, and polymorphism.

Prerequisite: CSE 020 and CSE 021. Letter grade only. Laboratory included.

ENGR 141: Environmental Science and Policy [4]
In depth-analysis of environmental case studies. Focus on science critical to policy development and implementation, the policy-making process, and policy outcomes. Special emphasis on interaction between scientific information and policy-making. Example topics include Western water resources, biodiversity conservation, and global warming. Emphasis on written and oral communication and critical analysis.

Prerequisite: WRI 010 and (any lower division BIO, ECON, ENVE, ESS, POLI, or PUBP. Discussion included.

ENGR 151: Strength of Materials [4]
Stresses and strain in solids with symmetric and asymmetric loads. Stresses in pressure vessels and rotating shafts. Strength and failure, plastic deformation, fatigue and elastic instability.

Prerequisite: ENGR 057. Letter grade only. Laboratory included.

ENGR 155: Engineering Economics Analysis [3]
Microeconomic principles and methods. Time value of money, interest and equivalences, analysis of economic alternatives, depreciation, inflation and taxes, estimates of demand, cost and risk, decision theory.

Prerequisite: Junior standing.

ENGR 160: Discrete Mathematics [4]
Covers the basic concepts of discrete mathematics used in computer science and other disciplines that involve formal reasoning. The topics include logic, proof, counting, discrete probability, relations, graphs, trees, and Boolean algebra.

Prerequisite: MATH 021 and MATH 022. Letter grade only. Laboratory included.

ENGR 166: Analog and Digital Electronics [3]
Intended for the upper division engineering student to facilitate the student's development into bioengineering investigation. The course has been designed to introduce fundamental principles of analog and digital electronics commonly used in biomedical research.

Prerequisite: ENGR 065. Letter grade only.

ENGR 170: Introduction to Electron Microscopy [3]
Principles and techniques of electron microscopy used in the study of materials. Emphasis upon practical applications.

Letter grade only.

ENGR 170L: Introduction to Electron Microscopy Laboratory [1]
Laboratory for principles and techniques of electron microscopy used in the study of materials. ENGR 170 must be taken concurrently.

Letter grade only.

ENGR 180: Spatial Analysis and Modeling [4]
Principles of geographic information systems [GIS]; applications of GIS to environmental, water, and resource management issues; problem solving with GIS. Other topics include spatial analysis interpolation techniques and model integration.

Prerequisite: MATH 021. Letter grade only. Laboratory included.

ENGR 191: Professional Seminar [1]
Presentation and discussion of professional engineering practices. Professional ethics and the roles and responsibilities of public institutions and private organizations pertaining to engineering.

Prerequisite: Senior standing. Permission of instructor required. Pass/No Pass grading only.

ENGR 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ENGR 197: Engineering Projects in Community Service [1-3]
Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process.

Letter grade only. May be repeated for credit. Fieldwork included.

ENGR 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENGR 208: BioEntrepreneurship [3]
Introduction for upper division undergraduate and graduate students to entrepreneurship. We start with a history of biotechnology and medical devices which inspires them to integrate entrepreneurship with engineering and/or life sciences. Case studies of start-up companies (including Genetech) brainstorm ideas about new inventions, and the requisite steps to start a new business venture (IP issues, team formation, raising capital).

Letter grade only. Discussion included.

ENGR 270: Introduction to Electron Microscopy [3]
Principles and techniques of electron microscopy used in the study of materials. Emphasis upon practical applications. Graduate requirements include additional assignments, quiz problems, and a project.

Letter grade only.

ENGR 270L: Introduction to Electron Microscopy Laboratory [1]
Laboratory for principles and techniques of electron microscopy used in the study of materials. Graduate requirements include additional laboratory reports and a research project.

Letter grade only.

ENGR 295: Graduate Research [1-6]
Supervised research in engineering.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

ENGR 298: Directed Group Study [1-6]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

ENGR 299: Directed Independent Study [1-6]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

ENVIRONMENTAL ENGINEERING

ENVE 010: Environment in Crisis [4]
Human effects on Earth's ecosystems, air, and waters. Social and technological solutions to interacting pressures from environmental pollution, biodiversity loss, water pollution, climate warming, and feeding Earth's population. Science and policy topics appropriate for students majoring in fields other than science or engineering. Not open to majors for credit.

Laboratory included.

ENVE 020: Introduction to Environmental Science and Technology [4]
Introduction to historical and current issues in the diverse field of environmental engineering. Principles of mass and energy balance. In-depth analysis of several key innovations from the field that have been instrumental in advancing the field. Design project.

Prerequisite: CSE 021 and CHEM 002 and MATH 032. Letter grade only.

ENVE 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ENVE 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVE 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVE 100: Environmental Chemistry [4]
Chemical principles of Earth and environmental systems focusing on environmental processes in water, soil, and air. Emphasis on acid-base chemistry, aqueous speciation, mineral and gas solubility, oxidation and reduction, and isotopes.

Prerequisite: CHEM 010 and (MATH 022 or PHYS 008 or MATH 012). Letter grade only. Offered fall only. Laboratory included.

ENVE 105: Environmental Data Analysis [3]
The objective of this class is to provide students with probabilistic and statistical methods to analyze environmental data. This class emphasizes both theoretical and applied aspects of data analysis methods. Weekly lab exercises are from environmental applications. Topics include: distribution, hypothesis test, linear regression, multiple regression, uncertainty analysis, outlier detection, sample design, and spatial and temporal data analysis.

Prerequisite: MATH 021 and PHYS 008. Letter grade only.

ENVE 110: Hydrology and Climate [4]
Basics of the hydrological cycle and the global climate system. Fundamentals of surface water hydrology, hydrometeorology, evaporation, precipitation, statistical and probabilistic methods, unit hydrograph, and flood routing.

Prerequisite: (ENVE 020 or MATH 015) and (MATH 022 or MATH 012). Letter grade only.

ENVE 112: Subsurface Hydrology [4]
Hydrologic and geologic factors controlling the occurrence and use of groundwater on regional and local scales. Physical, mathematical, geologic, and engineering concepts fundamental to subsurface hydrologic processes. Introduction to ground-water flow and transport modeling, with emphasis on model construction and simulation.

Prerequisite: ENVE 110 or ESS 110. Letter grade only. Offered spring only.

ENVE 114: Mountain Hydrology of the Western United States [3]
Principles of snow formation, occurrence, and measurement; components of evapotranspiration; runoff generation; groundwater recharge processes; water resource assessments; and resource management. Focus on California and the southwestern US. Design project.

Prerequisite: ENVE 110 or ESS 110. Letter grade only. Offered spring only.

ENVE 116: Applied Climatology [3]
Spatial and temporal patterns in climate and their association with land surface characteristics and processes. Methods for exploiting these for hypothesis testing, modeling, and forecasting. Applications include seasonal forecasting, ecological modeling, and analysis of processes such as flooding and wildfire.

Prerequisite: ENVE 110 or ESS 110 or consent of instructor.

ENVE 118: Global Change [4]
Detection of, adaptation to, and mitigation of global climate change. Climate-change science, sources, sinks, and atmospheric cycling of greenhouse gases. Societal context for implementing engineered responses. Assessment of options for responding to the threat of climate change.

Prerequisite: CHEM 002. Discussion included.

ENVE 121: Environmental Microbiology [4]
Fundamentals of environmental microbiology: physiology, biochemistry, metabolism, growth energetics and kinetics, ecology, pathogenicity, and genetics, with application to both engineered and natural environmental systems. Specific applications to water, wastewater, and the environmental fate of pollutants.

Prerequisite: BIO 001 and ENVE 020. Letter grade only. Laboratory included.

ENVE 130: Meteorology and Air Pollution [4]
Basic physics and thermodynamics of the atmosphere; fundamentals of atmospheric sciences important to environmental problems; chemistry and physics of atmospheric pollutants; visibility; air quality modeling; emissions; and air pollution control strategies.

Prerequisite: ENVE 020 or ESS 020. Letter grade only. Offered spring only.

ENVE 132: Air Pollution Control [3]
Topics include government regulations, design and economics of air pollution control for point and spatial sources, strategies for regional air pollution control and engineering solutions. Air pollution control for both point and mobile sources is addressed in the context of case studies.

Prerequisite: ENVE 130. Letter grade only. Offered spring only.

ENVE 140: Water Resources Planning and Management [3]
Quantitative analytical methods in water resources planning and management; introduction to systems analysis, multi-objective planning and risk assessment. Design Project.

Prerequisite: ENVE 020 and ENGR 155. Letter grade only.

ENVE 152: Remote Sensing of the Environment [4]
Fundamentals of electromagnetic remote sensing, concepts of information extraction and applications pertinent to environmental engineering and earth systems science. Topics include remote sensing principles, aerial photography, photogrammetry, image interpretation, image processing, and applications of remote sensing in a range of environmental applications (e.g. water resource, terrestrial ecosystems, climate change and other environmental topics).

Prerequisite: MATH 021 and PHYS 008. Letter grade only. Offered fall only. Laboratory included.

ENVE 155: Decision Analysis in Management [4]
Presents the tools of decision science using a quantitative approach with a focus on investment, finance, management, technology and policy decisions. These tools include decision tree analysis, risk and uncertainty analysis, stochastic dominance, the value of information, probability bias, and subjective probability.

Prerequisite: (ECON 100 or MGMT 100) and (ECON 010 or POLI 010) or consent of instructor. Letter grade only.

ENVE 160: Sustainable Energy [4]
Current systems for energy supply and use. Renewable energy resources, transport, storage, and transformation technologies. Technological opportunities for improving end-use energy efficiency. Recovery, sequestration, and disposal of greenhouse gases from fossil-fuel combustion.

Prerequisite: ENVE 020 or ESS 020. Letter grade only.

ENVE 162: Modeling and Design of Energy Systems [3]
Concepts and applications of solar thermal processes; applications of solar collectors for water heating; active and passive building heating and cooling; fundamentals and design of wind energy systems; economics of solar energy.

Prerequisite: Junior standing. Letter grade only.

ENVE 164: Energy Policy and Planning Modeling [4]
Introduce recent development of energy policy and present fundamental optimization and simulation tools for modeling firm and market behavior for the energy sector, with a focus on electric power.

Prerequisite: (ENGR 155 or ECON 100) and MATH 024 or consent of instructor. Letter grade only.

ENVE 170: Contaminant Fate and Transport [3]
Properties and behavior of organic and metal contaminants, in soils, groundwater, surface waters, and air. Emphasis on phase transfer and transport for organic compounds; complexation and surface processes for metals. Topics include modeling of environmentally important compounds, photochemical reactions, natural organic matter, sorption phenomena.

Prerequisite: ENVE 100 or ESS 100. Letter grade only.

ENVE 171: Environmental Organic Chemistry [3]
Processes governing the distribution and transformation of anthropogenic organic chemicals in the environment. Topics include chemical-physical properties of organic chemicals, sorption processes, bioaccumulation, chemical transformations, photochemical transformations, modeling concepts.

Prerequisite: ENVE 100 or ESS 100 or consent of instructor.

ENVE 176: Water and Wastewater Treatment [3]
Water treatment, use, reclamation, and reuse. Introduction to modeling and designing treatment systems; both conventional and advanced technology. Use of mass balances for system evaluation and design. Design project.

Prerequisite: (ENVE 020 or ESS 020) and (ENVE 100 or ESS 100) and ENGR 120. Letter grade only.

ENVE 181: Field Methods in Snow Hydrology [1-3]
Properties and measurement of snow. Principles of snow metamorphism and melting. Field workshops.

Prerequisite: ENVE 110 or ESS 110. Letter grade only. Offered spring only.

ENVE 182: Field Methods in Surface Hydrology [1-3]
Measurement and interpretation of data; stream gauging, hydrography, and limnology exercises; evaporation studies; micrometeorological instruments and methods; discharge measurement; flood plain mapping; preparation of hydrologic reports. Field workshops.

Prerequisite: ENVE 110 or ESS 110.

ENVE 183: Field Methods in Subsurface Hydrology [1-3]
Introduction to fundamental field instruments used for vadose zone and subsurface field investigations. Analysis of groundwater wells and of a (hypothetical) contaminated site. Field workshops.

Prerequisite: ENVE 112. Offered fall only.

ENVE 184: Field Methods in Environmental Chemistry [1-3]
Introduction to the fundamental field instruments used for environmental chemistry field investigations. Air, water, and soil sample collection and preservation procedures. Particle separation and analysis, ion selective electrodes, colorimetric assays for nutrients and metallic species, extraction of organic species. Experimental design, measurements, and interpretation of data.

Prerequisite: ENVE 100.

ENVE 191: Professional Seminar [1]
Presentation and discussion of professional environmental and water resources engineering practices. Professional ethics and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.

ENVE 192: Topics in Environmental Systems [1-6]
Examination of a topic in environmental engineering.

May be repeated for credit.

ENVE 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

ENVE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVE 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ENVIRONMENTAL SYSTEMS

ES 200: Environmental Systems [3]
Exploration of linkages in environmental systems and tools to evaluate important features of those systems. This is done by examining the characteristics of different Earth compartments (pedosphere, lithosphere, biosphere, atmosphere and hydrosphere) in terms of mass and energy balance, residence times and interactions. To provide a context, then we examine how each of these compartments interacts with the global water cycle.

Letter grade only. Offered spring only.

ES 201: Environmental Soil Science [4]
Introduction to principles of soil science designed for graduate students in Environmental Systems and other groups. ES 201 examines the soil as a natural resource and soils as ecosystems. Soil is the reservoir on which most life on earth depends, as the primary source of food, feed, forage, fiber, and pharmaceuticals. Soil plays a vital role in sustaining human welfare, assuring future agricultural productivity and environmental stability. Environmental soil science explores the major physical, chemical, and biological properties of soils, and fundamental processes that regulate interaction of the terrestrial biosphere with other components of the earth system.

Letter grade only. Discussion included.

ES 201L: Environmental Soil Science Lab [1]
Introduction to principles of soil science designed for graduate students in Environmental Systems and other groups. ES 201 examines the soil as a natural resource and soils as ecosystems. Soil is the reservoir on which most life on earth depends, as the primary source of food, feed, forage, fiber, and pharmaceuticals. Soil plays a vital role in sustaining human welfare, assuring future agricultural productivity and

environmental stability. Environmental soil science explores the major physical, chemical, and biological properties of soils, and fundamental processes that regulate interaction of the terrestrial biosphere with other components of the earth system.

Prerequisite: ES 201, which may be taken concurrently. Letter grade only.

ES 202: Chemistry and Mineralogy of Soils [3]
Thermodynamics and kinetics of chemical process in soil systems. Topics include the formation and identification of common minerals, adsorption/desorption, precipitation/dissolution, and electrochemical reactions in soils. Graduate requirements include individual additional exercises and preparation of a research paper.

ES 203: Geochemistry of Earth Systems [3]
Quantitative analysis of Earth systems using principles of thermodynamics, kinetics, and isotope geochemistry; solution-mineral equilibrium and phase relations; equilibrium and reactive transport approaches to modeling geochemical processes at ambient and elevated temperatures. Graduate requirements include individual student projects.

ES 204: Organic Geochemistry [3]
Focus on organic chemical reactions in soils and sedimentary environments. Topics include the formation and weathering of natural organic matter and reactions of natural organic matter with pollutants. Graduate requirements include individual additional exercises and preparation of a research paper.

ES 205: Watershed Biogeochemistry [3]
Movement, storage, and transformations involving water, nutrients, and solutes in natural and human impacted watersheds; biological and chemical processes; modeling of biogeochemical processes. Interactions of watersheds with lakes and streams. Graduate requirements include more in-depth investigation of one or more topics and preparation of paper.

ES 206: Instructional Methods in Environmental Systems [3]
Instrumental analytical methods and quantitative analysis applied to the study of environmental materials, including inorganic, organic, and biological substances. Completion of an individual research project and preparation of a project report is required for graduate credit.

Laboratory included.

ES 207: Environmental Data Analysis [3]
The objective of this class is to provide students with probabilistic and statistical methods to analyze environmental data. This class emphasizes both theoretical and applied aspects of data analysis methods. Weekly lab exercises are from environmental applications. Topics include: distribution, hypothesis test, linear regression, multiple regression, uncertainty analysis, outlier detection, sample design, and spatial and temporal data analysis.

Letter grade only.

ES 208: Surface and Colloid Chemistry of Earth Materials [3]
Surface, colloid, and interfacial chemistry related to soil, environmental, and microbial applications; properties, energetics, and reactivity of surfaces and interfaces of Earth materials; the role of mineral surfaces in promoting and catalyzing chemical phenomena at phase boundaries. Graduate requirements include individual additional exercises and preparation of a research paper.

ES 209: Chemistry and Mineralogy of Earth Materials [3]
Chemical principles, structure, and bonding of minerals and Earth materials, including crystallography (symmetry, space groups, group theory), coordination chemistry, bonding models (valence bond, crystal field, and MO theories), and electronic and magnetic properties.

Prerequisite: ESS 100 or CHEM 010 or consent of instructor. May be repeated for credit.

ES 212: Subsurface Hydrology [4]
Hydrologic and geologic factors controlling the occurrence and use of groundwater on regional and local scales. Physical, mathematical, geologic, and engineering concepts fundamental to subsurface hydrologic processes. Introduction to ground-water flow and transport modeling, with emphasis on model construction and simulation. Graduate requirements include completion of advanced analysis in problem sets, completion of a term paper or project, and development of project management skills in the course design project.

ES 214: Mountain Hydrology of the Western United States [3]
Principles of snow formation, occurrence, and measurement; components of evapotranspiration; runoff generation; groundwater recharge processes; water resource assessments; and resource management. Focus on California and the southwestern U.S. Design project. Graduate requirements include more in-depth investigation of one or more topics and preparation of paper.

ES 218: Global Change [4]
Detection of, adaptation to, and mitigation of global climate change. Climate-change science, sources, sinks, and atmospheric cycling of greenhouse gases. Societal context for implementing engineered responses. Assessment of options for responding to the threat of climate change. Graduate requirements include preparation of a detailed case analysis.

ES 221: Environmental Microbiology [4]
Fundamentals of environmental microbiology: physiology, biochemistry, metabolism, growth energetics and kinetics, ecology, pathogenicity, and genetics, with application to both engineered and natural environmental systems. Specific applications to water, wastewater, and the environmental fate of pollutants. Graduate requirements include additional projects.

ES 224: Terrestrial Ecosystem Ecology [3]
Ecosystem ecology is the study of interactions between organisms and their environment. Focus on energy, water and nutrient flows through the living (plants, animals, microbes) and nonliving (soils, atmosphere) components of ecosystems. We examine both natural and human-modified terrestrial ecosystems. Graduate requirements include preparation and peer review of a research proposal.

ES 225: Microbial Ecology [4]
Advanced study of microbiological systems and techniques. Graduate requirements include additional exercises and preparation of a research paper.

ES 226: Environmental Genomics [4]
Introduction to the principles and methods of genomics as applied to the understanding of ecosystems. Topics include population genetics, adaptation to environmental change, and genomic analysis of environmental microbial communities; experimental and computational methods relevant to environmental genomics. Graduate requirements include additional exercises and preparation of a research paper.

Laboratory included.

ES 227: Flora of California [5]
Introduces students to the plant diversity of California. It consists of lectures, discussions, and field trips. The field trips focus on plant identification in the foothills of the Central Sierra Nevada and help illustrate concepts presented in lecture such as endemism, plant/soil interactions, and vegetation types.

Letter grade only. Discussion and fieldwork included.

ES 228: Ecological Modeling [3]
An advanced study of modeling population dynamics and the flow of energy and matter in ecosystems. Graduate requirements include additional exercises and preparation of a research paper.

ES 232: Applied Climatology [3]
Spatial and temporal patterns in climate and their association with land surface characteristics and processes. Methods for exploiting these for hypothesis testing, modeling, and forecasting. Applications include seasonal forecasting, ecological modeling, and analysis of processes such as flooding and wildfire.

ES 234: Air Pollution and Resources [3]
Chemistry and physics of atmospheric pollutants, urban air pollution, visibility, mitigation, and resource economics.

Prerequisite: ESS 100 or consent of instructor. May be repeated for credit once.

ES 235: Heat Transfer [4]
Study of conduction, convection, and radiation heat transfer, with applications to engineering problems. Graduate requirements include in-depth investigation of one or more topics and preparation of paper.

Laboratory included.

ES 236: Advanced Mass Transfer [3]
Steady and unsteady mass diffusion; mass convection, simultaneous heat and mass transfer; Fick's law in a moving medium; similarity and integral methods in mass transfer; high mass transfer theory; research project in mass transport. Knowledge of Heat Transfer is essential for success in this course.

Letter grade only.

ES 237: Viscous Flows [4]
Study of the Navier-Stokes equations; Stokes' problems; creeping flows; internal and external flows; similarity and integral methods in boundary layer flows; stability and transition to turbulence. Knowledge of the topics covered in ENGR 135 or ES 235 Heat Transfer are necessary for the successful completion of this course.

Letter grade only. May be repeated for credit once.

ES 238: Air Pollution Control [3]
Physical and chemical principles for the capturing of air pollutants. Design of air pollution controls

devices for particulate and gaseous pollutants emitted from stationary and mobile sources. State and Federal Regulations for point, mobile and area sources. Economics aspects of air pollution control to meet ambient air quality standards. In case studies, particular issues are addressed as they relate to the San Joaquin Valley.

ES 240: Water Resources Planning and Management [3]
Basic concepts of and issues in water resources management, water resources planning, institutional and policy processes. Quantitative analytical methods in water resources planning and management; introduction to systems analysis, multi-objective planning, and risk assessment. Design project. Graduate requirements include preparation of a detailed case analysis.

ES 248: Advanced Topics in Ecology [3]
Utilizes directed readings and discussion of classical and current literature in ecology, including physiological, population, community, ecosystem, landscape, and global ecology studies.

Letter grade only.

ES 252: Remote Sensing of the Environment [4]
Fundamental and advanced concepts of electromagnetic remote sensing, information extraction and applications in environmental monitoring. Advanced topics include principles of image extraction, image correction, image enhancement, classification methods, and new development of sensor techniques. Reading materials and final research projects are required for graduate students.

Letter grade only. Laboratory included.

ES 260: Sustainable Energy [4]
Current systems for energy supply and use. Renewable energy resources, transport, storage, and transformation technologies. Technological opportunities for improving end-use energy efficiency. Recovery, sequestration, and disposal of greenhouse gases from fossil-fuel combustion. Graduate requirements include preparation of a detailed case analysis.

ES 262: Modeling and Design of Energy Systems [3]
Concepts and applications of solar thermal processes; applications of solar collectors for water heating; active and passive building heating and cooling; fundamentals and design of wind energy systems; economics of solar energy. Graduate-level requirements include preparation of a detailed case analysis.

ES 264: Energy Policy and Planning Modeling [4]
Introduce recent development of energy policy and present fundamental optimization and simulation tools for modeling firm and market behavior for the energy sector, with a focus on electric power.

Letter grade only.

ES 270: Contaminant Fate and Transport [3]
Properties and behavior of organic and metal contaminants, in soils, groundwater, surface waters, and air. Emphasis on phase transfer and transport for organic compounds; complexation and surface processes for metals. Topics include modeling of environmentally important compounds, photochemical reactions, natural organic matter, sorption phenomena. Graduate-level requirements include preparation of a detailed case analysis.

ES 291: Environmental Systems Seminar [1-3]
Seminar on advanced engineering and science topics, environmental systems research, and relevant case studies.

Satisfactory/Unsatisfactory grading only. May be repeated for credit once.

ES 292: Topics in Environmental Systems [1-6]
Treatment of a special topic or theme in environmental systems. May be repeated for credit in a different subject area.

May be repeated for credit. Discussion and laboratory included.

ES 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ES 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

ES 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

FRENCH

No credit is allowed for completing a less advanced course after successful completion of a more advanced course in the foreign languages. This applied only to lower division foreign language courses, not upper division courses.

FRE 001: Elementary French I [4]
Introduction to speaking, reading, writing and understanding French. Classes conducted in French.

Letter grade only.

FRE 002: Elementary French II [4]
Introduction to speaking, reading, writing and understanding French. Classes conducted in French.

Prerequisite: FRE 001 or appropriate score on French Placement Exam. Letter grade only.

FRE 003: Intermediate French I [4]
A review of French grammar with emphasis on building speaking and writing skills and on reading to build cultural understanding. Classes conducted in French.

Prerequisite: FRE 002 or appropriate score on French Placement Exam. Letter grade only.

FRE 004: Intermediate French II [4]
A review of French grammar with emphasis on building speaking and writing skills and on reading to build cultural understanding. Classes conducted in French.

Prerequisite: FRE 003 or appropriate score on French Placement Exam. Letter grade only.

FRE 092: Internship in French [1-4]
Provides oversight and structure for a student's internship in a field related to French in community organizations, professional research projects, etc. connected to the study of French. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of French.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

FRE 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

FRE 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

FRE 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

FRE 103: French Composition and Conversation [4]
Develops students' abilities to communicate in spoken and written French at an advanced level. The course emphasizes the importance of the interaction between writer, reader, purpose and message. Focuses on the four major modes of writing and oral practice.

Prerequisite: FRE 004 or appropriate score on French Placement Exam. Letter grade only.

FRE 192: Internship in French [1-4]
Provides oversight and structure for a student's internship in a field related to French in community organizations, professional research projects, etc. connected to the study of French. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of French.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

GEOGRAPHY

GEOG 010: Introduction to Spatial Analysis [4]
Teaches the value of geography as a basis for organizing and discovering information; the nature and meaning of maps, and the concepts and tools for spatial analysis: the description, organization, linkage, manipulation and communication of geographical information.

Discussion included.

GEOG 141: Environmental Science and Policy [4]
In depth-analysis of environmental case studies. Focus on science critical to policy development and implementation, the policy-making process and policy outcomes. Special emphasis on interaction between scientific information and policy-making. Example topics include Western water resources, biodiversity conservation and global warming. Emphasis on written and oral communication and critical analysis.

Prerequisite: WRI 010 and (any course in BIO, ECON, ESS, ENVE, or POLI). Discussion included.

GEOG 142: Geography of Resource Management [4]
Climate and biogeography of Western US relevant to Forestry, Fire, and Water Resources management introduced via the writings of 19th century explorers and surveyors of the West and recent scientific literature. Analyze role of climate and biogeographic information in public resource management policy debates of 1870s-1910s versus present day. Geographic perspective on long term repercussions of early 20th century resource management policy choices.

Prerequisite: Any HIST, LIT, PUBP, BIO, ENVE, or ESS course or WRI 010 or consent of instructor. Discussion included.

GLOBAL ARTS STUDIES PROGRAM

GASP 001: Introduction to Global Arts Studies [4]
Study of global arts with an integrated approach that examines visual arts, music, and a variety of other subjects offered by the Global Arts Studies Program.

Letter grade only.

GASP 002: Introduction to Music Studies [4]
Explores the fundamentals of music through various idioms, genres and traditions.

Letter grade only.

GASP 003: Introduction to Visual Culture [4]
An introduction to visual material in art and mass media from cultures throughout the world. Emphasizes the development of students' own critical skills in analyzing and understanding visual culture. Topics include artworks from the antiquity to postmodernism, as well as issues in mass media, pop culture, and cyberspace.

Letter grade only.

GASP 004: Introduction to Arts and Cultural Studies [4]
Introduction to a range of debates in cultural studies concerned with the impact race, gender, sexuality and class, for example, exert on cultural production, cultural identity and representation and/or aesthetics.

Letter grade only.

GASP 005: Introduction to Arts and Technology [4]
Familiarizes students with academic debates regarding the relationship between technology writ large and artistic production, distribution and consumption—as well as creation, critique and pleasure.

Letter grade only.

GASP 012: Asia Pacific Art [4]
Introduces students to the artistic traditions of cultures within Asia and/or the Pacific Ocean region.

Letter grade only.

GASP 013: Latin American Art [4]
Introduces students to the artistic traditions of Latin American cultures.

Letter grade only.

GASP 015: History of Western Art Music [4]
Introduction to the art music of western culture, including music from Medieval, Renaissance, Baroque, Classical, Romantic, and 20th century eras, featuring study of selected masterworks in relation to the periods which they represent. Emphasis is placed upon developing awareness of musical style and structure through lectures and directed listening.

GASP 021: Ethnomusicology [4]
Introduces and familiarizes students with the theoretical and methodological issues and concerns in the field of ethnomusicology.

Letter grade only.

GASP 023: Music of Asia Pacific [4]
Introduces and familiarizes students with a musical tradition from Asia and/or the Pacific Ocean.

Letter grade only.

GASP 025: Music of the Middle East [4]
Introduces and familiarizes students with a musical tradition from the Middle East.

Letter grade only.

GASP 026: Music in the World's Religions [4]
Examines the role and power of music in the rituals of the world's religions; Hinduism, Buddhism, Judaism, Christianity, and Islam. It covers formalized ritual structures, as well as the musical systems of a variety of religious and social groups, including both older and contemporary forms.

Letter grade only. Discussion included.

GASP 031: Critical Popular Music Studies [4]
Introduces students to current concerns in critical popular music studies, including issues of identity (e.g., race, gender) and representation. Students learn a variety of theories used in critical analyses of popular music. They also learn various methodological approaches used to research popular music.

Letter grade only.

GASP 032: Introduction to Jazz Studies: History of Jazz [4]
Introduces students to the history of jazz, including its key developments, innovators and styles.

Letter grade only. Discussion included.

GASP 034: The American Musical [4]
Explores the relationship between the American musical and American-ness. Ideas about what it means to be an American have been expressed on the musical stage and have both reflected and helped form those ideas. Readings help link ideas about America and Americans as well as the historical contexts for the songs and narratives of the musicals.

Letter grade only.

GASP 092: Internship in Global Arts [1-4]
Provides oversight and structure for a student's internship in a field of global arts in community organizations, professional research projects, etc. connected to the study of global arts. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of global arts.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

GASP 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

GASP 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GASP 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GASP 101: Visual Arts of the Twentieth Century [4]
Surveys a selection of artists and ideas in the twentieth century with a global perspective. Students read pertinent critical theories and examine artwork in its historical, cultural and sociopolitical contexts.

Letter grade only.

GASP 102: Asian American Art [4]
Examines the artistic production of American artists of Asian descent (both foreign and U.S. born). This class provides an overview of these artists' works in relation to issues of diaspora, immigration policies, social and civic engineering, racial relations, as well as formal and stylistic developments.

Prerequisite: Junior standing. Letter grade only.

GASP 121: Asian Pacific American Music [4]
Introduces students to the history of Asian Pacific American music—the musicians, their creative work, and the social and historical contexts under which they composed and performed their music.

Prerequisite: Junior standing. Letter grade only.

GASP 131: Critical Popular Music Studies [4]
Focus on current concerns in popular music studies, including issues of identity (e.g., race, gender) and representation. Students will learn a variety of theories used in critical analyses of popular music. They will also learn various methodological approaches used to research popular music.

Prerequisite: Junior standing. Letter grade only.

GASP 132: Critical Jazz Studies [4]
Focus on current concerns in jazz studies, including issues of identity (e.g., race, gender) and representation. Students will learn a variety of theories used in critical analyses of jazz music. They will also learn various methodological approaches used to research jazz music.

Prerequisite: Junior standing. Letter grade only.

GASP 135: African American Music [4]
Focus on a central question: how do we locate African American music, i.e., how can we define African American music? In attempting to answer this question, we will be thinking through concepts such as authenticity, representation, recognition, cultural ownership, appropriation, origin(s) in historical contexts.

Prerequisite: Junior standing. Letter grade only.

GASP 141: History and Practice of Photography [4]
Examine critical texts on the history and theory of photography, study the work of photographers from diverse backgrounds, and investigate cultural and sociopolitical issues in photographic practice and production. Students will also learn some basic techniques of taking photographs through various in-class exercises and assignments.

Prerequisite: Sophomore standing and any lower division ARTS or GASP course. Letter grade only.

GASP 151: Topics in Visual Culture [4]
Special topics in the study of visual culture in a global context.

Prerequisite: Junior standing and (any lower division GASP course or GASP 101) or consent of instructor. Letter grade only.

GASP 152: Topics in Music Studies [4]
Focuses on a combination of individual and group research projects in music studies.

Prerequisite: Junior standing. Letter grade only.

GASP 175: Race and Nationalism in American Art [4]
Addresses issues concerning pictorial representations of racial and national identities in twentieth-century American art through readings of historical, cultural, and sociopolitical documents and theories. Special emphasis is placed on artists who are considered outside the canon and on debates relating to assimilation and nationalism.

Prerequisite: Junior standing and (any lower division GASP course or GASP 101) or consent of instructor. Letter grade only.

GASP 192: Internship in Global Arts [1-4]
Provides oversight and structure for a student's internship in a field of global arts in community organizations, professional research projects, etc. connected to the study of global arts. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of global arts.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

GASP 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

GASP 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

GASP 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HISTORY

HIST 005: History of Cartography [4]
Interpretation of historical maps from East Asia, the Islamic world, Europe, and indigenous societies, and the relationship of map making traditions to state power, science, religion, and other areas of thought and practice. The final unit of the course addresses GIS and mapping in the computer age.

HIST 010: Introduction to World History to 1500 [4]
World History from the origins of civilization to the European encounter with the Americas. Major topics include the growth of human populations, the rise of empires and states, routes of trade and migration, the spread of ideas and religions, and the impact of human settlement upon the natural world.

Letter grade only. Discussion included.

HIST 011: Introduction to World History Since 1500 [4]
World history from the European encounter with the Americans to the present century. Major topics include colonization and decolonization, the rise of modern imperialism, capitalism and its opponents, urbanization and mass communication, technologies for war and peace, and the impact of human settlement upon the natural world.

Letter grade only. Discussion included.

HIST 016: Forging of the United States, 1607-1877 [4]
The history of the U.S. from colonial roots through the Civil War and Reconstruction. Major topics include the coming of the Revolution, the impact of slavery on the development of the United States, westward expansion, and the creation of a distinctively American culture.

Discussion included.

HIST 017: The Modern United States, 1877-Present [4]
The history of the United States from the Gilded Age through the early 21st century. Major topics include the impact of the Industrial Revolution on American life, the rise of the U.S. to a world power, the changing role of the federal government, and the ongoing struggle for civil rights.

Discussion included.

HIST 020: History of the American West 1500 - 1849 [4]
An exploration of the idea of the west as it developed in the United States from Columbus to the advent of Gold Rush California. Emphasis will be upon the age of exploration and discovery, the notion of the frontier, and the impact of westward expansion upon the colonizer as well as the indigenous people of the west.

Discussion included.

HIST 021: History of the American West, 1850-2000 [4]
The history of the idea of the west in the United States from the aftermath of the California Gold Rush to the rise of the Silicon Valley. Emphasis is upon the various roles that technology and the modern notion of the frontier played in the settlement and exploitation of the west before and after the Civil War.

Prerequisite: HIST 020. Discussion included.

HIST 025: Introduction to Environmental History [4]
Studies the interaction between environment and society, focusing on climate change and environmental degradation. This course will look at examples from historical cases including China, the Roman Empire, the Middle East and Medieval Europe, focusing on the effects of famine, resource depletion and migration.

Discussion included.

HIST 030A: Medieval Europe [4]
A survey of the development of Europe from the fall of Rome to the Renaissance.

Letter grade only. Discussion included.

HIST 030B: Early Modern Europe [4]
A survey of Europe from the Renaissance to the French Revolution. Covers European expansion, the Renaissance and Reformation, political change, scientific revolution and changes in trade, work, gender and family.

Letter grade only. Discussion included.

HIST 031: Modern European History [4]
A survey of the economic, social/cultural and political history of Europe from the early modern era to the present day.

Discussion included.

HIST 040: History of Technology in Society I [4]
Starting from the Paleolithic period and moving forward to the end of the 18th century and the dawn of the Industrial Revolution this course will examine the process of technological change and its relationship to societal change.

Letter grade only. Discussion included.

HIST 041: History of Technology in Society II [4]
Starting from the Industrial Revolution at the end of the 18th century and moving to the present, this course will examine the process of technological change and its relationship to societal change.

Letter grade only. Discussion included.

HIST 060: The Silk Road [4]
For millennia, monks, merchants, warriors and brides traveled a network of routes throughout Eurasia, exchanging religious beliefs, disease pathogens, foodstuffs and luxury goods. This interdisciplinary and multi-media course examines the Silk Road through maps, art, travel narratives, archaeological reports, and other genres.

Prerequisite: HIST 010 or HIST 011 or consent of instructor.

HIST 070: History of Islam I: From Muhammad to the Caliphate [4]
Fundamental principles of the Islamic religion, the emergence of Islam under the Prophet Muhammad, and the expansion of Islam under the First Four Caliphs to 661 A.D. Students examine Islam as a religion, a historical phenomenon, and a cultural impulse.

Discussion included.

HIST 071: History of Islam II: From the Caliphate to the Present [4]
Covers the spread of Islam from the end of the Era of Rightly Guided Caliphs (661 AD) until the present, including Islamic empires, art and culture, colonialization and the contemporary Muslim world; and cultural and political contacts between Islam and the West.

Discussion included.

HIST 080: History of China Through the Mongol Conquest [4]
Introduces the history of China from Neolithic times through the early Ming dynasty. It explores the emergence of the Chinese empire and the dynamic between China and its neighbors. Students will analyze maps, and work with primary sources including art, philosophy, essays and political documents.

Discussion included.

HIST 081: History of China Since the Mongol Conquest [4]
Introduces the history of China from the Mongol conquest to the present. It covers the late imperial era, the nineteenth century crises of social dislocation and imperialism, and the revolutionary twentieth century. Students analyze maps and work with primary sources including art, philosophy, essays and political documents.

Discussion included.

HIST 090X: Freshman Seminar [1]
Examination of a topic in history.

May be repeated for credit.

HIST 092: Internship in History [1-4]
Provides oversight and structure for a student's internship in a field related to history in community organizations, professional research projects, etc. connected to the study of history. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of history.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

HIST 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

HIST 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 100: The Historian's Craft [4]
Focuses upon the various techniques of research and writing used by historians, from Thucydides to the so-called revisionists of today's "culture wars," and the changing audience of the historian.

Prerequisite: Junior standing or consent of instructor. History majors only. Letter grade only.

HIST 101: Visual Arts of the Twentieth Century [4]
Surveys a selection of artists and ideas in the twentieth century with a global perspective. Students read pertinent critical theories and examine artwork in its historical, cultural and sociopolitical contexts.

Letter grade only.

HIST 103: Critical Popular Music Studies [4]
Focus on current concerns in popular music studies, including issues of identity (e.g., race, gender) and representation. Students will learn a variety of theories used in critical analyses of popular music. They will also learn various methodological approaches used to research popular music.

Prerequisite: Junior standing. Letter grade only.

HIST 104: Critical Jazz Studies [4]
Focus on current concerns in jazz studies, including issues of identity (e.g., race, gender) and representation. Students will learn a variety of theories used in critical analyses of jazz music. They will also learn various methodological approaches used to research jazz music.

Prerequisite: Junior standing. Letter grade only.

HIST 108: Topics in World History [4]
Topics in the field of World History.

Prerequisite: HIST 010 and HIST 011 or consent of instructor. Letter grade only. May be repeated for credit twice.

HIST 109: Topics in the History of Science and Technology [4]
Addresses the relationship between historical change and significant scientific or technological developments. Possible areas include technologies of war, scientific revolutions, agricultural intensification, hydrology or other topics as determined by the instructor.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100 or consent of instructor. Letter grade only. May be repeated for credit twice.

HIST 110: Climate Change and World History [4]
Draws upon both environmental science and history to examine how the rise and fall of civilizations; the evolution of farming, pastoralism, and trade; the course of wars, and patterns of migration have been affected by fluctuations in temperature and rainfall. It also examines how humans have contributed to climate change.

Prerequisite: One lower-division HIST or ESS course recommended.

HIST 111: The Legacy of Genghis Khan [4]
Examines Genghis Khan's life and legacy in Asia and the world, emphasizing topics such as the life of the Khan, Mongol military tactics, economic and trade policies, international relations, the interaction between nomadic and settled peoples, pre-modern state formation, and Mongol-influenced artistic and literary achievements.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017). Letter grade only.

HIST 112: History of Islamic Art and Architecture [4]
Studies the cultural history of Islamic societies as expressed by their art and architecture from the 7th century to the present. Changes in artistic styles, architectural advances and expression of the written word will be compared across time and geography in social context.

Prerequisite: Any lower division history course or consent of instructor.

HIST 113: History of the Gunpowder Empires [4]
Focus on three great "gunpowder empires" of the early modern world: The Ottomans, Safavids, and Mughals. We will begin with imperial origins, and then examine methods of expansion, political and religious developments, and foreign relations. Special topics will include art and architecture, kingship, political legitimacy, and historiography.

Prerequisite: Any lower division history course or consent of instructor. Letter grade only.

HIST 114: History and Practice of Photography [4]
Examine critical texts on the history and theory of photography, study the work of photographers from diverse backgrounds, and investigate cultural and sociopolitical issues in photographic practice and production. Students will also learn some basic techniques of taking photographs through various in-class exercises and assignments.

Prerequisite: Sophomore standing and any lower division ARTS or GASP course. Letter grade only.

HIST 116: History of Decolonization in the Twentieth Century [4]
This class will explore the ways that decolonization shaped the political, social, and economic landscape of the late twentieth century. Case studies of colonies throughout the world, and of imperial responses to decolonization, will illustrate the changing relationships among empires and subject peoples seeking self-determination.

Prerequisite: HIST 010 or HIST 011.

HIST 117: Topics in Regional or State History [4]
In-depth study of a particular topic in the history of a region or state. Possible topics include the social, cultural, economic, or political history of that region or state.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100 or consent of instructor. May be repeated for credit twice.

HIST 118: Topics in Environmental History [4]
In-depth study of a particular topic in environmental history. Possible topics include the impact of industrialization upon the natural world, the changing notion of "wilderness," the role of national parks, California's "water wars," and others.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100 or consent of instructor. May be repeated for credit twice.

HIST 119: Topics in the History of Migration and Immigration [4]
In-depth study of a particular topic in the history of migration and/or immigration. Possible topics include the origins and history of America's culturally diverse population with a focus upon the experiences of European, Native, African, Chicano/Latino and Asian Americans. May be repeated twice with different topics.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or HIST 100 or consent of instructor. May be repeated for credit twice.

HIST 120: Essence of Decision: Case Studies in History [4]
Examines the art and science of decision-making with specific examples from historical case studies. The focus is upon the historical determinates of both successful and unsuccessful decisions, and upon decisions that had both foreign policy and domestic implications.

Prerequisite: HIST 016 and HIST 017 or consent of instructor.

HIST 121: Asian Pacific American Music [4]
Introduce students to the history of Asian Pacific American music—the musicians, their creative

work, and the social and historical contexts under which they composed and performed their music.

Prerequisite: Junior standing. Letter grade only.

HIST 123: Comparative Race and Ethnicity in the United States [4]
Examine the construction of race and ethnicity in the United States in an historical and comparative context. The foundational concept of this course is that race is a social construction that comes into being through both historical and continuing interactions between various groups within U.S. society.

Prerequisite: HIST 016 or HIST 017.

HIST 124: African American History from Slavery to Civil Rights [4]
Examines the history of African Americans from the era of slavery through emancipation, Jim Crow segregation, and the Civil Rights and Black Power movements. Topics include the development of a distinct African American culture as well as political movements ranging from abolitionism to black nationalism.

Prerequisite: Junior standing or consent of instructor. Letter grade only. Lower division survey in American literature or history recommended.

HIST 125: African American Music [4]
Focus on a central question: how do we locate African American music, i.e., how can we define African American music? In attempting to answer this question, we will be thinking through concepts such as authenticity, representation, recognition, cultural ownership, appropriation, origin(s) in relation to historical contexts.

Prerequisite: Junior standing. Letter grade only.

HIST 126: Race and Nationalism in American Art [4]
Addresses issues concerning pictorial representations of racial and national identities in twentieth-century American art through readings of historical, cultural, and sociopolitical documents and theories. Special emphasis is placed on artists who are considered outside the canon and on debates relating to assimilation and nationalism.

Prerequisite: Junior standing and (any lower division GASP course or GASP 101) or consent of instructor. Letter grade only.

HIST 128: The United States and the Vietnam War [4]
Examines the roots and conduct of the war from the initial American involvement after World War II through the withdrawal of American troops in 1973. Additionally, students explore the way in which the war both reflected and amplified divisions within American society during this period.

Prerequisite: HIST 016 or HIST 017 or consent of instructor.

HIST 130: The Cold War, 1941-1991 [4]
The political, cultural, and intellectual history of America's confrontation with Communism at home and abroad, from U.S. entry into the Second World War to the collapse of the Soviet Union and its aftermath.

Prerequisite: HIST 016 and HIST 017 or consent of instructor.

HIST 131: Topics in National History: "Manifest Destiny:" The United States and the World, 1840s-Present [4]
Beginning with the Mexican-American war and the conquest of the West, this seminar examines the way in which the U.S. has aggressively expanded its role on the world stage. Major themes include the impact of economics and religion and ongoing debates over globalization and imperialism.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) and HIST 100, which may be taken concurrently, or consent of instructor. May be repeated for credit three times.

HIST 132: Intelligence and National Security, 1945-2000 [4]
Focuses upon the roles that intelligence and espionage have played in U.S. national security since 1945. A particular emphasis lies in those historical instances where technical intelligence had a part in resolving, or avoiding, major Cold War crises.

Prerequisite: HIST 016 and HIST 017 or consent of instructor.

HIST 134: History and Literature of the Great Depression [4]
Focusing on the turbulent decade of the 1930s, we use the lens of history and literature to explore how events from 1929-1941 helped shape modern America. Particular attention is paid to the impact of these years upon California and the West.

Prerequisite: Junior standing and LIT 020 or LIT 021 or HIST 016 or HIST 017. Letter grade only.

HIST 135: History and Literature of the 1960s [4]
Examines American politics, culture, and society in the 1960s. Topics include civil rights, feminism, the Vietnam War, the Beat and other counterculture movements, and the sexual revolution.

Prerequisite: LIT 030 or LIT 031 or HIST 016 or HIST 017. Letter grade only.

HIST 137: Topics in European History [4]
In-depth study of a particular topic in the history of Europe. Possible topics include the social, cultural, economic, or political/diplomatic history of Europe.

Prerequisite: HIST 010 and (HIST 011 or HIST 030) and HIST 031. Permission of instructor required.

HIST 138: Topics in Visual Culture [4]
Special topics in the study of visual culture in a global context.

Prerequisite: Junior standing and any lower division GASP course or GASP 101 or consent of instructor. Letter grade only.

HIST 139: Topics in United States History [4]
Topics in the History of the United States.

Prerequisite: HIST 016 and HIST 017 or consent of instructor. May be repeated for credit twice.

HIST 158: Topics in Middle Eastern History [4]
Topics in the field of Middle Eastern History.

Prerequisite: Junior standing and (HIST 010 and HIST 011) or (HIST 070 and HIST 071) or consent of instructor. Letter grade only. May be repeated for credit twice.

HIST 165A: China in the Ancient World [4]
Introduces the history of ancient China. It begins with the emergence of life ways associated with farming and pastoralism. It covers kingship and empire, philosophy, religion, and the interactions between China and its neighbors. It ends with the reunification of China under the Sui dynasty in the sixth century.

Prerequisite: Any course in HIST or consent of instructor.

HIST 165B: From Tang to Song: China in the Medieval World [4]
From the seventh to the fourteenth century, China was the world's most powerful and technologically sophisticated society. This course examines the history of middle period China in the context of the Eurasian world. By emphasizing primary sources we will see how people envisioned their world.

Prerequisite: Any course in HIST or consent of instructor.

HIST 165C: Late Imperial China [4]
Introduces late imperial Chinese history. It begins with the Mongol conquest and its impacts. It explores Ming contraction and resurgence, the Manchu Qing and their ethnically hybrid state, the eighteenth century golden age, and the decline of empire in the context of Japanese and European imperialism.

Prerequisite: Any course in HIST or consent of instructor.

HIST 165D: China in the Modern World [4]
Covers the history of modern China. It begins with the decline of the Chinese empire in the nineteenth century, describes the twentieth century Republican and Communist revolutions, and charts the emergence of China as a twenty-first century world power.

Prerequisite: any course in HIST.

HIST 170: Law and Society In England 1066-1800 [4]
An examination of the social, political and cultural factors shaping the development of English law and constitutional practice from the Norman Conquest until the 19th century. Attention to both the daily practice of law and constitutional principles.

Prerequisite: HIST 010 and HIST 011 or junior standing. Letter grade only.

HIST 171: Modern European Intellectual History [4]
Examines the ideas and ideologies which transformed modern Europe: the French Revolution, nationalism, totalitarianism, the world wars, and the Cold War. Throughout, we place the major (and lesser) figures of the modern European intellectual scene in relation (or contrast) to the political and social scene in which they found themselves.

Prerequisite: HIST 030 or HIST 031 or consent of instructor.

HIST 172: Europe and the Early Modern Atlantic World [4]
Survey of Europe's involvement in the Atlantic, including the process of colonizing the Americas, the development of the slave trade, and the European response to both Africa and American colonies.

Prerequisite: (HIST 010 and HIST 011) or (HIST 016 and HIST 017) or consent of instructor. Letter grade only.

HIST 179: Topics in European History [4]
In-depth study of a particular topic in the history of Europe. Possible topics include the social, cultural, economic, or political/diplomatic history of Europe.

Prerequisite: (HIST 010 and HIST 011) or (HIST 030 and HIST 031) or consent of instructor. May be repeated for credit twice.

HIST 191: History Capstone [4]
A capstone course for history majors, which involves the preparation of an extended research project done under the supervision of a faculty member and with extensive peer review.

Prerequisite: Senior standing. History majors only. Letter grade only.

HIST 192: Internship in History [1-4]
Provides oversight and structure for a student's internship in a field related to History in community organizations, professional research projects, etc. connected to the study of History. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of History.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

HIST 193: Honors Thesis Research [4]
First half of the History Honors thesis sequence (HIST 193-4). Students research a topic in preparation for producing an Honors thesis.

Prerequisite: Senior standing. History Honors Program students only. Permission of instructor required. Letter grade only.

HIST 194: Honors Thesis [4]
Second half of the History Honors thesis sequence. Students write a 50-100 page thesis under the supervision of a faculty mentor.

Prerequisite: Senior standing. History Honors Program students only. Permission of instructor required. Letter grade only.

HIST 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

HIST 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HIST 200: The Uses and Abuses of the Past: History's Role in Society [4]
Examines the role of history, and the historian, in modern American society. Topics to be considered include the various potential roles of the historian as writer and biographer, curator, social critic, ethicist, and the phenomenon of "history for hire."

HIST 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

HIST 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

HIST 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

HUMAN BIOLOGY

HBIO 190: Research Seminar [1]
Student-led presentations of current topics in human biology, including independent research presentations.

Prerequisite: Junior standing. Permission of instructor required.

HBIO 195: Research Project in Human Biology [1-5]
Group or individual research projects in human biology under the direction of a BIO faculty member and a faculty member from the School of Social Sciences, Humanities and the Arts.

Prerequisite: Junior standing. Permission of instructor required. May be repeated for credit.

HBIO 198: Directed Group Study in Human Biology [1-5]
Group directed study in human biology under the direction of a BIO faculty member and a faculty member from the School of Social Sciences, Humanities and the Arts.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

HBIO 199: Directed Independent Study in Human Biology [1-5]
Independent study in human biology under the direction of a BIO faculty member and a faculty member from the School of Social Sciences, Humanities, and the Arts.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

JAPANESE

No credit is allowed for completing a less advanced course after successful completion of a more advanced course in the foreign languages. This applied only to lower division foreign language courses, not upper division courses.

JPN 001: Elementary Japanese I [4]
Introduction to speaking, reading, writing and understanding modern Japanese.

Letter grade only.

JPN 002: Elementary Japanese II [4]
Introduction to speaking, reading, writing and understanding modern Japanese.

Prerequisite: JPN 001 or appropriate score on Japanese Placement Exam. Letter grade only.

JPN 003: Intermediate Japanese I [4]
Continuation of elementary Japanese. Emphasizes the further development of speaking, writing and reading skills, with an intensive review of basic grammar as well as an introduction to more advanced grammar and vocabulary.

Prerequisite: JPN 002 or appropriate score on Japanese Placement Exam. Letter grade only.

JPN 004: Intermediate Japanese II [4]
Continuation of elementary Japanese and Japanese 3. Emphasizes the further development of speaking, writing and reading skills, with an intensive review of basic grammar as well as an introduction to more advanced grammar and vocabulary.

Prerequisite: JPN 003 or appropriate score on Japanese Placement Exam. Letter grade only.

JPN 092: Internship in Japanese [1-4]
Provides oversight and structure for a student's internship in a field related to Japanese in community organizations, professional research projects, etc. connected to the study of Japanese. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Japanese.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

JPN 103: Advanced Japanese I [4]
Continuation of Intermediate Japanese II. Emphasizes the further development of reading, writing and speaking Japanese, with learning social and cultural issues of contemporary Japanese society.

Prerequisite: JPN 004 or consent of instructor. Letter grade only.

JPN 104: Advanced Japanese II [4]
Continuation of Advanced Japanese II. Emphasizes the further development of reading, writing and speaking Japanese, with learning social and cultural issues of contemporary Japanese society.

Prerequisite: JPN 103 or consent of instructor. Letter grade only.

JPN 192: Internship in Japanese [1-4]
Provides oversight and structure for a student's internship in a field related to Japanese in community organizations, professional research projects, etc. connected to the study of Japanese. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Japanese.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

LITERATURE

LIT 020: Introduction to World Culture and Literature I [4]
Introduction to the connections between language, literature, and culture over time and across national traditions through a variety of literary genres. Introduces the masterworks of world literature in their cultural contexts, through comparative analysis.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 021: Introduction to World Culture and Literature II [4]
Introduction to the connections between language, literature, and culture over time and across national traditions through a variety of literary genres. Introduces the masterworks of world literature in their cultural contexts, through comparative analysis.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 030: Introduction to American Literature I [4]
Survey of the history and major works of literature of the United States from colonial times to the present, with a special emphasis on the range of American cultural traditions in a comparative context.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 031: Introduction to American Literature II [4]
Survey of the history and major works of literature of the United States from colonial times to the present, with a special emphasis on the range of American cultural traditions in a comparative context.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 032: American Women Writers [4]
Features selected works of writers from pre-Columbian to the present, with an emphasis on social, cultural and historical constraints on women's arts; the rise in feminist artistic strategies; and contemporary trends in literary production. Includes some study of influences on American women writers.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only. Discussion included.

LIT 040: Introduction to British Literature I [4]
Survey of the history and major works of the literature of the British Isles from the Middle Ages to the present.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 041: Introduction to British Literature II [4]
Survey of the history and major works of the literature of the British Isles from the Middle Ages to the present.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only. Discussion included.

LIT 042: British Women Writers [4]
From selected works of British women writers, we include a variety of texts, from early religious treatise through the birth of the British novel and beyond. Students study economic, social and cultural constraints, and examine the relationship between historical context and artistic production of women writers.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only.

LIT 050: Introduction to Hispanic Literature I [4]
Survey of the history and major works of Peninsular, Latin American and Latino literatures until the nineteenth century.

Prerequisite: SPAN 004 or SPAN 011 or equivalent score on the Spanish Placement Exam. Discussion included.

LIT 051: Introduction to Hispanic Literature II [4]
Survey of the history and major works of Peninsular, Latin American and Latino literatures from the 19th. C to the 21st. C.

Prerequisite: SPAN 004 or SPAN 011 or equivalent score on the Spanish Placement Exam. Discussion included.

LIT 055: Introduction to Portuguese and Brazilian Literature and Culture [4]
Emphasis on reading and discussion of literary texts representative of different literary movements and authors of the Luso-Brazilian world. Discussion of significant historical, social and cultural trends in the Portuguese-speaking world. We focus on Portugal, Azores, Portuguese Africa, the Portuguese in the United States and Brazil.

LIT 060: Introduction to Chicano Culture and Experiences [4]
Provides an introduction to Chicano cultural practices and experiences, with an emphasis on the ties between culture, race, gender, social class, language, historical developments, artistic and literary expression, migration and transculturation.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only. Discussion included.

LIT 061: Hispanic/Latino Children's Literature and Film [4]
Explores Latino/Hispanic children's literature and film from theoretical and cultural perspectives. We study texts, contexts, illustrations, traditions, as well as issues related to production, reception, publishing and marketing. Special attention is paid to linguistic issues, including bilingualism and translation, and to visual forms of representation, including comic books.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 063: Hispanic Film and Popular Culture [4]
Theoretical and historical overview of Hispanic film and popular culture, including music, performing arts, traditional storytelling, mass entertainment, among others. Particular attention is paid to connections with the arts and literature. Course, films, and readings are given in Spanish.

Prerequisite: (WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent) and SPAN 004. Letter grade only.

LIT 067: Multicultural Children's Literature [4]
Explores the field of children's literature from a theoretical and a cultural perspective. Readings include books from many cultural traditions as well as secondary sources on multiculturalism and cultural literacy. We study texts, contexts, illustrations, traditions, as well as issues related to publishing and marketing.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only. Discussion included.

LIT 069: US Latino Literature [4]
A representative overview of U.S. Latino literature, from its colonial and pre-colonial origins to the present. A socio-historical framework is first outlined in order to situate the different periods in the history of this literature. Main groups studied include Chicanos, Puerto Ricans, and Cuban-Americans, though others are represented as well.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Discussion included.

LIT 090X: Freshman Seminar [1]
Examination of a topic in Literature.

May be repeated for credit.

LIT 092: Internship in Literatures and Cultures [1-4]
Provides oversight and structure for a student's internship in a field related to literature in community organizations, professional research projects, etc. connected to the study of literature. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of literature.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

LIT 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

LIT 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

LIT 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

LIT 100: Engaging Texts: Introduction to Critical Practice [4]
An introduction to issues and approaches in literary theory and criticism, with an emphasis on applications of methods to selected literary texts.

Prerequisite: Juniors standing or consent of instructor. Literatures and Cultures majors only.

LIT 110: Topics in World Literature [4]
Topics may include literature of one country or region of the world or comparisons of multiple literatures.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. May be repeated for credit twice.

LIT 111: Empire, the Postcolonial, and Representation: Reading East and West [4]
Study though literature, film and mass media of emancipatory uprisings and postcolonial challenges of the last 200 years that unsettled the old Eurocentric and the U.S. colonial order. Includes Occidental readings on Asian and African cultures. Topics: racism, xenophobia, illegal migrations and terrorism. Strong interdisciplinary approach to case examination.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 112: Literature and History [4]
Emphasizes historical contextualization of literature, including theoretical approaches such as Marxism, Post colonialism, Intellectual and Social Historicism. Explores ways in which literary histories are written. Course may focus on a specific historical period in order to understand the distinct relationship among literature, history and cultural production.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 120: Topics in the Literature of Difference [4]
In-depth study of representative literary works in a single genre: novel, poetry, drama, et.a.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. May be repeated for credit three times.

LIT 125: Literary Genres [4]
Explores how individual literary genres articulate larger cultural, aesthetic, and social issues. In addition, we analyze literary genres alongside other media in which those issues are also articulated, exploring differences and similarities in their treatment of those matters.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 130: Topics in American Literature [4]
In-depth study of a period, theme, et.a. in American literature.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. May be repeated for credit three times.

LIT 131: American Literature of the Expanding Nation [4]
We focus on the narratives by which America constructed its "manifest destiny." Some writers or works that may be covered: Bradford, Bradstreet, Edwards, early Native American texts and colonial captivity narratives, and early exploration narratives. Also, we look at writers who justified and critiqued westward expansion.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 132: American Protest Literature [4]
Readings and discussion focus on literary genres that have voiced dissent, protest, and social displacements. While race and gender play a significant role in the course, protests against subjugation and/or oppression based on labor issues, religious preference, class, and age also be covered.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 133: New Voices in American Fiction and Poetry [4]
Provides an exploration of contemporary practices in the field of American literature. Students study themes and forms in the fields of poetry, prose and fiction as they have been developed and interrogated by America's young and new writers.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 134: Literature and History of the Great Depression [4]
Focusing on the turbulent decade of the 1930s, we use the lens of history and literature to explore how events from 1929-1941 helped shape modern America. Particular attention is paid to the impact of these years upon California and the West.

Prerequisite: Junior standing and LIT 020 or LIT 021 or HIST 016 or HIST 017. Letter grade only.

LIT 135: Literature and History of the 1960s [4]
Examines American politics, culture, and society in the 1960s. Topics include civil rights, feminism, the Vietnam War, the Beat and other counterculture movements, and the sexual revolution.

Prerequisite: Junior standing and LIT 030 or LIT 031 or HIST 016 or HIST 017. Letter grade only.

LIT 136: Literature and Culture of African Americans [4]
American literature from the slavery period through the Harlem Renaissance and into the present. We emphasize African American writers in the context of cultural history that influenced and often repressed their literary production, with special emphasis on specific discursive practices and the rise and fall of various literary movements.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 137: U.S. American Indian Literature and Cultures [4]
Explores the writing and the recorded oral narratives of Native American authors and story tellers. Emphasizes the roles of story-telling, cultural heritage and preservation in constructing individual and tribal identity, and examines contemporary issues such as displacement stories and narratives, recovering of history, and the definition of self and community.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 140: Topics in British Literature [4]
In-depth study of a period, theme et.al. in British literature.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. May be repeated for credit twice.

LIT 141: British Literature of the Expanding Empire [4]
A look at British colonial literature, from early travel narratives such as Behn's Oroonoko to Forster, Orwell and current writers. Emphasis is on understanding the processes which literature helped to construct the idea of an empire. Attention is paid to relationships between postcolonial narratives and emerging character of colonized nations.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051.

LIT 143: New Voices in British Fiction and Poetry [4]
Exploration of contemporary practices in the field of British literature. Students study themes and forms in the fields of poetry, prose and fiction as they have been developed and interrogated by young and new writers in Britain and Ireland.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051.

LIT 145: Plays and Poetry of Shakespeare [4]
Introduction and analysis of Shakespeare's major plays and works of poetry.

Prerequisite: Junior standing.

LIT 146: Shakespeare: Early Works [4]
Selected work from Shakespeare's early period up to the middle works, between 1599 and 1604.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051.

LIT 147: Shakespeare: Later Works [4]
Selected work from Shakespeare's middle works, between 1599 and 1604, until the end of his career.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051.

LIT 150: Topics in Hispanic Literature [4]
In depth study of Spanish literature of a single country, one or more countries in a comparative context, a period et.al.

Prerequisite: LIT 050 or LIT 051 or consent of instructor. May be repeated for credit three times.

LIT 151: Golden Age Spanish Literature [4]
Study through theater, novel and poetry of Renaissance and Baroque Peninsular literature (1492-1680): poetry of Garcilaso, Lope de Vega and the Spanish Baroque Theater; Cervantes and the origins of the modern novel; Conceptism and Culteranism; and relevant Portuguese figures (e.g., Gil Vicente and Camoes). Course is conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 152: The Transatlantic Baroque [4]
Centers around Transatlantic exploration of Golden Age Spain and colonial Latin America. Special attention and analysis is paid to commerce and cultural contact, travel writing, center and periphery, literary representation, arts, music, and other relevant cultural forms of the times. Course and readings are conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 153: Spanish Literature Since the 20th Century [4]
From Generations of 1898 through 1927, the Civil War, Francoist and Post-Francoist literature, to contemporary voices. Selected readings on Spanish nationalisms: from Rizal to Teixidor. Course critically examines the constructions of Spain and "Spanishness", seeking to build a more complex understanding of its cultures. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 154: Spanish Literature 18-19 Centuries [4]
Representative works of Spanish/Peninsular prose fiction, theater, essay, and poetry produced during the 18th and 19th centuries. Students will become familiarized with texts that vary from Neoclassicism to Realism/Naturalism. Also, they will have an understanding of socio-historical phenomena such as the Industrial Revolution,

The Enlightenment, and The 1st International Socialist.

Prerequisite: LIT 050 or LIT 051 or consent of instructor. Letter grade only.

LIT 155: Latin American Colonial Literature [4]
Selected readings on chronicles, poetry and theater from Columbus travel narratives to Fernandez de Lizardi's El periquillo sarniento. Emphasis on understanding the various processes by which literature helped to construct the idea of identity and independence. Theoretical frame based on cultural studies: the relationship between knowledge and power, the text and its context. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 156: Latin American Literature Since the Independence [4]
Primary concentration is on Romantic poetry; Indigenist, Anti-slavery and Indianist novel: Marti, Ruben Dario and Modernismo; Rodo and the essayist of the early XX century; the novel of the Mexican Revolution; and the Latin American 'Boom' and 'Post Boom'. Some selected readings on Brazilian literature after Dom Pedro Primeiro are included. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 157: Caribbean Literatures and Cultures [4]
Explores the cultures and literatures of the Hispanic Caribbean, including those of Cuba, Puerto Rico, and the Dominican Republic. We also explore multiple cultural substrata (e.g. Spanish, African, Anglo-American, Native) as well as their current presence in the Caribbean islands. Course and readings are conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 158: Transatlantic Modernismo [4]
Study through poetry, novel, essay and chronicle of principal characteristics of Spanish-American and Peninsular Modernismo. We examine the issue of the influence of Latin American writers in Spain (e.g. Ruben Dario, Gomez Carrillo), and the evolution of poets or prose writers out of Modernismo into the Generation of '98 (e.g. Antonio Machado) or into a unique, independent voice (e.g. Juan Ramon Jimenez, Valle-Inclan, Unamuno). Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 159: Diasporas and Exiles in the Hispanic World [4]
Concentration on literary works of political exiles from oppressive regimes (e.g., Spain's Franco, Portugal's Salazar) and 70's and 80's South American dictatorships. Focus on diasporas produced by economical constraints in the U.S., Latin America and Spain. Strong interdisciplinary approach in examining of cases and ideas. Conducted in Spanish.

Prerequisite: LIT 050 or LIT 051 or consent of instructor.

LIT 160: Hispanic Women Writers [4]
Explores the development of writing by women in the Hispanic world, including the formation of a feminine aesthetics, the reception of works by women writers, canons and exclusions, and connections with writings by women from other cultures. Course and readings are conducted in Spanish.

Prerequisite: LIT 051.

LIT 161: Latinos/as in Children's Lit & Film [4]
Engages in an in-depth study of Latinos/as in children's literature and film, with special attention to issues of representation and self-representation, reception, publishing, markets, stereotypes, historical evolution, bilingualism and other linguistic issues. The course combines film analysis with literary criticism. Taught in English.

Prerequisite: LIT 021 or LIT 031 or LIT 051 or consent of instructor. Letter grade only.

LIT 162: Bilingualism and Borders in Hispanic Literatures [4]
Explores cultural and linguistic contacts in borderland areas throughout the Hispanic world, from medieval times to the present. We focus on the artistic, social, and historical effects of coexistence around borders, with special attention to issues of bilingualism and cultural hybridism. Course and readings are conducted in Spanish.

Prerequisite: LIT 051.

LIT 164: Hispanic Drama and Performing Arts [4]
Both textual and non-textual dramatic works from all around the Hispanic world are covered. Special attention is paid to Golden Age theatre, didactic and ritual dramas in the Americas, contemporary dance, Latin American theater, and the rise and development of Chicano theater. Course and most readings are conducted in Spanish.

Prerequisite: LIT 051. Discussion included.

LIT 165: Great Writers [4]
In-depth examination of the works of a single writer, read in the original language of that writer.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051.

LIT 168: Chicano Literature [4]
Representative overview of Chicano literature, from its colonial and precolonial origins to the present. Through the analysis of works from different genres, students are exposed to the main themes, techniques, styles, etc. of some of the most influential Chicano writers to date.

Prerequisite: LIT 021 or LIT 031 or LIT 051.

LIT 169: US Latino Literature [4]
Representative overview of U.S. Latino literature, from its colonial and precolonial origins to the present. A socio-historical framework is first outlined in order to situate the different periods in the history of this literature. Main groups studied include Chicanos, Puerto Ricans, Cuban-Americans and Central Americans.

Prerequisite: LIT 021 or LIT 031 or LIT 051.

LIT 170: Topic in Language and Linguistics [4]
Topics may include linguistic theories, history of the English language.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. May be repeated for credit twice.

LIT 171: Teaching Literature and Culture [4]
An exploration of historical and contemporary issues related to the teaching of literature and culture. Discussions include teaching practices, pedagogy and assignments. Students are required to submit a semester project. Strongly recommended for teaching credential candidates.

Prerequisite: LIT 021. LIT 100 recommended.

LIT 180: American Nature Writing and Literature of the Environment [4]
Study of the wilderness and environment in major texts. Attention paid to Biblical and British influences and "founding" nature writers such as Thoreau; Muir and Mary Austin, as well as more recent environmental thinkers, Gary Snyder, Edward Abbey, Leslie Marmon Silko.

Prerequisite: Junior standing.

LIT 181: Literature of California [4]
Exploration of the developing identity of California, with emphasis on how that identity is reflected in and shaped by its literature. Covers early Native and California life, the Gold Rush, the major waves of immigration, and contemporary issues, all within a political, cultural and intellectual framework. Term paper required.

Prerequisite: LIT 020 or LIT 021 or LIT 030 or LIT 031 or LIT 040 or LIT 041 or LIT 050 or LIT 051. Letter grade only.

LIT 183: Literature and the Other Arts [4]
Study of the relationship of literature to other arts, including visual and performance. May be focused on a detailed study of one period or artistic development.

Prerequisite: Junior standing.

LIT 185: Literature and Power [4]
Subjects of discussion based on selected texts that deal with the use and abuse of power. We address all literary genres and concentrate in XIX through XXI century writings. Strong theoretical frame based on Foucault and Post-structuralism, Colonial and Postcolonial studies.

Prerequisite: LIT 021.

LIT 186: Novel of the Latin American Dictator [4]
Examines the representation of the Latin American dictator and the mediation of the mysteries of power as seen in several novels published during the second half of the 20th century and the beginning of the 21st.

Prerequisite: LIT 050 or LIT 051. Letter grade only.

LIT 190: Senior Thesis [4]
Capstone course for majors. Completion of a senior thesis. Extensive writing required.

Prerequisite: Senior standing. Literature and Cultures majors only. Letter grade only.

LIT 192: Internship in Literatures and Cultures [1-4]
Provides oversight and structure for a student's internship in a field related to Literature in community organizations, professional research projects, etc. connected to the study of Literature. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Literature.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

LIT 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. Letter grade only. May be repeated for credit.

LIT 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

LIT 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MANAGEMENT

MGMT 002: Case Study Seminar on Business and Management [1]
Survey of the field of business management. Invited speakers from local companies and public organizations cover topics that include the business environment, human relations, technology in business, ethical behavior, global and economic forces, organization, quality, products and services, functional management, and current issues and developments.

Prerequisite: ECON 001. May be repeated for credit once.

MGMT 025: Introduction to Finance [4]
Particular attention is paid to how managers maximize shareholder wealth. This class covers the foundations of financial management, including the time value of money, capital budgeting and evaluation, capital structure, and valuation of various capital sources.

Laboratory included.

MGMT 026: Introduction to Accounting [4]
A broad introduction and accounting. Students are equipped to draw up and interpret accounts and are introduced to some key ideas of auditing. Covers the fundamental accounting concepts and how to apply them; record accounting entries, prepare accounts for different business entities and understand the differences between them, the basic principles of auditing.

Laboratory included.

MGMT 090X: Freshman Seminar [1]
Examination of a topic in management.

May be repeated for credit.

MGMT 092: Internship in Management [1-4]
Provides oversight and structure for a student's internship in a field related to management in community organizations, professional research projects, etc. connected to the study of management. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of management.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

MGMT 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

MGMT 097: Service Learning: Engineering Projects in Community Service [1-3]
Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process, and Management students gain practical experience working in a team of engineers and managing a project. Students are encouraged to participate at both the lower division and upper-division (MGMT197) levels.

Permission of instructor required. May be repeated for credit twice.

MGMT 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 099: Lower Division Individual Study [1-5]
The objective of an independent study is to provide advanced and capable students an opportunity to pursue a topic of their interest with in depth supervision of a faculty member. The study can be done in combination with an internship in a business or government organization.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 100: Intermediate Microeconomic Theory [4]
Price determination and resource distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics.

Prerequisite: ECON 001 and (MATH 021 or MATH 011). Letter grade only. Discussion included.

MGMT 101: Intermediate Macroeconomic Theory [4]
Analysis of output, employment, interest rates, and the price level. The effects of these on changes in monetary and fiscal variables.

Prerequisite: ECON 001 and MATH 021 or consent of instructor. Discussion included.

MGMT 115: Economics of Industrial Organization [4]
The organization and structure of industrial production in the United States economy.

Prerequisite: ECON 100 or MGMT 100.

MGMT 116: Organizational Strategy [4]
Discussion of critical issues in the design and functioning of effective organizations. Topics covered include: the boundary of the firm, firm structure, arrangements within the firm, alliances and contracts between firms, and trust and culture in the firm.

Prerequisite: ECON 001.

MGMT 120: Marketing [4]
Marketing is about identifying consumer needs, developing products and services which meet the changing consumer needs or market conditions. We provide an examination of principles of customer marketing as well as business-to-business marketing. It focuses those aspects of marketing which most frequently demand strategic attention in any business.

Prerequisite: Junior standing or consent of instructor.

MGMT 121: The Economics of Money, Banking, and Financial Institutions [4]
Addresses issues of money, banking, and financial institutions. Topics covered include: the structure of central banks and the Federal Reserve system, theories of money demand and money supply, the relationship between money supply and overall economic activity, and the role the Federal Reserve plays in economic stabilization.

Prerequisite: ECON 001. Letter grade only.

MGMT 130: Econometrics [4]
Introduction of problems of observation, estimation and hypotheses testing in economics through the study of the theory and application of linear regression models, critical evaluation of selected examples of empirical research and exercises in applied economics.

Prerequisite: (ECON 010 or POLI 010) and MATH 021. Letter grade only. Laboratory included.

MGMT 135: Business Law [4]
Conceptual and functional analysis of legal principles relevant to the conduct and understanding of commercial business transactions. Topics include personal and real; government regulations; negotiable instruments; debtor/creditor relationships; and bankruptcy and reorganization. Salient legal aspects of international business are also discussed.

Prerequisite: MGMT 025 and MGMT 026 or consent of instructor.

MGMT 141: Industrial Relations and Human Resource Economics [4]
Examines how firms make decisions involving human resources. Topics covered include employee hiring and recruitment, compensation and use of incentives, and employee motivation and teamwork. Builds on both economic theory and practical examples to illuminate key concepts.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

MGMT 150: Services Science and Management [4]
Services—e.g., restaurants, hotels, lawyers, information technology operations, business consulting—account for more than 70% of the US economy. Through case studies of businesses and scientific studies of people in real service settings, we focus on how to align people and technology effectively to generate value.

Prerequisite: ECON 001. Letter grade only.

MGMT 151: Public Economics [4]
The influence of governmental revenue and expenditure decisions on economic performance. Examines such issues as public goods and externalities, as well as specific expenditure and taxation programs.

Prerequisite: ECON 100 or MGMT 100.

MGMT 152: Law and Economics [4]
The economic analysis of legal rules and institutions, including property, contract, and tort law. We also consider issues surrounding crime and punishment.

Prerequisite: ECON 100 or MGMT 100.

MGMT 153: Judgment and Decision Making [4]
An introduction to the study of human judgment and decision making. Topics include decision making under uncertainty, financial choices, health decision making, group decisions, rational theories of choice behavior, and improving decision making. The material is related to cognitive science, psychology, economics, and other social sciences.

Prerequisite: COGS 001 or PSY 001 or ECON 001.

MGMT 154: Cognitive Science Applications for Management [4]
Covers thought, behavior, and interaction in modern businesses, where knowledge workers interact with one another and with technology. Topics include business decision making, risk behavior, attitudes toward risk, planning, communication, information management, information systems, human-computer interaction, neuroeconomics, and organizational behavior.

Prerequisite: COGS 001 or PSY 001 or consent of instructor.

MGMT 155: Decision Analysis in Management [4]
Presents the tools of decision science using a quantitative approach, with a focus on investment, finance and management decisions. These tools include decision tree analysis, risk and uncertainty analysis, stochastic dominance, the value of information, probability bias, and subjective probability.

Prerequisite: (ECON 100 or MGMT 100) and (ECON 010 or POLI 010) or consent of instructor.

MGMT 160: International Microeconomics [4]
This is a course in international microeconomics at the intermediate level. Standard microeconomics is the study of decision-making by various types of agents under various constraints and in various environments. International microeconomics examines such decision-making in a world of many different decision-makers, objectives, outputs, and countries.

Prerequisite: ECON 100 or MGMT 100.

MGMT 165: Corporate Finance [4]
Explores corporate decision making in allocating investment funds to capital projects and alternative methods of raising capital from financial markets. Related topics include asset pricing, capital budgeting, capital structure, dividend policy, valuation of bonds, stocks, and options. Particular attention is paid to how managers maximize shareholder wealth.

Prerequisite: ECON 100 or MGMT 100. Letter grade only.

MGMT 173: Advanced Judgment and Decision Making [4]
Advanced study of recent research on judgment and decision making, such as behavioral economics, rationality and intelligence, health and medical decision making, decision neuroscience.

Prerequisite: COGS 153 or MGMT 153.

MGMT 180: Entrepreneurship [4]
Integrates the skills students have developed in prior MGMT courses, and provides a framework for the consideration of new business ventures. Topics covered include: market research, creation of a formal business plan, marketing strategy, financing, establishing channels of distribution and bringing products or services to market.

Prerequisite: Junior standing and MGMT 165 or consent of instructor.

MGMT 191: Topics in Management [4]
Intensive treatment of a special topic or problem in management.

Prerequisite: Junior standing and MGMT 025 and MGMT 026 or consent of instructor. May be repeated for credit three times.

MGMT 192: Internship in Management [1-4]
Provides oversight and structure for a student's internship in a field related to management in community organizations, professional research projects, etc. connected to the study of management. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of management.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

MGMT 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

MGMT 196: Case Study Seminar in Management [4]
Seminar and capstone experience presents case studies in the field of business management. Issues explored are the ethical behavior, global and economic forces, organization, quality, products and services, functional management, and current issues and developments. Students work in teams analyzing the cases presented.

Prerequisite: Senior standing and MGMT 025 and MGMT 026 and ECON 010 and (ECON 130 or MGMT 130) and (ECON 100 or MGMT 100) or consent of instructor. Management majors only. Letter grade only.

MGMT 197: Service Learning: Engineering Projects in Community Service [1-3]
Multi-disciplinary teams of freshman through senior students work with community organizations to design, build, and implement engineering-based solutions for real-world problems. Students gain insight into the design and development process, and Management students gain practical experience working in a team of engineers and managing a project. Students are encouraged to participate at both the lower division (MGMT97) and upper-division (MGMT197) levels.

Permission of instructor required. May be repeated for credit twice.

MGMT 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MGMT 290: Labor Studies Seminar [3]
Research presentations by visiting scholars in the area of quantitative labor studies.

Satisfactory/Unsatisfactory grading only.

MATERIALS SCIENCE AND ENGINEERING

MSE 110: Solid State Materials Properties [4]
Structure of atomic and molecular solids; crystallography of inorganic and organic solids; symmetry; short range order; 1-, 2- and 3-dimensional defects; energy levels; band theory of conductors, semiconductors and insulators; mechanical, thermal, optical and magnetic properties of materials and their relevance to processing and devices.

Prerequisite: Junior standing and CHEM 002 and ENGR 045 and MATH 021 and PHYS 008 or consent of instructor. Letter grade only. Laboratory included.

MSE 111: Materials Processing [4]
Thermodynamics of sold solutions; enthalpy, entropy and free energy of mixing; Ellingham diagrams; phase diagrams for 2- and 3-component systems; phase rule; lever rule; nucleation and growth; spinodal decomposition; control of microstructure; materials extraction/synthesis, forming and joining processes.

Prerequisite: Junior standing and MATH 021 and PHYS 008 and CHEM 002 and ENGR 045 or consent of instructor. Letter grade only.

MSE 112: Materials Selection and Performance [3]
Design considerations in the use of materials; quality control; selecting materials to optimize multiple properties; materials failure; long-term materials properties; materials behavior under extreme conditions; corrosion; discussion of design and materials selection strategy; processing and process selection strategy; process economics; life-cycle thinking and eco-design; special topics.

Prerequisite: Junior standing and ENGR 045 and good academic standing or consent of instructor. Engineering majors only. Letter grade only. Discussion and laboratory included.

MSE 113: Materials Characterization [4]
Characterization of materials structure and properties. Interactions between electromagnetic radiation and matter, and between electron beams and matter. Principles of image formation; Fourier methods and convolution; image processing. X-ray diffraction, optical and electron imaging and diffraction; scanned probe methods. Thermal analysis. Mechanical property and failure characterization.

Prerequisite: Junior standing and MATH 021 and PHYS 008 and PHYS 009. Science majors only. Letter grade only. Offered spring only. Laboratory included.

MSE 114: Polymeric Materials [4]
Relationships between molecular characteristics, thermodynamics, kinetics, microstructure and properties in the context of polymeric materials. Students will apply their knowledge of physics, chemistry, mathematics and biology to develop a proficient understanding of how structure and processing affect the properties and performance of biological and synthetic polymers.

Prerequisite: Junior standing and ENGR 045 or equivalent or consent of instructor. Science majors only. Letter grade only. Discussion included.

MSE 115: Ceramic Materials [3]
Crystallography of inorganic compounds; packing and connectivity of coordination polyhedral. Defects in ionic and covalent crystals and their effect on properties. Ceramics, glasses and cements. Engineering ceramics. Production of powders; compaction; sintering; control of nanostructure and microstructure; bulk defects. Zeolites. Hydration of cement and concrete. Biological ceramics.

Prerequisite: MATH 021 and PHYS 008 and PHYS 009 and ENGR 045.

MSE 116: Composites [3]
Hard materials and soft materials. Roles of matrix and filler phases. "Rule of mixtures" as a function of morphology and connectivity. Length scale effects: nanocomposites, microcomposites and macrocomposites. Biological composites. Porous materials. Interface characteristics and their effect on properties. Toughening mechanisms in composites. Processing and joining. Structure and property characterization.

Prerequisite: PHYS 009 and ENGR 045.

MSE 117: New Materials [3]
Materials requirements for electronics, communication, transportation, energy, data storage, homeland security, healthcare. Non-linear optical materials. Liquid crystals. "Whole life cycle" concepts and sustainability. Green materials. Self-assembling materials. Self healing materials. Biological and bio-inspired materials. Biomedical materials.

Prerequisite: MATH 021 and PHYS 008 and PHYS 009 and ENGR 045.

MSE 118: Introduction to Nanotechnology and Nanoscience [3]
An introduction for engineers in nanotechnology and nanoscience. Topics covered include nanoscale phenomena; nanofabrication (top-down and bottom-up approaches); and applications relevant to engineering, the physical sciences and biology. Interdisciplinary aspects of nanotechnology and nanoscience are discussed, including perspectives from materials science, chemistry, physics, and biology.

Prerequisite: (MATH 021 or PHYS 008) and CHEM 002. Letter grade only. Offered fall only.

MSE 119: Materials Simulations [3]
Difference between modeling, theory and simulations. Atomic and molecular scale modeling. Ab initio, Monte Carlo and molecular dynamics methods. Lattice models. Mesoscale and multiscale modeling. Finite element methods. Modeling phase separation, nanostructure and microstructure evolution, and material properties. A computational project using a modeling software will be performed.

Prerequisite: Junior standing and ENGR 045 or good academic standing or consent of instructor. Letter grade only. Discussion and laboratory included.

MSE 120: Materials Capstone Design [3]
Design project based on materials selection and performance evaluation, with reference to engineering standards and realistic constraints that include the following considerations: economic, environmental, sustainability, processability, ethical, health and safety, social, political. A different project will be implemented on each occasion that the course is offered.

Prerequisite: Senior standing and MSE 112 and MSE 113 or consent of instructor. MSE majors only. Letter grade only. Laboratory included.

MSE 126: Nanodevice Fabrication: Bridging Research and Education [3]
Teaches basic properties of nanomaterials and their applications as transducers (the lecture part). Nanomaterial synthesis using both solution and vapor-based approaches will be performed and a transducer will be fabricated and tested (the lab part). The interactive and experiential education will be blended with theoretical concepts.

Prerequisite: Junior standing and CHEM 002 and (PHYS 009 or PHYS 019). Letter grade only. ENGR 065 is highly recommended but not required. Laboratory included.

MSE 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

MSE 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MSE 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATHEMATICS

MATH 005: Preparatory Calculus [4]
Preparation for calculus. Elementary functions, trigonometry, polynomials, rational functions, systems of equations and analytical geometry.

Letter grade only. Course cannot be taken after obtaining credit for MATH 021.

MATH 011: Calculus I [4]
Introduction to differential and integral calculus of functions of one variable, including exponential, logarithmic and trigonometric functions, emphasizing conceptual understanding and applying mathematical concepts to real-world problems (approximation, optimization). Course does not lead to MATH 023, 024.

Prerequisite: MATH 005 or equivalent score on the Math Placement Exam. Letter grade only. For majors that do not require more than two semesters of calculus courses. Course may not be taken for credit after obtaining credit for MATH 021. Discussion included.

MATH 012: Calculus II [4]
Continuation of MATH 011. Introduction to integral calculus of functions of one variable and differential equations, emphasizing conceptual understanding and applying mathematical concepts to real-world problem. Course does not lead to Math 023, 024.

Prerequisite: MATH 011 or MATH 021. Letter grade only. For majors that do not require more than two semesters of calculus courses. Course may not be taken for credit after obtaining credit for MATH 022. Discussion included.

MATH 015: Introduction to Scientific Data Analysis [2]
Fundamental analytical and computational skills to find, assemble and evaluate information, and to teach the basics of data analysis and modeling using spreadsheets, statistical tool, scripting languages, and high-level mathematical languages. Not for students from the School of Engineering.

Prerequisite: MATH 005, which may be taken concurrently, or equivalent score on the Math Placement Exam. Engineering majors only. Laboratory included.

MATH 018: Statistics for Scientific Data Analysis [4]
Analytical and computational methods for statistical analysis of data. Descriptive statistics, graphical representations of data, correlation, regression, causation, experiment design, introductory probability, random variables, sampling distributions, inference and significance.

Prerequisite: (MATH 005 or equivalent score on the Math Placement Exam) and (MATH 015 or CSE 020 or CSE 005 or ENVE 105). Letter grade only. Course cannot be taken for credit after obtaining credit for Math 32. Discussion included.

MATH 021: Calculus I for Physical Sciences and Engineering [4]
An introduction to differential and integral calculus of functions of one variable. Elementary functions such as the exponential and the natural logarithm, rates of change and the derivative with applications to physical sciences and engineering.

Prerequisite: MATH 005 or equivalent score on the Math Placement Exam. Letter grade only. Applied Mathematical Sciences, Physics, Chemical Sciences, Earth Systems Science, and School of Engineering majors only. Course may not be taken for credit after obtaining credit for MATH 011. Discussion included.

MATH 022: Calculus II for Physical Sciences and Engineering [4]
Continuation of MATH 021. Analytical and numerical techniques of integration with applications, infinite sequences and series, first order ordinary differential equations.

Prerequisite: MATH 021. Letter grade only. Applied Mathematical Sciences, Physics, Chemical Sciences, Earth Systems Science, and School of Engineering majors only. Course may not be taken for credit after obtaining credit for Math 012. Discussion included.

MATH 023: Vector Calculus [4]
Calculus of several variables. Topics include parametric equations and polar coordinates, algebra and geometry of vectors and matrices, partial derivatives, multiple integrals, and introduction to the theorems of Green, Gauss, and Stokes.

Prerequisite: MATH 022. Letter grade only. Discussion included.

MATH 024: Linear Algebra and Differential Equations [4]
Introduces ordinary differential equations, systems of linear equations, matrices, determinants, vector spaces, linear transformations and linear systems of differential equations.

Prerequisite: MATH 022. Letter grade only. Discussion included.

MATH 032: Probability and Statistics [4]
Concepts of probability and statistics. Conditional probability, independence, random variables, distribution functions, descriptive statistics, transformations, sampling errors, confidence intervals, least squares and maximum likelihood. Exploratory data analysis and interactive computing.

Prerequisite: MATH 023, which may be taken concurrently. Letter grade only. Discussion included.

MATH 050: Beginning MATLAB Programming [2]
This half-semester minicourse introduces students to the writing, implementing, and testing of MATLAB algorithms to solve mathematical problems. Topics include programming syntax, data visualization, debugging, and coding aesthetics.

Prerequisite: MATH 022. Letter grade only.

MATH 090X: Freshman Seminar [1]
Topics in mathematics.

Letter grade only.

MATH 091: General Topics in Applied Mathematics [1]
Introduction to a variety of concepts useful in applied mathematics. Topics covered included floating point arithmetic, methods of proofs, random walks, stereographic projections, transforms, etc. Students are exposed to advanced mathematical topics in preparation for their ongoing studies.

Prerequisite: MATH 023 and MATH 024, both of which may be taken concurrently. Pass/No Pass grading only.

MATH 095: Lower Division Undergraduate Research [1-6]
Supervised research in mathematics.

Permission of instructor required. Letter grade only. May be repeated for credit.

MATH 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 101: Real Analysis [4]
Introduction to rigorous mathematical proofs and concepts pertaining to real numbers. The class will cover the structure of real numbers, sequences, series and functions of real numbers, and, time permitting, concepts of abstract algebra.

Prerequisite: MATH 023. Letter grade only. Discussion included.

MATH 122: Complex variables and applications [4]
Introduction to complex variables, analytic functions, contour integration and theory of residues. Mappings of the complex plane. Introduction to mathematical analysis.

Prerequisite: MATH 023 and MATH 024. Letter grade only. Discussion included.

MATH 125: Intermediate Differential Equations [4]
Introduces advanced solution techniques for ordinary differential equations (ODE) and elementary solution techniques for partial differential equations (PDE). Specific topics include higher-order linear ODE, power series methods, boundary value problems, Fourier series, Sturm-Liouville theory, Laplace transforms, Fourier transforms, and applications to one-dimensional PDE.

Prerequisite: MATH 023 and MATH 024. Letter grade only. Discussion included.

MATH 126: Partial Differential Equations [4]
Introduces students to the theory of boundary value and initial value problems for partial differential equations with emphasis on linear equations. Topics covered include Laplace's equation, heat equation, wave equation, application of Sturm-Liouville's theory, Green's functions, Bessel functions, Laplace transform, method of characteristics.

Prerequisite: MATH 125. Letter grade only. Discussion included.

MATH 131: Numerical Analysis I [4]
Introduction to numerical methods with emphasis on algorithm construction, analysis and implementation. Programming, round-off error, solutions of equations in one variable, interpolation and polynomial approximation, approximation theory, direct solvers for linear systems, numerical differentiation and integration, initial-value problems for ordinary differential equations.

Prerequisite: MATH 024. Letter grade only. Discussion included.

MATH 132: Numerical Analysis II [4]
Initial-value problems for ordinary differential equations, interactive techniques for solving linear systems, numerical solutions of nonlinear systems of equations, boundary-value problems for ordinary differential equations, numerical solutions to partial differential equations.

Prerequisite: (MATH 121 or MATH 125) and MATH 131. Letter grade only. Discussion included.

MATH 140: Mathematical Methods for Optimization [3]
Linear programming and a selection of topics from among the following: matrix games, integer programming, semidefinite programming, nonlinear programming, convex analysis and geometry, polyhedral geometry, the calculus of variations and control theory.

Prerequisite: MATH 023. Letter grade only.

MATH 141: Linear Analysis I [4]
Applied linear analysis of finite dimensional vector spaces. Review of matrix algebra, vector spaces, orthogonality, least-squares approximations, eigenvalue problems, positive definite matrices, singular value decomposition with applications in science and engineering.

Prerequisite: MATH 131, which may be taken concurrently. Letter grade only. Discussion included.

MATH 142: Linear Analysis II [4]
Applied linear analysis of infinite dimensional vector spaces. Inner product spaces, operators, adjoint operators, Fredholm alternative, spectral theory, Sturm-Liouville operators, distributions and Green's functions with applications in science and engineering.

Prerequisite: MATH 141. Letter grade only. Discussion included.

MATH 150: Mathematical Modeling [4]
Introduction to the basics of mathematical modeling emphasizing model construction, analysis and application. Using examples from a variety of fields such as physics, biology, chemistry and economics, students will learn how to develop and use mathematical models of real-world systems.

Prerequisite: MATH 131 and (MATH 125 or MATH 141). Letter grade only. Discussion included.

MATH 171: Mathematical Logic [4]
Introduction to the meta-theory of first-order logic. Topics include the consistency, compactness, completeness and soundness proofs for propositional and first-order logic; model theory; the axiomatization of number theory; Gödel's incompleteness theorems and related results.

Prerequisite: PHIL 005 or consent of instructor. Discussion included.

MATH 181: Stochastic Processes [4]
Introduction to stochastic processes with emphasis on problem-solving using both analytical and computational techniques. Markov chains in discrete and continuous time, martingales, branching processes, renewal processes, and Brownian motion.

Prerequisite: MATH 024 and MATH 032. Letter grade only. Discussion included.

MATH 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

MATH 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MATH 201: Teaching and Learning in the Sciences [1]
Students are introduced to 'scientific teaching'—an approach to teaching science that uses many of the same skills applied in research. Topics include how people learn, active learning, designing, organizing and facilitating teachable units, classroom management, diversity in the classroom and assessment design.

Satisfactory/Unsatisfactory grading only.

MATH 221: Partial-Differential Equations I [4]
Partial differential equations (PDEs) of applied mathematics. Topics include modeling physical phenomena, linear and nonlinear first-order PDEs, D'Alembert's solution, second-order linear PDEs, characteristics, initial and boundary value problems, separation of variables, Sturm-Liouville problem, Fourier series, Duhamel's Principle, linear and nonlinear stability.

Prerequisite: MATH 122 or consent of instructor. Letter grade only. Discussion included.

MATH 222: Partial-Differential Equations II [4]
Continuation of Math 221. Topics include integral transforms, asymptotic methods for

integrals, integral equations, weak solutions, point sources and fundamental solutions, conservation laws, Green's functions, generalized functions, variational properties of eigenvalues and eigenvectors, Euler-Lagrange equations, Maximum principles.

Letter grade only. Discussion included.

MATH 223: Asymptotics and Perturbation Methods [4]
Asymptotic evaluation of integrals, matched asymptotic expansions, multiple scales, WKB, and homogenization. Applications are made to ODEs, PDEs, difference equations, and integral equations to study boundary and shock layers, nonlinear wave propagation, bifurcation and stability, and resonance.

Prerequisite: Math 221 or consent of instructor. Letter grade only. Discussion included.

MATH 231: Numerical Solution of Differential Equations I [4]
Examines fundamental methods typically required in the numerical solution of differential equations. Topics include direct and indirect methods for linear systems, nonlinear systems, interpolation and approximation, eigenvalue problems, ordinary-differential equations (IVPs and BVPs), and finite differences for elliptic partial-differential equations. A significant amount of programming is required.

Prerequisite: MATH 132 or consent of instructor. Letter grade only. Discussion included.

MATH 232: Numerical Solution of Differential Equations II [4]
Fundamental methods presented in Math 231 are used as a base for discussing modern methods for solving partial-differential equations. Numerical methods include variational, finite element, collocation, spectral, and FFT. Error estimates and implementation issues are discussed. A significant amount of programming is required.

Letter grade only. Discussion included.

MATH 233: Scientific Computing [4]
Theoretical and practical introduction to parallel scientific computing. Survey of hardware and software environments, and selected algorithms and applications. Topics include linear systems, N-body problems, FFTs, and methods for solving PDEs. Practical implementation and performance analysis are emphasized in the context of demonstrative applications in science and engineering.

Letter grade only. Discussion included.

MATH 291: Applied Mathematics Seminar [1]
Seminar series covering various topics in applied mathematics presented by faculty, graduate students, and visiting speakers.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MATH 292: Special Topics in Applied Mathematics [1-4]
Treatment of a special topic or theme in applied mathematics at the graduate level. May be repeated for credit in a different subject area.

Permission of instructor required. May be repeated for credit.

MATH 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MATH 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. May be repeated for credit.

MATH 299: Directed Independent Study [1-6]
Permission of instructor required. May be repeated for credit.

MATH 399: University Teaching [1]
Centered on a student's classroom experiences as a Teaching Assistant in an undergraduate Applied Mathematics course. Provides a faculty-directed opportunity to implement teaching practices presented in the course Teaching and Learning in the Sciences. Involves video-taping of teaching, peer review, and weekly meetings with faculty.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit once. Discussion and laboratory included.

MECHANICAL ENGINEERING

ME 120: Component Design [3]
Three-dimensional stress analysis; deflection and stiffness; static and dynamic loading; failure theories and fatigue; fasteners; welded joints; mechanical springs; bearing; gears; shafts; clutches; brakes and couplings; belts and pulleys.

Prerequisite: ENGR 151. Letter grade only.

ME 135: Finite Element Analysis [3]
Introduces finite element methods used for solving linear problems in structural and continuum mechanics. Covers modeling, mathematical formulation, and computer implementation. Students develop a 2D plane-stress finite element program. Topics in nonlinear finite-element analysis, heat transfer, and fluid dynamics are introduced as time permits.

Prerequisite: MATH 023 and MATH 024. Letter grade only. Offered spring only.

ME 136: Aerodynamics [4]
Methodologies for conducting wind tunnel experiments; Navier-Stokes Equations; Scaling; Prandtl Systems and Boundary Layer Theory; Circulation; Vorticity; Drag and Lift; Airfoil Theory; Source and Vortex Panel Methods; Compressible Flows.

Prerequisite: ENGR 120 and MATH 032. Letter grade only. Laboratory included.

ME 137: Computer Aided Engineering [3]
Introduction to the use of modern computational tools used for design and analysis. Primary focus is on product design with solid modeling and finite-element analysis. Software used is representative of that found in industry. Topics such as 2-D and 3-D drawing, tolerance specification, and FEA validation are also covered.

Prerequisite: ME 135. Letter grade only. Offered fall only. Laboratory included.

ME 140: Vibration and Control [4]
Dynamics of particles and rigid bodies. Vibration of discrete systems with finite degrees of freedom and continuous structures including beams and plates. Resonance, anti-resonance, damping, and modal coupling. Modal analysis. Proportional, derivative and integral feedback controls of vibrations. Stability concept. Control design by root locus and frequency domain method.

Prerequisite: MATH 024 and ENGR 057. Letter grade only. Offered spring only. Laboratory included.

ME 142: Mechatronics [4]
Introduction to electro-mechanical systems controlled by microcontroller technology. The course covers theory, design and construction of smart systems; closely coupled and fully integrated products and systems; the synergistic integration of sensors, interfaces, actuators, microcontrollers, control and information technology.

Prerequisite: ENGR 057 and ENGR 065. Letter grade only. Laboratory included.

ME 170: Mechanical Engineering Capstone Design [3]
Design project must be selected and approved; project feasibility study and outline of the design project is completed; design methodology, optimization, product reliability and liability, economics, use of ASME codes. A final presentation is given at the end of the semester.

Prerequisite: Senior standing and ME 120 and ENGR 135 and ME 137. Letter grade only. Laboratory included.

ME 188: Machine Shop Technology [1]
Introduction to machine shop technology. Study of basic measuring tools, vernier calipers, steel rules, and micrometers, layout tools, hand tools. Emphasis in the theory and practice in the use of vertical milling machine, lathes and drilling machines.

Pass/No Pass grading only. May be repeated for credit twice.

ME 190: Special Topics in Mechanical Engineering [3]
Lectures on special topics are announced at the beginning of the semester in which the course is offered. Topics may include special mechanisms, non-Newtonian fluid mechanics, non-equilibrium thermodynamics, design methods for special applications, among other possibilities.

Prerequisite: Junior standing. Permission of instructor required. Letter grade only. May be repeated for credit twice.

ME 195: Upper Division Undergraduate Research [1-4]
Supervised research.

Permission of instructor required. May be repeated for credit.

ME 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

ME 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

MECHANICAL ENGINEERING AND APPLIED MECHANICS

MEAM 201: Advanced Dynamics [4]
Rigid body dynamics, including topics such as: dynamical systems, motion representation and constraints, Newtonian, Lagrangian and

Hamiltonian mechanics, stability analysis and introduction to multibody dynamics.

Prerequisite: MATH 024 and ENGR 057. Letter grade only. Offered fall only. May be repeated for credit once.

MEAM 202: Transport Phenomena [4]
Systematic analysis of fluid flow, heat transfer and mass transfer phenomena, with emphasis on the analogies and specific techniques used in treating such boundary value problems.

Prerequisite: ENGR 135. Letter grade only. Offered spring only.

MEAM 210: Linear Control Systems [3]
Concepts related to feedback control, state-space representation of dynamic systems, dynamics of linear systems, frequency-domain analysis, controllability and observability, linear observers, compensator design, linear quadratic optimum control.

Prerequisite: MATH 024. Letter grade only. May be repeated for credit once.

MEAM 211: Nonlinear Controls [4]
Phase plane and singularities. Methods for nonlinear analysis. Lyapunov stability theory. Passivity. Lyapunov control design. Topics of nonlinear controls including feedback linearization, sliding control and back stepping design. Adaption algorithms and system identification. Discussion of current research topics in nonlinear controls.

Permission of instructor required. Letter grade only.

MEAM 215: Matrix Methods in Dynamics and Control [4]
Review of mathematical theory and computations of matrix. LU decomposition. Singular value decomposition. QR decomposition. Schur decomposition. Eigen-decomposition. Cholesky decomposition. Expansion theorem. Pseudoinverse and solution of linear algebraic equations. Matrix representation of dynamical systems, the fundamental solution, and control formulation. Optimal sliding surface. Other engineering applications. Knowledge of the topics covered in ME 140 Vibration and Control are necessary for the successful completion of this course.

Permission of instructor required. Letter grade only.

MEAM 220: Continuum Mechanics [4]
Cartesian tensors in mechanics, coordinate transformations, analysis of stress and strain, principal values, invariants, equilibrium and compatibility equations, constitutive relations, field equations; problems in elasticity; computational methods.

Prerequisite: ENGR 120. Letter grade only. Offered fall only.

MEAM 221: Rheology [4]
Basic concepts (forces, displacements, stress, tensor, strain, etc.), linear and nonlinear elastic solids, linear viscous fluids, linear viscoelastic fluids and solids, and selected topics in nonlinear viscoelastic behavior.

Letter grade only.

MEAM 231: Conduction Heat Transfer [3]
Heat conduction fundamentals; one-and mutli-deminsional steady state; transient conduction; hyperbolic conduction. Solution methods (separation of variables, integral transforms, integral method, numerical methods). Graduate standing is required. Knowledge in the undergraduate physics sequence; undergraduate thermodynamics; undergraduate heat transfer desirable but not essential.

Letter grade only.

MEAM 236: Advanced Mass Transfer [4]
Steady and unsteady mass diffusion; mass convection, simultaneous heat and mass transfer; Fick's law in a moving medium; similarity and integral methods in mass transfer; high mass transfer theory; research project in mass transport.

Prerequisite: ES 235 or ENGR 135. Letter grade only. May be repeated for credit once.

MEAM 237: Radiative Heat Transfer [3]
Thermal radiation fundamentals; radiative properties of opaque's surfaces; radiative exchange between opaque surfaces; radiative transfer equation; radiative properties of gases and particles; radiative exchange in participating media.

Prerequisite: Graduate standing; undergraduate physics sequence; undergraduate hermodynamics; undergraduate heat transfer desirable but not essential. Letter grade only.

MEAM 250: Compressible Flows [4]
Addresses the effects of compressibility in viscous and inviscid flows; steady and unsteady inviscid subsonic and supersonic flows; method of characteristics; small disturbance theories (linearized and hypersonic); shock dynamics; and hypersonic flows. Students are expected to be conversant in materials that are covered in ENGR 120 or the equivalent course.

Letter grade only.

MEAM 251: Viscous Flows [4]
Study of the Navier-Stokes equations; Stokes' problems; creeping flows; internal and external flows; similarity and integral methods in boundary layer flows; stability and transition to turbulence.

Knowledge of the topics in ENGR 135 or ES 235 Heat Transfer are necessary for the successful completion of this course. Letter grade only. Offered fall only. May be repeated for credit once.

MEAM 254: Computational Fluid Dynamics [4]
Provides fundamentals of computational theory and computational methods. The first part covers material fundamentals to the understanding and application of numerical methods. The second part illustrates the use of such methods in solving different types of complex problems encountered in fluid mechanics and convective heat transfer.

Letter grade only.

MEAM 260: Non-Imaging Optics [4]
Provides the fundamentals and methodologies of non-imaging optics to design energy systems. The first part covers material fundamental to the understanding of imaging optics. This will lead into the non-imaging optical systems and the physics that made it possible to design solar energy concentrators. The second half of the course covers material dedicated to the designs of non-imaging optical systems applied to the solar energy field and optimization and analysis of these systems.

Permission of instructor required. Letter grade only. Discussion included.

MEAM 280: Variable Order Mechanics [4]
Introduction to fractional calculus and fractional dynamic modeling oscillators; numerical methods for variable order differential equations; viscous particle motion; sedimentation; variable order rheology.

Students are expected to be conversant in materials that are covered in MEAM 201 and MEAM 202. Permission of instructor required. Letter grade only. Discussion included.

MEAM 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MEAM 298: Directed Group Study [1-6]
Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

MEAM 299: Directed Independent Study [1-6]
Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

NATURAL SCIENCES EDUCATION

NSED 023: Introduction to Teaching Science in Elementary School [1]
Introduction to teaching science in elementary school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 024: Fieldwork: Introduction to Teaching Science in Elementary School [1]
Fieldwork component for the NSED 23 course. Classroom observations and teaching practicum at an elementary school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 023 must be taken concurrently.

NSED 033: Introduction to Teaching Mathematics in Elementary School [1]
Introduction to teaching mathematics in elementary school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 034: Fieldwork - Introduction to Teaching Mathematics in Elementary School [1]
Fieldwork component for the NSED 33 course. Classroom observations and teaching practicum at an elementary school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 033 must be taken concurrently.

NSED 043: Introduction to Teaching Science in Middle School [1]
Introduction to teaching science in middle school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and

experimentation using inquiry-based learning modules.

NSED 044: Fieldwork - Introduction to Teaching Science in Middle School [1]
Fieldwork component for the NSED 43 course. Classroom observations and teaching practicum at a middle school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 043 must be taken concurrently.

NSED 053: Introduction to Teaching Mathematics in Middle School [1]
Introduction to teaching mathematics in middle school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 054: Fieldwork - Introduction to Teaching Mathematics in Middle School [1]
Fieldwork component for the NSED 53 course. Classroom observations and teaching practicum at a middle school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 053 must be taken concurrently.

NSED 063: Introduction to Teaching Science in High School [1]
Introduction to teaching science in high school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 064: Fieldwork - Introduction to Teaching Science in High School [1]
Fieldwork component for the NSED 63 course. Classroom observations and teaching practicum at a high school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 063 must be taken concurrently.

NSED 073: Introduction to Teaching Mathematics in High School [1]
Introduction to teaching mathematics in High school. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. Activities include seminars, discussions, and experimentation using inquiry-based learning modules.

NSED 074: Fieldwork - Introduction to Teaching Mathematics in High School [1]
Fieldwork component for the NSED 73 course. Classroom observations and teaching practicum at a high school under the guidance of a mentor teacher. Emphasis on inquiry-based learning practices and effective research-based teaching strategies. NSED 073 must be taken concurrently.

NSED 090X: Introduction to Teaching Science/Math [1]
Freshman seminar.

Pass/No Pass grading only.

NSED 095: Lower Division Undergraduate Research [1-6]
Supervised research.

Permission of instructor required. May be repeated for credit.

NSED 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

NSED 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

NSED 100: Introduction to Instruction, Assessment, and Management for Beginning Teachers [4]
Prepares students for careers in K-12 education. Students gain knowledge of classroom management strategies and learn how to organize a classroom, to plan units and to develop lesson plans. A special focus will be the techniques necessary to effectively teach in multicultural and multilingual schools.

Letter grade only.

NSED 120: Diversity in Education [4]
Focusing on American education, we examine historical and current issues of diversity, noting controversial initiatives such as mainstreaming, bilingual education, multiculturalism, and gender-neutral or gender-segregated instruction. Students also consider cultural and linguistic challenges of teaching English language learners, including those who are generation 1.5 students.

Letter grade only. Discussion included.

PHILOSOPHY

PHIL 001: Introduction to Philosophy [4]
An introduction to the main areas of philosophy using classic and contemporary sources. Consideration of central and enduring problems in philosophy, such as skepticism about the external world, the mind-body problem and the nature of morality.

Discussion included.

PHIL 005: Logic and Critical Reasoning [4]
Introduction to formal and informal logic. Topics include argumentation analysis, fallacies, soundness vs. validity, inductive vs. deductive reasoning, truth tables, proof techniques in statement and predicate logic, and the probability calculus.

Discussion included.

PHIL 009: Phenomenology and Existentialism [4]
Consideration of central themes in phenomenology and existentialism and their philosophical origins in nineteenth century philosophy. Readings from such figures as Nietzsche, Husserl, Sartre, Freud, Merleau-Ponty, and Heidegger.

PHIL 090X: Freshman Seminar [1]
Examination of a topic in philosophy.

May be repeated for credit.

PHIL 092: Internship in Philosophy [1-4]
Provides oversight and structure for a student's internship in a field related to philosophy in community organizations, professional research projects, etc. connected to the study of philosophy. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of philosophy.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

PHIL 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

PHIL 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHIL 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHIL 101: Metaphysics [4]
Inquiry into the fundamental nature of reality: the categories of being; the differences between abstract entities, concrete entities, substances, properties, and processes; what constitutes identity of objects through time; necessity and possibility; free will and determinism; space, time, and causation.

Prerequisite: PHIL 001 and PHIL 005 or consent of instructor.

PHIL 103: Philosophy of the Mind [4]
Selected topics in the philosophy of mind, including the relation between mind and body, the self, personal identity, consciousness, the unconscious, materialism, functionalism, behaviorism, determinism and free will, and nature of psychological knowledge.

PHIL 104: Ethical Theory [4]
An examination of core issues in moral philosophy. Topics may include: the nature of moral judgments, methods of ethical decision making, the relationship between morality and self-interest, and proposed resolutions to situations involving conflicting moral principles.

Prerequisite: PHIL 001 or consent of instructor. Letter grade only.

PHIL 105: Philosophy of Language [4]
What is language? How do symbols, sounds, and gestures carry information? In this course we will study work by both philosophers and linguists on the nature of language, meaning, reference, and truth.

Prerequisite: Junior standing and PHIL 005 or consent of instructor. Letter grade only.

PHIL 107: Philosophy of Religion [4]
An examination of core issues in the philosophy of religion, using classical and contemporary sources. Topics may include: arguments for and against the existence of God, differing concepts of the divine, the rationality of religious belief, mysticism, divine foreknowledge and free will, death and immortality.

Prerequisite: Junior standing and PHIL 001 or consent of instructor.

PHIL 108: Political Philosophy [4]
An examination of core issues in political philosophy. Topics may include: descriptive and normative analyses of institutions, alternative justifications of political authority, classical and modern accounts of the social contract, theories of justice.

Prerequisite: PHIL 001. Letter grade only.

PHIL 110: Philosophy of Cognitive Science [4]
Consideration of philosophical and foundational issues in cognitive science, including the Turing Test, the Chinese Room argument, the nature of cognitive architecture, animal cognition, connectionism vs. symbolic artificial intelligence, and the possibility of thinking machines.

Prerequisite: PHIL 001 and (COGS 001 or PSY 001).

PHIL 111: Philosophy of Neuroscience [4]
Questions at the intersection of philosophy and neuroscience. Relevance of recent research in neuroscience to epistemology and metaphysics. Specific topics include the mind-body problem, free will, consciousness, religion, and the nature of the self.

PHIL 134: Modern Philosophy [4]
An examination of the works of several of the most important philosophers of the 17th and early 18th centuries. Special attention will be devoted to the new theories of knowledge and the new moral theories proposed during this time.

Prerequisite: PHIL 001 or consent of instructor. Letter grade only.

PHIL 150: Topics in Phenomenology [4]
Study of the foundations of phenomenology in Husserl and its background in Bolzano, Frege, Brentano, Meinong, Kant, and Descartes. Topics include phenomenological method, theory of intentionality, meaning, perception, evidence, ego, other minds, intersubjectivity, and the life-world, as well as application of phenomenological methods to themes in natural science, social science, art, and literature.

May be repeated for credit once.

PHIL 160: Mathematical Logic [4]
Introduction to the meta-theory of first-order logic. Topics include the consistency, compactness, completeness and soundness proofs for propositional and first-order logic; model theory; the axiomatization of number theory; Gödel's incompleteness theorems and related results.

Prerequisite: PHIL 005 or consent of instructor. Discussion included.

PHIL 170: Philosophy, Politics and Economics [4]
We will explore issues in the intersection of philosophy, political theory and economic theory. We will consider how discoveries in political science and economics can advance some debates in traditional political and moral philosophy. Conversely, we will consider how the insights and methods of philosophy influence economics and political science.

Prerequisite: PHIL 001 or consent of instructor. Letter grade only.

PHIL 190: Advanced Seminar in Philosophy [4]
Intensive treatment of a special topic or problem within philosophy.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit once.

PHIL 192: Internship in Philosophy [1-4]
Provides oversight and structure for a student's internship in a field related to philosophy in community organizations, professional research projects, etc. connected to the study of philosophy. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of philosophy.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

PHIL 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

PHIL 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHIL 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYSICS

PHYS 005: Energy and the Environment [3]
Introduction to energy and the environment. Examines different types of renewable and nonrenewable energy sources and the environmental effects of using these energy resources. We cover environmental, economic and sustainability considerations associated with fossil fuels and alternative energy sources.

Letter grade only.

PHYS 006: The Cosmos, Science and You [4]
Introduction to physics and astronomy for non science and engineering majors. Topics include: scientific method as illustrated by astronomical discoveries about the cosmos; and the concepts of matter and energy; and the formation of the universe, galaxies, stars and the solar system. Throughout the course our physical connection and dependence the cosmos are illustrated using new discoveries in astrophysics, astrochemistry and astrobiology.

Discussion included.

PHYS 008: Introductory Physics I [4]
Introduction to classical and contemporary physics. Intended for students with preparation in calculus and algebra. Topics include introduction to forces, kinetics, equilibria, fluids, waves, and heat. Experiments and computer exercises are integrated into the course content.

Prerequisite: MATH 021, which may be taken concurrently. Discussion and laboratory included.

PHYS 009: Introductory Physics II [4]
Continuation of introduction to classical and contemporary physics. Topics include introduction to electricity, magnetism, electromagnetic waves, optics, and modern physics. Experiments and computer exercises are integrated into the course content.

Prerequisite: PHYS 008 and MATH 021 and (MATH 022 or MATH 030, either of which may be taken concurrently). Discussion and laboratory included.

PHYS 009H: Honors Introductory Physics II for Scientists and Engineers [4]
Physics 9H is a mathematically intense introduction to classical electromagnetism for students who are motivated to learn physics at an advanced level. Utilizing calculus, topics include electrostatics, magnetism, AC and DC circuits, electromagnetism, and optics. Advanced coursework prepares students for advanced study in physical science and engineering courses.

Prerequisite: MATH 021, with a grade of B or better, and PHYS 008, with a grade of A- or better, or consent of instructor. Letter grade only. Discussion and laboratory included.

PHYS 010: Introductory Physics III [4]
An introduction to developments in modern physics over the last 100 years that have radically altered our view of nature. Particular emphasis is placed on the quantum theory, with applications to atoms, molecules, solids, and light.

Prerequisite: (PHYS 008 or PHYS 018) and MATH 024, which may be taken concurrently, and (PHYS 009 or PHYS 019, which may be taken concurrently). Laboratory included.

PHYS 012: Light, Color, and Vision [4]
Introduction to the physics, chemistry, and biology of light and vision for nonscientists. Covers basic optics, optical instruments, photography, light and color in nature, human and animal vision, visual perception and optical illusions, and aspects of modern technology including fiber optics and lasers. Includes classroom demonstrations and out-of-class observational exercises.

Discussion included.

PHYS 018: Introductory Physics I for Biological Sciences [4]
First introductory physics course for biological science majors. Topics include vectors, kinematics, Newton's Laws, work, energy and conservation, torque and rotation, fluids and elasticity, oscillations and waves all with an emphasis on biological applications.

Prerequisite: MATH 021 or MATH 011, either of which may be taken concurrently. Letter grade only. Discussion and laboratory included.

PHYS 019: Introductory Physics II for Biological Sciences [4]
The physical principles of electromagnetism and thermodynamics are introduced, examined, and discussed in the context of biological applications.

Prerequisite: (MATH 011 or MATH 021) and (PHYS 008 or PHYS 018). Discussion and laboratory included.

PHYS 090X: Freshman Seminar [1]
Examination of a topic in physics.

May be repeated for credit.

PHYS 095: Lower Division Undergraduate Research [1-5]
Supervised research

Permission of instructor required. May be repeated for credit.

PHYS 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 104: Biophysics [4]
Aims to give students an understanding of relevant physical principles for biological systems, introduce them to experimental and theoretical techniques of biophysics and to communicate the excitement of cutting-edge biophysics research. Topics include diffusion, fluids, entropic forces, motor proteins, enzymes, nerve impulses, networks and evolution.

Prerequisite: (PHYS 018 or PHYS 008) and (PHYS 019 or PHYS 009). Letter grade only. Discussion included.

PHYS 105: Analytic Mechanics Core [4]
Rigorous, mathematical foundation in classical mechanics. Topics include Newtonian mechanics; motion of particles in one, two and three dimensions; central force motion; moving coordinate systems; mechanics of continuous media; oscillations; normal modes; Lagrange's equations; and Hamiltonian methods.

Prerequisite: (PHYS 008 or PHYS 018) and MATH 022 and MATH 023, which may be taken concurrently, and MATH 024, which may be taken concurrently. Letter grade only. Discussion included.

PHYS 108: Thermal Physics Core [4]
Aims to give students a deep understanding of the fundamental principles of thermal physics. Topics include probability, ensembles, equilibrium, entropy, laws of thermodynamics, heat engines, magnetism, chemical equilibria and quantum statistics.

Prerequisite: PHYS 009 or PHYS 019. Letter grade only. Discussion included.

PHYS 110: Electrodynamics Core [4]
Intermediate Electrodynamics. Topics covered include vector calculus including divergence, curl and vector field theorems; electrostatics including field, potential, work and energy; Laplace's equation including solutions in different geometries, separating variables, method of images and multipole expansions; electrostatics in media including polarization and dielectrics (linear/nonlinear); magnetostatics including the Biot-Savart Law, Ampere's Law and vector potentials; magnetic fields in matter including magnetization, linear and non-linear media; and electrodynamics including EMF, induction and Maxwell's equations as well as conservation of charge, energy, and momentum in EM fields.

Prerequisite: PHYS 009 and MATH 023. Discussion included.

PHYS 111: Electromagnetic Radiation Minicourse [2]
This half-semester minicourse covers plane electromagnetic waves including polarization, reflection, refraction and dispersion. Electromagnetic waves in wave guides and cavities also are covered. Additional topics include radiation, both dipole and multipole as well as scattering and diffraction.

Prerequisite: PHYS 110 and PHYS 122, which may be taken concurrently. Discussion included.

PHYS 112: Statistical Mechanics [4]
Covers the fundamental concepts of statistical mechanics, which form the microscopic basis for thermodynamics. Topics include applications to macroscopic systems, condensed states, phase transformations, quantum distributions, elementary kinetic theory of transport processes, and fluctuation phenomena.

Prerequisite: PHYS 108. Letter grade only. Discussion included.

PHYS 120: Physics of Materials [4]
Electrical, optical, and magnetic properties of solids. Free electron model, introduction to band theory. Crystal structures and lattice vibrations. Mechanisms and characterization of electrical conductivity, optical absorption, magnetic behavior, dielectric properties, and p-n junctions.

Prerequisite: PHYS 009 and CHEM 112. Laboratory included.

PHYS 122: Waves Minicourse [2]
This half-semester minicourse covers wave phenomena and associated mathematical methods in Physics. Topics include: coupled oscillations and normal modes, polarization, Fourier analysis, superposition, interference, and diffraction.

Prerequisite: PHYS 009 and MATH 024. Discussion included.

PHYS 124: Atomic Structure Minicourse [2]
This half-semester minicourse develops the quantum theory of atomic structure, focusing on the hydrogen atom. It builds on PHYS 137 and gives students a chance to see quantum mechanics "in action". Material covered includes: angular momentum and spin, spherical harmonics, hydrogen eigenstates, spin-orbit coupling, radiative transitions, and the Stark effect.

Prerequisite: PHYS 137. Discussion included.

PHYS 126: Special Relativity Minicourse [2]
This half-semester minicourse introduces the exciting and thought-provoking physics of special relativity. Topics include hallmark experiments; Lorentz transformations; time dilation and length contraction; relativistic optics; tensor techniques; mass, energy, and momentum; relativistic mechanics; and relativistic electricity and magnetism.

Prerequisite: PHYS 009. PHYS 110 recommended. Discussion included.

PHYS 137: Quantum Mechanics Core [4]
Covers the fundamentals of quantum mechanics, which forms the foundation of our modern understanding of matter at the atomic and molecular level. Topics include the Schroedinger equation, Hilbert spaces, the operator formalism, the Heisenberg Uncertainty Principle, tunneling, pertubation and WKB theory, fermions, and bosons.

Prerequisite: PHYS 010 and MATH 023 and MATH 024. Discussion included.

PHYS 141: Condensed Matter Physics [4]
An introduction to the physics of materials designed for upper level undergraduate students in physics or chemistry. The course will cover traditional solid state physics and include topics in soft matter. This class will examine the relationship between microscopic structure and bulk properties in different materials.

Prerequisite: (PHYS 137 or CHEM 112) and (PHYS 112 or CHEM 113). Letter grade only. Discussion included.

PHYS 144: Modern Atomic Physics [4]
The description and calculation of the properties of atomic energy levels based on the central field approximation. Modern experimental methods in atomic physics and some of the important physics obtained from them. Examples include magnetic resonance, lasers and masers, ion and neutral atom traps, optical pumping and beam foil spectroscopy.

Prerequisite: PHYS 124. Discussion included.

PHYS 148: Modern Optics [4]
We will discuss light from the electromagnetic and geometrical perspectives. Students will learn about reflection and refraction, revisit and then expand upon geometrical optics, gain a deeper understanding of interference, and learn about polarization.

Prerequisite: PHYS 009 and MATH 023 and MATH 024. Letter grade only. Discussion included.

PHYS 150: Energy Sources [3]
Fossil energy resources, nuclear energy, solar energy, and other renewable energy sources (wind, hydro, geothermal.)

Prerequisite: (PHYS 008 or MATH 022) and PHYS 009.

PHYS 151: Topics in Solar Energy Physics [3]
The physics of solar energy production and utilization. Specific topics may be emphasized according to instructor, including: the solar energy resource, modeling and simulation, thermal and photovoltaic collectors, solar energy systems, nonimaging optics, and special applications (solar lasers, material processing, etc.)

Prerequisite: MATH 022 and PHYS 009.

PHYS 159: Particle Physics [4]
Tools of particle and nuclear physics. Properties, classification, and interactions of particles including the quark-gluon constituents of hadrons. High-energy phenomena analyzed by quantum mechanical methods. Quantum number determination of resonances, hadron structure functions, introductory electroweak theory with dirac matrices, Standard Model (overview), grand unified theories.

Prerequisite: PHYS 137. Discussion included.

PHYS 160: Modern Physics Lab [4]
Provides a rigorous foundation in physics laboratory techniques, with an emphasis on hands-on laboratory training. The nature of the experiments available to students cover a range of modern topics, from nonlinear dynamics and chaos through nonlinear optics and spectroscopy. Emphasis is placed on error estimation, data analysis, and interpretation.

Prerequisite: PHYS 010 or consent of instructor. Laboratory included.

PHYS 161: Astrophysics and Cosmology [3]
Elements of general relativity. Physics of pulsars, cosmic rays, black holes. The cosmological distance scale, elementary cosmological models, properties of galaxies and quasars. The mass density and age of the universe. Evidence for dark matter and concepts of the early universe and of galaxy formation. Reflections on astrophysics as a probe of the extrema of physics.

Prerequisite: MATH 022 and PHYS 009.

PHYS 192: Special Topics in Physics [1-4]
Treatment of a special topic or theme in Physics.

Prerequisite: PHYS 009 or PHYS 019 or consent of instructor. May be repeated for credit. Laboratory included.

PHYS 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

PHYS 196: Undergraduate Thesis [2]
This is the final capstone component for the undergraduate thesis in Physics. Students will complete their faculty-supervised thesis research, write up and submit their theses, and give a final oral presentation on their thesis work.

Prerequisite: Junior standing. Physics majors only. Permission of instructor required. Letter grade only.

PHYS 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PHYS 204: Biophysics [4]
Aims to give students an understanding of relevant physical principles for biological systems, introduce them to experimental and theoretical techniques of biophysics and to communicate the excitement of cutting-edge biophysics research. Topics include diffusion, fluids, entropic force, motor proteins, enzymes, nerve impulses, networks and evolution.

Letter grade only. Discussion included.

PHYS 205: Classical Mechanics [4]
Topics in classical mechanics, including Lagrangian and Hamiltoninan formulations, Conservation Laws and Symmetry and the relationship, Calculus of variations and variational principle, Euler angles and rigid body dynamics, Oscillations and normal modes.

Letter grade only. Discussion included.

PHYS 210: Electrodynamics and Optics I [4]
Introduction to electrodynamics. Electrostatics including Poisson and Laplace Equations, Green's Theorem and different Boundary Value Problems, Polarizibility, Susceptibility and dielectric media. Magnetostatics, Maxwell's equations, Plane Electromagnetic Waves, Polarization of light, Electromagnetic radiation in different media.

Letter grade only. Discussion included.

PHYS 211: Electrodynamics and Optics II [4]
Continuation of electrodynamics. Wave guides and resonant cavities, Multipole radiation, Relativistic charged particles in electromagnetic fields, Collisions between charged particles and radiation from moving charges with relativistic corrections, introductory magnetohydrodynamics.

Letter grade only. Discussion included.

PHYS 212: Statistical Mechanics [4]
Topics include: General principles of statistical mechanics including microcanonical, macrocanonical and grand canonical ensembles, fluctuations and equilibrium. Thermodynamics including Legendre transforms and Maxwell relations, fluctuations and stability and Landau theory. Quantum statistical mechanics including Bose-Einstein and Fermi-Dirac statistics.

Letter grade only. Discussion included.

PHYS 237: Quantum Mechanics I [4]
Introductory Quantum Mechanics starting with simple Quantum two-state systems and one-dimensional problems, Uncertainty relations, Solution of Schrodinger's equation for important two and three dimensional physical situations, Angular momentum, identical particles and spin statistics. Hydrogen and multi-electron atoms.

Letter grade only. Discussion included.

PHYS 238: Quantum Mechanics II [4]
Perturbation methods, both stationary and time-dependent, Scattering, interaction with electromagnetic fields, Stark effect, Measurement theory and decoherence, Quantum Hall effect.

Letter grade only. Discussion included.

PHYS 241: Condensed Matter Physics [4]
An introduction to the physics of materials designed for graduate students in physics or chemistry. The course will cover traditional sold state physics and include topics in soft matter. This class will examine the relationship between microscope structure and bulk properties in different properties.

Prerequisite: Students should have taken classes in electrodynamics, thermal physics and introductory quantum mechanics. Letter grade only. Discussion included.

PHYS 249: Introduction to Quantum Field Theory [4]
Introduces quantum field theory with a special emphasis on quantum electrodynamics (QED). Topics include canonical quantization of scalar fields, electromagnetic fields, perturbation theory and renormalization methods among others.

Prerequisite: PHYS 238. Letter grade only. Discussion included.

PHYS 290: Current Topics in Physics and Chemistry [3]
Exploration of current research directions, problems, and techniques in molecular and materials chemistry, physics and engineering. Course format emphasizes student-led presentation, analysis, and discussion of reading assignments from the current and recent scientific literature. Topics determined by the instructor and changes each semester.

May be repeated for credit.

PHYS 291: Physics and Chemistry Seminar [1]
Graduate seminar on current research in molecular and materials chemistry, physics, and engineering.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 292: Special Topics in Physics [1-4]
Treatment of a special topic or theme in Physics at the graduate level.

May be repeated for credit. Laboratory included.

PHYS 293: Physics Colloquium [1]
This is a colloquium series with talks on a wide range of research topics in Physics. Speakers for the colloquia are primarily invited researchers from other Institutions. Some of the seminars additionally showcase the research performed by UC Merced Physics faculty, post doctoral researchers and graduate students. This is a forum to introduce the undergraduate and graduate students to cutting edge research in Physics conducted on-site and elsewhere, and to give them an opportunity to meet researchers and faculty from other Universities/Research Institutions.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 295: Graduate Research [1-15]
Supervised research.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PHYS 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

POLITICAL SCIENCE

POLI 001: Introduction to American Politics [4]
A general introduction to political institutions and political behavior in the United States. Specific topics include the U.S. Constitution, Congress, the presidency, the federal judiciary, political parties, interest groups, mass public opinion, elections, and voting behavior.

Discussion included.

POLI 002: Controversies in American Politics [4]
Examination of select problems in contemporary American politics. Possible subjects include campaign finance, culture wars and party polarization, barriers to third party success, and media coverage of politics.

Discussion included.

POLI 003: Introduction to Comparative Politics [4]
Introduction to the cross-national study of political institutions and behavior. Formal and informal aspects of politics in selected countries are covered, as are comparative research methods.

Discussion included.

POLI 005: Introduction to International Relations [4]
Introduction to the study of the politics of conflict and war, diplomacy, international cooperation, and international institutions.

Discussion included.

POLI 006: Global Issues [4]
Examination of select problems in international relations and foreign policy. Possible topics include terrorism, proliferation of nuclear weapons, and conflict in the Middle East.

Discussion included.

POLI 009: Community Mobilization and Politics [4]
Examination of political and social mobilization at the local level, including strategies for organization and advocacy.

Discussion included.

POLI 010: Analysis of Political Data [4]
Overview of the application of social scientific methods to the study of politics. Covers research

design, measurement, descriptive and inferential statistics, and the linear regression model as applied to political phenomena.

Prerequisite: MATH 005 or equivalent score on the Math Placement Exam. Laboratory included.

POLI 090X: Freshman Seminar [1]
Examination of a topic in political science.

May be repeated for credit once.

POLI 092: Internship in Political Science [1-4]
Provides oversight and structure for a student's internship in a field of political science in community organizations, professional research projects, etc. connected to the study of political science. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of political science.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

POLI 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

POLI 098: Lower Division Directed Group Study [1-5]
Prerequisite: Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 100: Congressional Politics [4]
Elections and representation, legislative organization and process, legislative parties and leadership, lobbying, legislative outcomes, and the determinants of these outcomes in the U.S. Congress.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 101: The Presidency [4]
Powers, constraints, and behavior of the U.S. president and executive branch. Includes specific topics such as legislative-executive interactions, presidential control of the bureaucracy, nomination campaigns and general elections, and public opinion and the presidency.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 102: Judicial Politics [4]
Structure, function, and politics of the U.S. court system, with a particular focus on the selection of judges, judicial decision making, external political influences on the judiciary, and the impact of court decisions.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 105: Interest Groups and Political Parties [4]
Formation, strategies, and effectiveness of interest groups and political parties in the U.S.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 106: Urban Politics [4]
Examines urban political development and policy processes in the United States. It will trace the historical development of local government, analyze urban coalitions and the distributions of power, and tackle the relationship between politics and policy making in the areas of growth, education, cultural issues, and welfare.

Prerequisite: POLI 001. Letter grade only.

POLI 107: State Politics [4]
The structure and performance of state governments, including California state politics.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 108: Direct Democracy [4]
The politics of the initiative, referendum, and recall in the American states. Specific topics may include the history and origins of direct democracy, voter support for ballot measures, the role of interest groups, the effect of initiatives and referenda on candidate elections and civic engagement, and policy implications.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 110: Governmental Power and the Constitution [4]
Introduces students to the manner in which Supreme Court decisions shape our political system by delineating the sources and limits of governmental power. The powers of the three branches of the federal government are covered, as is the relationship between the federal government and the states.

Letter grade only.

POLI 111: Liberty, Equality and the Constitution [4]
Examines the constitutional politics of landmark U.S. Supreme Court cases involving civil liberties and civil rights. Specific topics may include First Amendment freedoms, privacy, the rights of criminal suspects, and discrimination based on race, gender, and sexual orientation.

Prerequisite: Junior standing and POLI 001 or consent of instructor.

POLI 120: Voting Behavior, Campaigns, and Elections [4]
Voting behavior, voter turnout, campaign strategies, and election outcomes.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 125: Public Opinion [4]
An examination of the nature and origins of public opinion in the United States and the role of public opinion in the policy process.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 127: Race, Gender, and Politics [4]
Contemporary and historical identity politics in the U.S., with a focus on the importance of race and gender in political representation, attitude formation, and civil rights.

Prerequisite: POLI 001 and (POLI 010 or ECON 010).

POLI 130: Comparative Political Institutions [4]
Cross-national comparison of the design, evolution, and impact of political institutions, such as electoral systems, legislatures, executives, courts, and parties.

Prerequisite: POLI 003 and (POLI 010 or ECON 010).

POLI 135: Comparative Political Behavior [4]
Analysis of multiple forms of political behavior across a variety of countries. Includes public opinion, political culture, voting, and less conventional forms of participation.

Prerequisite: POLI 003 and (POLI 010 or ECON 010).

POLI 140: Transitions to Democracy [4]
Formation of democratic institutions and norms. Particular attention is paid to nations labeled as developing democracies.

Letter grade only.

POLI 142: Contemporary Chinese Politics [4]
Introduces students to major issues in contemporary Chinese politics. The course will focus on the major challenges confronting China today, including economic reform and development, social unrest, democratization and the Tiananmen movement, village elections, ethnic conflicts, news media, Taiwan, and China's foreign relations.

Letter grade only.

POLI 150: Causes of International Conflict [4]
Investigation of the causes of international conflict and war, the conduct of war, its ultimate termination, and the possibility of its prevention.

Prerequisite: POLI 005 and (POLI 010 or ECON 010).

POLI 153: Judgment and Decision Making [4]
An introduction to the study of human judgment and decision making. Topics include decision making under uncertainty, financial choices, health decision making, group decisions, rational theories of choice behavior, and improving decision making. The material will be related to cognitive science, psychology, economics, and other social sciences.

Prerequisite: COGS 001 or ECON 001 or PSY 001.

POLI 155: International Political Economy [4]
The connections between politics, policy, and international economics.

Prerequisite: POLI 005 and (POLI 010 or ECON 010).

POLI 160: US Foreign Policy [4]
The formation of U.S. foreign policy, with an emphasis on the modern era and an introduction to analytical tools for understanding current foreign policy issues and debates.

Prerequisite: POLI 005 and (POLI 010 or ECON 010).

POLI 165: International Organizations & Regimes [4]
Investigates the emergence and rise of international organizations and the network of regulation and international governance that they facilitate. The course explores the institutional structures, political processes, and impact of international organizations within three issue areas: international peace and security, human

rights and humanitarian affairs, and global trade and development.

Prerequisite: POLI 005. Letter grade only.

POLI 170: Theoretical Models of Politics [4]
The development, utility, and limitations of theoretical models of the political world. May include rational choice theory, game theory, and psychological theories of politics.

Prerequisite: POLI 010 or ECON 010.

POLI 171: Politics and Film [4]
Considers whether politics as portrayed on film differs from political reality as understood through political science, and further uses films as vehicles for better understanding an array of topics from political science, including legislative behavior, elections, presidential politics, local politics, war, and international relations.

Prerequisite: POLI 001. Letter grade only.

POLI 190: Topics in Political Science [4]
Intensive treatment of a special topic or problem in political science.

Prerequisite: Juniors standing and POLI 001 or consent of instructor. Political Science majors only. May be repeated for credit three times.

POLI 191: Seminar in Political Science [4]
An in-depth, research-intensive, seminar-style treatment of a specific problem, topic, or puzzle in the field of political science. Recommended for students considering graduate school in political science.

Prerequisite: Junior standing and POLI 010 or consent of instructor. Political Science majors only. Letter grade only. May be repeated for credit four times.

POLI 192: Internship in Political Science [1-4]
Provides oversight and structure for a student's internship in a field of political science in community organizations, professional research projects, etc. connected to the study of political science. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of political science.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

POLI 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

POLI 196: UC Sac Public Policy [1-5]
Letter grade only. May be repeated for credit.

POLI 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

POLI 200: Research Design in Political Science [4]
Intended to give students an introduction to designing political science research. The course will emphasize scientific method and causal inference, with special emphasis on designing strong tests, including introductory experimental and quasi-experimental design, as well as the use of natural experiments and observational data.

May be repeated for credit twice.

POLI 210: Quantitative Analysis of Political Data, I [4]
An introduction to the theory and practice of quantitative data analysis. As the first statistics course in the department's research methods sequence, it is intended to prepare students for future work in methodology. Aside from formal treatment of the material, students will receive an basic introduction to the use of Stata statistical analysis software. As time permits, we will also discuss substantive examples of the quantitative techniques introduced in class.

May be repeated for credit twice.

POLI 211: Quantitative Analysis of Political Data, II [4]
Provides an in-depth introduction to ordinary least squares regression analysis and its use in political science.

Prerequisite: POLI 210. May be repeated for credit twice.

POLI 220: American Political Institutions [4]
Intended to provide students with a broad understanding of American political institutions (the constitution, Congress, presidency, bureaucracy, judiciary, electoral systems, and subnational governments). The first portion of the semester will emphasize concepts and tools while later weeks will examine institutions in more depth, emphasizing classic writings and contemporary research controversies.

May be repeated for credit twice.

POLI 230: Institutions and Institutional Change in Comparative Perspectives [4]
Explores the political economy of institutions and institutional change in comparative perspectives. It will analyze the causes of institutional emergence/change and the effects of institutions.

May be repeated for credit twice.

POLI 250: American Political Behavior [4]
Provides students with a broad understanding of American political behavior (political participation, the nature and origins of public opinion, vote choice). The first portion of the semester will emphasize concepts and tools while later weeks will examine political behavior in more depth, emphasizing classic writings and contemporary research controversies.

May be repeated for credit twice.

PSYCHOLOGY

PSY 001: Introduction to Psychology [4]
Introduction to psychology as a science of behavior, including history, research methods, biological bases of behavior, cognition, personality, social behavior, psychological disorders, techniques of therapy and applied science.

PSY 010: Analysis of Psychological Data [4]
Design and analysis of psychological research including experimental design, correlational research, and descriptive and inferential statistics. Students in the Psychology major or minor must take this course before taking any upper division Psychology courses.

Prerequisite: COGS 001 or PSY 001.

PSY 015: Research Methods in Psychology [4]
Survey of common methodological approaches in psychological research.

Prerequisite: PSY 010.

PSY 090X: Freshman Seminar [1]
Examination of a topic in psychology.

May be repeated for credit once.

PSY 092: Internship in Psychology [1-4]
Provides oversight and structure for a student's internship in a field related to psychology in community organizations, professional research projects, etc. connected to the study of psychology. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of psychology.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

PSY 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

PSY 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 105: Advanced Research Methods in Psychology [4]
Survey of advanced methodological approaches in psychological research.

Prerequisite: PSY 015. Letter grade only.

PSY 110: History of Psychology [4]
Major schools of psychology, as well as the philosophical and physiological influences that lead to the birth of psychology as an independent discipline. Focus is on integration over these areas with the goal of better understanding the current state of the science of psychology.

Prerequisite: Junior standing and PSY 001 or consent of instructor.

PSY 123: Alcohol, Drugs, and Behavior [4]
Survey of major drugs of abuse, their mode of action, and their behavioral effects, both acute and chronic; etiology and maintenance of drug abuse and review of prominent strategies for prevention, intervention and treatment.

Prerequisite: PSY 001.

PSY 124: Health Disparities [4]
Focus on the differential effect of environmental factors and behavior on human health. In our examination of the determinants of health, we will discuss issues related to ethnic, cultural, and gender psychology, risk behavior, behavioral medicine, psychosocial epidemiology, and policy.

Letter grade only.

PSY 130: Developmental Psychology [4]
Covers the stages that children go through as they develop; covers cognitive development, biological development, social development, personality

development, emotional development, among others. Focus is on integrating across these different content areas.

Prerequisite: Junior standing and PSY 001 or consent of instructor.

PSY 131: Social Psychology [4]
Behavior of the individual in social situations, surveying problems of social cognition, social interaction, group tensions, norm development, attitudes, values, public opinion, status.

Prerequisite: PSY 001. Letter grade only.

PSY 135: Language Acquisition [4]
Covers the stages that children go through as they learn their first language. We also explore the causal mechanisms behind language acquisition as outlined by the major theoretical approaches in the field. Bilingual language acquisition are also covered.

Prerequisite: Junior standing and PSY 130 or consent of instructor.

PSY 136: Cognitive Development [4]
Covers the major theories and stages of children's cognitive development. Among others, we cover Piaget, Vygotsky, information processing theories, and connectionist approaches to learning.

Prerequisite: Junior standing and PSY 130 or consent of instructor.

PSY 137: Conceptual Development [4]
Exploration of how children learn about specific conceptual domains, such as naive biology and theory or mind. The major theoretical approaches in the area are covered. Questions of process, such as radical reorganization vs. enrichment of content areas set the context for the course.

Prerequisite: Junior standing and PSY 130.

PSY 138: The Development of Social Mind [4]
Considers the emergence of social reasoning and behavior from infancy to adulthood. Special focus on the cognitive processes underlying reasoning about others as intentional agents, as members of social groups such as race and gender.

Prerequisite: PSY 001.

PSY 139: Cognitive Development and Education [4]
How can developmental psychology inform educational practice? We review current developmental theories as well as attempts to apply them to education, with the aim of building an understanding of both the promise and pitfalls of a developmentally based approach to education.

Prerequisite: PSY 130.

PSY 140: Clinical Psychology [4]
Major theoretical approaches to clinical psychology, including psychoanalysis, existentialism, humanism, systems theory, and behavioral approaches. A review of what clinical psychologists do, including assessment methods, professional roles, and approaches to treatment.

Prerequisite: PSY 001.

PSY 142: Abnormal Psychology [4]
Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic behavior.

Prerequisite: PSY 001.

PSY 143: Abnormal Child Psychology [4]
Approaches to and current scientific knowledge about psychological disorders during childhood are reviewed. Examples are anxiety, attention deficit, autistic, and substance use disorders. Interventions implemented to prevent or treat these disorders are also examined.

Prerequisite: PSY 001.

PSY 145: Human Sexuality [4]
Survey of existing knowledge of human sexual behavior; physiological, anatomical, psychological, and cultural components; normative sexual functioning. Such topics as sexual deviation, sexual dysfunctions, and types of treatment are also considered.

Prerequisite: PSY 001.

PSY 147: Health Psychology [4]
Survey of topics in health psychology, behavioral medicine, and pediatric health psychology.

Prerequisite: PSY 001.

PSY 150: Psychological Perspective on Cultural, Racial Ethnic Diversity [4]
Issues that bear upon race, ethnicity, and culture, such as the cultural specificity of psychological theories, cultural influences on child development, ethnic identity, psychological issues in immigration, ethnic and racial prejudice, and assessment and interventions with culturally diverse and ethnic minority populations.

Prerequisite: PSY 001.

PSY 151: The Psychology of Stereotyping and Prejudice [4]
Cognitive processes underlying stereotyping and prejudice are reviewed. Focuses on the relationship between stereotyping and categorization in general, the development of stereotyping and prejudice, and empirical proposals to reduce bias through contact or other forms of intervention.

Prerequisite: PSY 001 or COGS 001.

PSY 157: Personal Relationships [4]
Surveys the psychological science of close relationships, including interpersonal attraction, communication, interdependence, friendship, love, sex, conflict, violence, breakups and relationship loss.

Prerequisite: PSY 001. Letter grade only.

PSY 158: Positive Psychology [4]
Survey of research on the strengths and virtues that enable individuals and communities to thrive. Positive Psychology emphasizes positive emotions, positive individual traits, and positive institutions. Note: This course fundamentally addresses the UC Merced guiding principles of scientific literacy, communication, self and society, and development of personal potential.

Prerequisite: PSY 001.

PSY 159: Personality Psychology [4]
The theories of Freud, Erikson, and other major twentieth-century contemporary approaches to personality.

Prerequisite: PSY 001.

PSY 160: Cognitive Psychology [4]
Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation.

Prerequisite: PSY 001 or COGS 001. Laboratory included.

PSY 161: Perception [4]
An introduction to key theoretical constructs and experimental procedures in visual and auditory perception. Topics include psychophysics; perception of color, space, shape and motion; pattern recognition; perceptual attention; and brain areas engaged in perception.

Prerequisite: PSY 001 or COGS 001.

PSY 162: Visual Perception [4]
A survey of central topics in the psychological study of vision: neurophysiological structure and function of the visual system; psychophysical methods for studying visual perception; color, motion, and form perception; three dimensional space perception; visual attention and oculomotor behavior; evolutionary advantages of vision; psychological and philosophical theories of visual consciousness.

Prerequisite: PSY 001 or COGS 001.

PSY 170: Industrial and Organizational Psychology [4]
How psychology is applied to industrial and organizational problems, including workplace testing, personnel issues, advertising, etc.

Prerequisite: PSY 001.

PSY 171: Psychological Tests and Measurement [4]
Principles of measuring behavior and developing and selecting psychological tests are explained. Common tests are also surveyed, such as intelligence, achievement, personality, and employment related tests.

Prerequisite: PSY 001.

PSY 172: Forensic Psychology [4]
Survey of the application of psychology to the criminal justice system, including public policy, sanity, competency, eyewitness testimony and treatment of mentally ill offenders.

Prerequisite: PSY 001.

PSY 180: Physiological Psychology [4]
Relationship of brain structure and function to behavior, motivation, emotion, language, and learning in humans and other animals. Review of research methods used in physiological psychology and neuroscience.

Prerequisite: PSY 001.

PSY 181: Clinical Neuropsychology [4]
The organization of the brain at the gross, cellular and molecular level and how the brain accomplishes vision, hearing, sleep, motor skills, emotions and memory. Brain disease such as agnosias, depression, addictions, stroke, Alzheimer's and Parkinson's are investigated.

Prerequisite: PSY 001. Letter grade only.

PSY 190: Topics in Psychology [4]
Intensive treatment of a special topic or problem of psychological interest.

Prerequisite: Junior standing and PSY 001 or consent of instructor. Psychology majors only. May be repeated for credit three times.

PSY 192: Internship in Psychology [1-4]
Provides oversight and structure for a student's internship in a field related to psychology in community organizations, professional research projects, etc. connected to the study of

psychology. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of psychology.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

PSY 195: Upper Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

PSY 198: Upper Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 199: Upper Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PSY 200A: Professional Seminar for First-Year PhD Graduate Students I [4]

A two semester sequence required of and limited to first-year Ph.D. students in Psychology. Survey of major issues in contemporary psychology with their historical backgrounds.

Letter grade only.

PSY 200B: Professional Seminar for First-Year Graduate Students II [4]

A two semester sequence required of and limited to first-year Ph.D. students in Psychology. Survey of major issues in contemporary psychology with their historical backgrounds.

Letter grade only.

PSY 202A: Advanced Psychological Statistics I [4]

The nature of causal inference; experimental and quasi-experimental designs including randomized experiments, nonrandomized control group studies, time series, regression discontinuity; generalizing from experiments; ethical issues and ethical principles of research conduct; practical problems in experiments.

Letter grade only.

PSY 202B: Advanced Psychological Statistics II [4]

Classical test theory; factor analysis; generalizability theory; item-response theory; inter-rater reliability; fundamental measurement theory.

Letter grade only.

PSY 202C: Multivariate Analysis [4]

Introduction to analysis of data having multiple dependent variables. Topics include continuous multivariate distributions, multiple regression, multivariate analysis of variance, discriminant analysis, classification, canonical correlation, principal component analysis. Applications from clinical, cognitive, physiological, and social psychology. Computer methods.

Letter grade only.

PSY 204: Research Design and Methodology [4]

The nature of causal inference; experimental and quasi-experimental designs including randomized experiments, nonrandomized control groups studies, time series, regression discontinuity; generalizing from experiments; ethical issues and ethical principles of research conduct; practical problems in experiments.

Letter grade only.

PSY 205: Measurement Theory and Psychometrics [4]

Classical test theory, factor analysis, generalizability theory, item response theory, interrater reliability, fundamental measurement theory.

Letter grade only.

PSY 206: Quantitative Methods for Reviewing Research [4]

Quantitative procedures (meta-analysis) for reviewing research findings; techniques for locating and coding research studies, calculating effect sizes, and analyzing study findings.

Letter grade only.

PSY 207: Linear Structural Modeling [4]

Path models, path analysis, cross-lagged panel studies, confirmatory factor analysis, and complete latent variable causal models, applications to experimental and nonexperimental data.

Letter grade only.

PSY 208A: Methods for Program Evaluation [4]

Introduction to program evaluation. Survey of the many methods used in program evaluation, including needs assessment, surveys, experiments, and qualitative methods. Discussion of policy and strategy issues, and of utilization of findings.

Letter grade only.

PSY 208B: Theory of Program Evaluation [4]

History and nature of program evaluation, review of different approaches taken to evaluation by variety of major theorists in the field; practice in evaluation.

Letter grade only.

PSY 211: Computer Programming for Social Sciences [4]

An introduction to specialty computer programs that are useful in the social sciences, such as Matlab, GAUSS, specialty programs in meta-analysis, and basic languages.

Letter grade only.

PSY 212: Special Problems in Psychological Statistics [4]

Special problems in psychological statistics and data analysis.

Letter grade only.

PSY 214: History of Psychology [4]

Covers the major schools of psychology, including Wundtian psychology, structuralism, functionalism, behaviorism, gestalt psychology, cognitive psychology, etc., as well as the philosophical and physiological influences that lead to the birth of psychology as an independent discipline. Focus is on integration over these areas with the goal of better understanding the current state of the science of psychology. Major recurring themes within these schools include the mind/body problem, the nature/nurture debate, and the criteria for practicing a science.

Letter grade only.

PSY 220: Health Psychology [4]

A review of theory and research on how behavior affects health and disease as well as how disease affects behavior (e.g., cognitions, emotions, relationships) in humans. Research into behavioral interventions to improve, ameliorate, or prevent disease are also reviewed. Focus is placed on the role of behavior for the major diseases and threats to health in children, adolescents, and adults.

Letter grade only.

PSY 230: Developmental Psychology [4]

The stages that children go through as they develop. Covers cognitive development, biological development, social development, personality development, emotional development, among others. Focus is on integrating across these different content areas.

Letter grade only.

PSY 234: The Nativism Empiricism Debate [4]

A major debate in developmental psychology concerns the relative contribution of innate versus learned knowledge and skills. We focus on theoretical and empirical contributions to this debate, and try to place them within a broader framework of contemporary cognitive development.

Letter grade only.

PSY 235: Language Acquisition [4]

The stages that children go through as they learn their first language. Course also explores the causal mechanisms behind language acquisition as outlined by the major theoretical approaches in the field. Bilingual language acquisition are also covered.

Letter grade only.

PSY 236: Cognitive Development [4]

The major theories and stages of children's cognitive development. Among others, we cover Piaget, Vygotsky, information processing theories, and connectionist approaches to learning.

Letter grade only.

PSY 237: Conceptual Development [4]

Explores how children learn about specific conceptual domains, such as naive biology and theory or mind. The major theoretical approaches in the area are covered. Questions of process, such as radical reorganization vs. enrichment of content areas set the context for the course.

Letter grade only.

PSY 238: The Development of Social Mind [4]

Considers the emergence of social reasoning and behavior from infancy to adulthood. Special focus on the cognitive processes underlying reasoning about others as intentional agents, as members of social groups such as race and gender.

Letter grade only.

PSY 239: Cognitive Development and Education [4]

How can developmental psychology inform educational practice? We review current developmental theories as well as attempts to apply them to education, with the aim of building an understanding of both the promise and pitfalls of a developmentally based approach to education.

Letter grade only.

PSY 250: Social Psychology [4]
Designed for graduate psychology students. Intensive consideration of concepts, theories, and major problems in social psychology.

Letter grade only.

PSY 251: The Psychology of Prejudice and Stereotyping [4]
Cognitive processes underlying prejudice and stereotyping are reviewed. We focus on the relationship between stereotyping and categorization in general, the development of stereotyping and prejudice, and empirical proposals to reduce bias through contact or other forms of intervention.

Letter grade only.

PSY 263: Language and Communication in Everyday Life [4]
Conversational language, metaphor, idioms, ambiguity, spatial language, gesture, sign language, propaganda, dialects, cross-cultural variation, semantic change.

Letter grade only.

PSY 264: Language, Mind and Brain [4]
Language and linguistic representation from various angles and disciplines, including psychology, linguistics, philosophy, and neuroscience. Possible topics: sentence processing, word meaning, neurolinguistic deficits, language learning, artificial intelligence (natural language processing), and the interaction of language with other cognitive processes.

Letter grade only.

PSY 286: Presentation of Psychological Materials [4]
Supervised practicum in undergraduate teaching. Students serve as discussion section leaders in selected undergraduate courses, and give guest lectures in courses where appropriate.

Satisfactory/Unsatisfactory grading only.

PSY 288: Psychological Research Practicum [1-4]
Faculty and graduate students who share interests discuss current literature, new ideas, methodological issues, and preliminary findings. Meetings include research presentations and opportunities for feedback on current and proposed research activity to encourage, support, and facilitate student research expertise. Assigned reading including.

Satisfactory/Unsatisfactory grading only.

PSY 289: Psychology Colloquium [1]
One and one-half hours of colloquium per week. Reports and discussions of original research in psychology. Not all participants must report in any given semester, but all are expected to attend and to enter into the discussion.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 290: Special Topics Study Course [4]
Under faculty supervision, group of students meets each week for a semester in a student-led study group to pursue a specific topic of their choice that is not covered in other department courses.

Letter grade only. May be repeated for credit.

PSY 294: Individual Studies [2-12]
Designed primarily as preparation for qualifying examinations. May be required by some area committees as a requisite for taking examinations.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

PSY 296: Research Topics in Psychology [1]
Research group meeting, one hour. Limited to graduate students. Discussion of current literature, new ideas, methodological issues, and preliminary findings. Research presentations and opportunities for feedback on current and proposed research activity to encourage, support, and facilitate student research expertise. Assigned readings included.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 297: Research for Ph.D. Dissertation [2-12]
At least one 297 course is required during each year following completion of qualifying examinations.

Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PSY 299: Directed Individual Research and Study in Psychology [2-12]
One 299 course is required during second semester of the first year of graduate study, and both semesters of the second year of graduate study.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

PUBLIC HEALTH

PH 100: Introduction to Epidemiology [4]
Concentrates on the non-random distribution of disease in human populations and demonstrate how disparities in human culture and behavior are related differences in disease risk by characteristics person, place and time. Patterns of disease will be examined from the agent-host-environment paradigm.

Prerequisite: Sophomore standing. Letter grade only.

PH 105: Introduction to US Health Care System [4]
Overview of the US Health Care system. Topics include development and organization of US health system, challenges in California and US, how providers and funders work together, current problems, previous attempts to improve coverage and access to health care, and health care in other countries compared to the US.

Prerequisite: Sophomore standing. Letter grade only.

PUBLIC POLICY

PUBP 001: Introduction to Public Policy [4]
Interdisciplinary introduction to public policy and policy issues facing the American voter. Emphasis is on how difficult it is to arrive at an informed decision—not on determining what that decision ought to be. Examines a diverse set of policy topics, including environment, health, education, and social policy, among others.

Letter grade only.

PUBP 090X: Freshman Seminar [1]
Examination of a topic in public policy.

Pass/No Pass grading only. May be repeated for credit.

PUBP 092: Internship in Public Policy [1-4]
Provides oversight and structure for a student's internship in a field of public policy in community organizations, professional research projects, etc. connected to the study of public policy. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of public policy.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

PUBP 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

PUBP 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PUBP 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PUBP 100: Political Process and Institutions [4]
Political and governmental context of policy, form agenda setting to evaluation. Course examines the context for setting constitutional, federal and local policy, as well as processes by which governmental institutions make decisions. We also examine interactions between institutions and approaches that further policy decision making.

Prerequisite: PUBP 001 or POLI 001. Letter grade only.

PUBP 110: Poverty and Social Policy [4]
Overview of poverty and social policy in the United States in a historical context from the nineteen century until the present. Discusses current policy issues and policy debates surrounding poverty and inequality.

Prerequisite: (PUBP 001 and PUBP 100 and ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 120: Health Care Policy [4]
Examines current health policy issues and policy approaches, as a way of exploring problems in the design and implementation of policy. It concentrates on issues of access to care, quality of care, health care costs, health insurance, health behavior, and the cultural and linguistic issues facing immigrants' access to care.

Prerequisite: (PUBP 001 and PUBP 100 and ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 130: Environmental Policy [4]
Examines current environmental policy as a way of exploring problems in the design and implementation of policy. Provides an overview of basic concepts and methods of environmental policy analysis and implementation looking at a range of local and global environmental policy issues, such as environmental justice, air quality, and urbanization.

Prerequisite: (PUBP 001 and PUBP 100 and ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 140: Immigration and Public Policy [4]
Examines the origins, consequences, and characteristics of immigrants to the United States, from the nineteenth century to the present. We look at social and economic forces behind immigration; the impact of immigrants; and their process of integration. We also examine various debates on immigrant and immigration policy.

Prerequisite: (PUBP 001 and PUBP 100 and ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 150: Race, Ethnicity and Public Policy [4]
Examines the ways in which policies are shaped by and respond to issues of race, ethnicity and culture. Among others, we explore issues of inequality in the labor market, segregation, discrimination, environmental justice, health care access, and social and political inequality.

Prerequisite: (PUBP 001 and PUBP 100 and ECON 100 and PSY 105) or ECON 130. Letter grade only.

PUBP 192: Internship in Public Policy [1-4]
Provides oversight and structure for a student's internship in a field of public policy in community organizations, professional research projects, etc. connected to the study of public policy. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of public policy.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

PUBP 195: Upper Division Undergraduate Research [1-4]
Supervised research.

Permission of instructor required. May be repeated for credit twice.

PUBP 198: Upper Division Directed Group Study [1-5]
Group directed study.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

PUBP 199: Upper Division Individual Study [1-4]
Involves an independent research project under the supervision of a Public Policy faculty member. To be taken in the senior year.

Prerequisite: PUBP 100 and ECON 100 and (PSY 105 or ECON 130). Permission of instructor required. May be repeated for credit twice.

QUANTITATIVE AND SYSTEMS BIOLOGY

QSB 200: Molecular Cell Biology [3]
Focus on molecular aspects of cellular processes, including signal transduction, cell division, differentiation, protein synthesis and degradation, and regulation of gene expression. Each topic is accompanied by critical evaluation of classic papers and recent publications. Upper division undergraduate courses in cell and molecular biology should have been completed as course requisites for this course.

Letter grade only.

QSB 201: Teaching and Learning in the Sciences [1]
Students are introduced to 'scientific teaching' —an approach to teaching science that uses many of the same skills applied in research. Topics include how people learn, active learning, designing, organizing and facilitating teachable units, classroom management, diversity in the classroom and assessment design.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. Discussion included.

QSB 207: Physical Biochemistry [3]
Physical Biochemistry is the study of properties such as macromolecular folding, multimerization, structure, and ligand binding. This course will instruct students on these, and on the experimental techniques that can quantitatively probe these properties, including hands-on work with multidimensional NMR data. Also included is in-depth discussion of recent biophysical literature.

Letter grade only.

QSB 212: Advanced Signal Transduction and Growth Control [4]
Signal transduction in mammalian cells with emphasis on molecular and genetic regulation of these processes and their role in cell function. Graduate requirement includes an advanced discussion section involving research methodology and data interpretation led by the instructor.

Prerequisite: An undergraduate biochemistry course or consent of instructor.

QSB 214: Tissue Engineering Design [3]
Fundamental topics include: issues related to the cell source (including stem cells, plasticity, transdifferentiation, therapeutic cloning vs. reproductive cloning, bone marrow transplants, and cell differentiation and purification), cell culture and tissue organization, gene therapy delivery methods, cell adhesion and migration, issues in construct design, tissue preservation, and immunoisolation and/or modulation. Current case studies and issues for FDA approval of tissue engineered products are also covered.

Prerequisite: BIO 002 or equivalent.

As an undergraduate at UC Merced, I was able to build a strong relationship with some of the faculty members, which enabled to me to begin graduate research during that time. Getting a head start on my graduate work led me to complete my master's degree in one year.

—Nabora S. Reyes de Rogers, Quantitative and Systems Biology

QSB 215: Principles of Biological Technologies [3]
The principles underlying commonly used and cutting-edge technical procedures in biological research. Lectures and primary literature critiques on biochemical, molecular, cellular, bioengineering and computational techniques.

QSB 217: Lab on a Chip: Developing 3rd World Diagnostics for Global Health [3]
This is the first-ever four campus course between UC San Francisco, UC Berkeley, UC Santa Cruz, and UC Merced which aims to 1) raise awareness and knowledge about global health issues 2) teach students critical engineering skills such as nano/micro-fabrication 3) enable students to design, build, and test their own diagnostics and 4) develop entrepreneurial skills. Students learn about tuberculosis from leading experts at UCSF and then address the dearth of sensitive diagnostics by designing and testing their own nano/micro-systems. Taught at UC Merced with teleconferencing to the other campuses and two field trips. Funded in part by QB3.

Letter grade only. Laboratory included.

QSB 220: Cellular Microbiology [3]
Emphasizes the molecular basis of interaction between microbial pathogens (bacteria, viruses and protozoan parasites) and host cells. We also include discussion of the immune response to infection. Student-led presentations and discussion of reading assignments from the current scientific literature.

Letter grade only.

QSB 227: Virology [3]
Overview of viruses, focusing on structure, infecting cycle, interactions with host, transmission and methods of detection and control.

Discussion included.

QSB 241: Advanced Genomic Biology [4]
Comprehensive introduction to the language of genes and genomes, including genotype to phenotype relationships, gene regulation of development and disease, sources of phenotypic variation, and organization of genomes across the domains of life. Graduate requirements include advanced discussion section led by instructor and genome informatics project.

QSB 242: Genome Biology [5]
Introduction to the concepts behind genome biology and a detailed overview of the many tools used in comparative genomics. Specific topics include genome assembly, gene modeling and comparative genomics, transcriptomics, and proteomics of prokaryotic and eukaryotic organisms. Students carry out real scientific projects in collaboration with course faculty and produce new genomic data of publishable quality. Mandatory weekly three hour lab is part of this course.

Prerequisite: BIO 141. Letter grade only. Discussion and laboratory included.

QSB 244: Phylogenetics: Speciation and Macroevolution [3]
Theory underlying reconstruction of evolutionary relationships and introduces the comparative methods and tools of phylogenetics. Topics include morphological, molecular, and fossil data in distance, parsimony, likelihood, and Bayesian frameworks for investigating geographic patterns and rates of speciation, phenotypic evolution, diversification, extinction, and biogeography.

Letter grade only. Discussion included.

QSB 244L: Phylogenetics Laboratory: Speciation and Macroevolution [1]
Practice in reconstruction of evolutionary relationships and introduces the comparative methods and tools of phylogenetics. Topics include morphological, molecular, and fossil data in distance, parsimony, likelihood, and Bayesian frameworks for investigating geographic patterns and rates of speciation, phenotypic evolution, diversification, extinction, and biogeography. QSB 244 must be taken concurrently.

Letter grade only.

QSB 248: Advanced Topics in Ecology [3]
Utilizes directed readings and discussion of classical and current literature in ecology, including physiological, population, community, ecosystem, landscape, and global ecology studies.

Letter grade only. Discussion included.

QSB 250: Embryos, Genes and Development [3]
Principles of developmental biology as revealed through analysis of invertebrate and vertebrate system. Animal models are used to examine the molecular and cellular mechanisms that influence cell fate. Cell signaling is studied in the context of embryonic pattern formation and the development of body plans and organ systems. Graduate level students read discuss and critique current research papers relevant for the field.

Prerequisite: QSB 290 and BIO 110 or equivalent, or consent of instructor. Letter grade only. Discussion included.

QSB 252: Cancer Genetics and Tumor Biology [3]
Topics include viral and hormonal carcinogenesis, molecular aberrations in cancer, tumor development, epigenetic and cancer, tumor immunology, oncogenes.

Letter grade only.

QSB 253: Evolution and Development [3]
Compares and contrasts the developmental cues of a variety of animals and emphasizes how conserved developmental pathways have been manipulated through evolutionary processes to produce different physical features. The effects of regulatory region mutations, gene duplication, and genetic co-opting will be investigated.

Permission of instructor required. Letter grade only. Discussion included.

QSB 261: Human Physiology [3]
Understanding the mechanisms underlying function of major human organs. Emphasis includes neural transmission and action potential, cardiovascular, renal and gastrointestinal physiology, metabolism, and endocrinology. Laboratory experiments demonstrating and reinforcing topics covered in lecture with an emphasis on scientific method. Discussion section critically reads and evaluates papers in physiology and provide an opportunity for the students to practice presenting scientific data to an audience.

Permission of instructor required. Letter grade only. Discussion and laboratory included.

QSB 280: Advanced Mathematical Biology [3]
Graduate level mathematical modeling and data analysis skills for life science researchers taught through hands-on computational laboratories. Topics include population models, predator-prey and competition systems, epidemic models with applications to sexually transmitted diseases, dynamic diseases, enzyme kinetics, biological oscillators, and switches.

Letter grade only. Discussion included.

QSB 281: Advanced Computational Biology [4]
Introduction to the principles and application of computational simulations and modeling in biology, ranging from bioinformatics to computational cell biology. Topics to be covered include genome sequence analysis and annotation, phylogenic analysis, protein structure prediction, molecular modeling, and docking and simulations of metabolic and regulatory networks. Graduate requirements include advanced discussion section led by instructor and computational biology project.

Discussion and laboratory included.

QSB 282: Bioinformatics [5]
Graduate level introduction to tools, algorithms, statistics, and databases used in bioinformatics, emphasizing an open-source, command-line toolbox approach. Topics covered as in BIO 182, plus critical assessment of bioinformatics literature, introduction to Perl, and an independent research project. Mandatory computer laboratory, for which prior programming experience helpful but not assumed.

Discussion and laboratory included.

QSB 283: Population Genetics [3]
The various factors that affect gene flow and frequency within a population. Theories of selection, neutrality, drift, hitchhiking, recombination, mutation, isolation, in-breeding, and selfish genetic elements are taught along with statistical tests and experimental methods for detecting these forces.

Letter grade only. Discussion included.

QSB 290: Current Topics in Quantitative and Systems Biology [3]
Discussion, reading, and study that exposes students to current research directions in the field; student-led presentation, analysis, and discussion of reading assignments from the scientific literature.

Letter grade only.

QSB 291: Quantitative and Systems Biology Seminar [1]
Seminar series covering various topics in quantitative and systems biology presented by QSB Graduate Group faculty and visiting speakers.

Letter grade only. May be repeated for credit.

QSB 292: Quantitative and Systems Biology Group Meeting [1]
Meetings to describe current progress and research plans lead by individual QSBGG faculty.

Letter grade only. May be repeated for credit.

QSB 293: Quantitative and Systems Biology Journal Club [1]
Student-led presentation, analysis, and discussion of reading assignments from the scientific literature.

Letter grade only. May be repeated for credit.

QSB 294: Responsible Conduct of Research [1]
Seminar covering responsibilities and expectations for researchers as well as advice for success in graduate school and science careers, required for NIH-funded graduate students.

Satisfactory/Unsatisfactory grading only.

QSB 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

QSB 296: Professional Skills Development [1]
Exposes graduate students to some of the more critical skill sets to enhance their professional development. Topics to be covered will consist of (but not limited to): 1) Writing abstracts, 2) Writing a manuscript, 3) writing grants, 4) research presentations (oral and poster), 5) lecture presentation, 6) critical scientific evaluation, 7) manuscript review, and 8) developing a CV

Satisfactory/Unsatisfactory grading only.

QSB 297: Systems Biology: From Molecules to Metabolic Networks [3]
A rigorous introduction to the theories, tools, and applications of systems biology. The course is organized around the biological flow of information (i.e. the Central Dogma) from DNA to RNA to proteins, then extending into metabolic and cellular networks. Each component includes an introduction to the experimental and high throughput approaches for generating large datasets, then continues with the theory, algorithms, and computational approaches for their analysis. Data for analysis will come from ongoing systems biology projects taking place in the Instructor's lab (genomics, metagenomics, metabolomics) as well as those of collaborators at UC Merced and other nearby institutions (transcriptomics, proteomics). The course will take advantage of presentations by guest lecturers with expertise in one of the many aspects of systems biology, or one of the sciences upon which it crucially depends.

Letter grade only. QSB 297L Systems Biology lab is a co-requisite for enrolling in QSB 297, though may be opted out of by instructor permission if students have taken coursework covering the material of QSB 297L.

QSB 297L: Systems Biology Lab [1]
Provides the mathematical and computational foundations necessary to understand apply and advance the tools of modern systems biology.

Prerequisite: Graduate standing; QSB 297 is co-requisite. Students with previous coursework that covers the topics of QSB 297L can opt out of 297L by instructor's permission only. Letter grade only.

QSB 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. May be repeated for credit.

QSB 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Grading option is instructor preference. May be repeated for credit.

QSB 399: University Teaching [1]
Centered on a student's classroom experiences as a Teaching Assistant in an undergraduate Biological Sciences course. Provides a faculty-directed opportunity to implement teaching practices presented in the course Teaching and Learning in the Sciences. Involves video-taping of teaching, peer review, and weekly meetings with faculty.

Prerequisite: Must hold at least a 25%-time appointment as a Teaching Assistant for an undergraduate course in Biological Sciences. QSB 201 or MATH 201 or (Teaching and Learning in the Sciences) are co-requisites. Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit once. Discussion and laboratory included.

SOCIAL AND COGNITIVE SCIENCES

SCS 090X: Freshman Seminar [1]
Examination of a topic in the social, behavioral and cognitive sciences.

May be repeated for credit once.

SCS 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

SCS 098: Lower Division Directed Group Study [1-5]
Instructor directed study for groups of lower division status.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit once.

SCS 099: Lower Division Individual Study [1-5]
Instructor directed study for groups of lower division status.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit once.

SCS 140: Psychology and Economics [4]
A review of psychological and economic research on departures from perfect rationality, self-interest, and other classical assumptions of economics. The implications of these new findings for classical economics are explored.

Prerequisite: PSY 001 and ECON 001. Discussion included.

SCS 145: Second Language Learning and Bilingualism [4]
Issues in second language acquisition, including processing of linguistic information by bilinguals (perception, recall, translation), structure of bilingual discourse, child bilingualism, language maintenance or shift, with particular focus on the North American Context.

Prerequisite: PSY 001. Discussion included.

SCS 192: Integrative Topics [4]
Special topics that integrate theory or research from more than one discipline in the social and behavioral sciences.

Prerequisite: PSY 001 or ECON 001 or SOC 001 or POLI 001 or consent of instructor. May be repeated for credit once.

SCS 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

SCS 198: Upper Division Directed Group Study [1-5]
Group study for upper division students.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit three times.

SCS 199: Upper Division Individual Study [1-5]
Individual directed study for upper division students.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit three times.

SCS 210: Philosophy of Cognitive Science [4]
Consideration of philosophical and foundational issues in cognitive science, such as: behaviorism, functionalism, the Turing Test, the Chinese Room argument, the nature of cognitive architecture, animal cognition, connectionism vs. symbolic artificial intelligence, consciousness, the self, free will, embodiment, and ethics.

Letter grade only. Discussion included.

SCS 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

SCS 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

SCS 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/Unsatisfactory grading only. May be repeated for credit.

SOCIOLOGY

SOC 001: Introduction to Sociology [4]
The study of groups, culture, collective behavior, classes and caste, community and ecology, role, status, and personality.

Discussion included.

SOC 009: Community Mobilization and Politics [4]
Examination of political and social mobilization at the local level, including strategies for organization and advocacy.

Discussion included.

SOC 010: Statistics for Sociology [4]
Introduces students to the logic and use of statistical techniques in sociological research. By the end of the course, students will have the tools to appreciate and evaluate social research, and a foundation for conducting statistical social research themselves.

Prerequisite: MATH 005 or equivalent score on the Math Placement Exam. Letter grade only. Laboratory included.

SOC 015: Sociological Research Methods [4]
Provides students with a basic understanding of how to conduct social science research. Topics will include the logic of research design, issues of conceptualization and measurement, the range of data collection methods available to social scientists, and what social scientists do with data once they have collected it.

Prerequisite: Sophomore standing. Letter grade only. Discussion included.

SOC 020: Social Problems [4]
Examine the perceptions, theories, arguments, and proposed solutions to the most vexing social issues. Explanations of these problems can be grouped into micro, meso, and macro levels of analysis. In addition, for the last 100 years researchers have examined the overlap between different social problems.

Discussion included.

SOC 030: Social Inequality [4]
Examine the main classical and modern explanations of the causes of social, economic and political inequality. Issues include: power; processes that create/maintain inequality, the central axes of inequality in society (race/class/gender); consequences of inequality for individuals and groups; how policy can mitigate or exacerbate inequality.

Discussion included.

SOC 035: Introduction to Political Sociology [4]
The most pressing issues of our time are addressed via the political system. This course considers the many processes that influence the political system and political outcomes. By drawing on the insights of sociology, we will better understand these processes and how the political system works.

Discussion included.

SOC 036: Globalization [4]
Surveys major global social trends over the last few centuries. Specifically, we examine the rise of bureaucracy, industrial capitalism, and national social movements/revolutions to assist us in comprehending current social trends such as the network society, neo-liberal economic restructuring, international social movements, and global conflict.

Letter grade only. Discussion included.

SOC 070: Introduction to Crime and Deviance [4]
Examines the process of criminal justice in the US and address major theories of crime and deviance. In addition: how individuals and social groups are processed through the criminal court system; historical changes in correctional philosophy and organizational structure; inmate socialization, and social environment changes in U.S. prisons.

Discussion included.

SOC 090X: Freshman Seminar [1]
Examination of a topic in sociology.

May be repeated for credit once.

SOC 092: Internship in Sociology [1-4]
Provides oversight and structure for a student's internship in a field related to sociology in community organizations, professional research projects, etc. connected to the study of sociology. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of sociology.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

SOC 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

SOC 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SOC 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SOC 100: Sociological Theory [4]
Sociological theory explores many big questions that people have pondered for centuries, including inequality and why it is tolerated, social change and how it occurs, and social order and how it is maintained. This course provides an introduction to sociological theory, examining both classic and contemporary schools of sociological thought.

Prerequisite: Junior standing and SOC 001 and (any additional lower division SOC course). Letter grade only.

SOC 110: Social Movements, Protest and Collective Action [4]
Introduction to the social scientific study of social protest (meaning all forms of non-routine, or contentious politics) and collective action. Examines organized collective efforts to promote or resist change in society that rely, in some part, on non-institutionalized forms of political action.

Prerequisite: POLI 001 or SOC 001 or PUBP 001 or consent of instructor.

SOC 111: Environmental Sociology [4]
Provides an overview of major issues in the field of environmental sociology. Students will learn to critically evaluate the dominant paradigms explaining environmental crisis. The course draws from a number of prominent environmental issues and case studies.

Prerequisite: SOC 001 or POLI 001. Letter grade only.

SOC 115: Political Sociology [4]
Sociological analysis of types of political organization and action and their relations to elements of social life. Topics include: Social movements, voting, interest group politics, protest behavior, revolutions, human rights, global political diffusion, and other elements of the interaction between the political structure and everyday life.

Prerequisite: SOC 001 or POLI 001 or PUBP 001. Letter grade only.

SOC 118: Hate Crime [4]
Examines the causes and consequences of hate crimes, as well as the social contexts within which they occur.

Prerequisite: SOC 001 or SOC 070. Letter grade only.

SOC 120: Sociology of Culture [4]
The sociology of culture is both an approach to, and a subject within sociology. This course will explore central themes and issues in the sociology of culture, such as: What is the relation of the cultural forms studied by humanists to the social structures studied by sociologists and political scientists?

Prerequisite: SOC 001 or ANTH 001 or POLI 001 or ECON 001. Letter grade only.

SOC 130: Social Stratification [4]
Classical and modern explanations of the causes of social, economic and political inequality. Issues include: the central axes of inequality in society (race/class/gender); power; processes that create/maintain inequality; and, the consequences of inequality for individuals and groups.

Prerequisite: SOC 001 or SOC 030 or consent of instructor. Letter grade only.

SOC 131: Urban Inequality [4]
Examines a small selection of the work on urban poverty in the United States in a seminar setting. We examine in depth theories behind the evolution of the urban poor, as well as the impact of poverty upon individuals.

Prerequisite: SOC 001 or SOC 003 or SOC 008 or POLI 001 or PUBP 001. Letter grade only.

SOC 132: Sociology of Education [4]
Focuses on how social forces (such as politics, economics, demographics and institutional context) create variation in school practices, and how variation in school practices affects individual student achievement and behavior. Students will also become familiar with presenting, interpreting, and discussing public education data.

Prerequisite: SOC 001 or SOC 030 or consent of instructor. Letter grade only.

SOC 134: Sports and Society [4]
Sports are often dismissed as unimportant to society's working. However, some of society's most important moments, racial integration (Jackie Robinson), gender equality (Title IX), and recognition of new nations (Olympics) have been through sports. We examine the dynamics sports play in society, focusing on issues of race, gender and nationality.

Prerequisite: SOC 001 or ANTH 001 or POLI 001 or consent of instructor.

SOC 140: Organizational Behavior [4]
Examines the evolution of the modern organization, focusing on approaches to corporate strategy and to managing employees. We read social scientific analyses and case studies to trace the history of management, and study social

science perspectives that question the efficiency and the equity of current organizational practices.

Prerequisite: SOC 001 or ECON 001 or POLI 001. Letter grade only. Discussion included.

SOC 150: Self and Society [4]
Presents an overview of one fundamental topic in the sociological approach to social-psychology, the shaping of consciousness by interaction. Beginning with classical texts, we will then examine a set of contemporary works, arranged in order of the degree to which psychology is made fundamentally social.

Prerequisite: SOC 001 or PSY 001. Letter grade only.

SOC 155: Sociology of the Family [4]
Examines the family in a larger social context. The course will explore sociological perspectives on the family, investigate the diversity that families have in society, and explore inequality both within the family and between families.

Prerequisite: SOC 001. Letter grade only.

SOC 160: Gender and Society [4]
The role gender plays in structuring social lives. We begin by discussing sociological theories of gender, gender socialization/parenting, gender identity and intersections of gender and sexuality. We then examine gender on an institutional and systemic level-focusing on how organizations, such as work, education, the law, and politics are gendered.

Prerequisite: SOC 001 or consent of instructor. Letter grade only. May be repeated for credit three times.

SOC 161: Sociology of Sexuality [4]
Focus on the social construction of sexuality and on sexual behavior and demographic trends. We will also study the intersection of sexuality and social institutions, as well as the politics of sexuality.

Prerequisite: SOC 001 or SOC 030 or consent of instructor. Letter grade only.

SOC 170: Qualitative Research Methods [4]
Introduces techniques of, and approaches to, qualitative research. We will explore research design issues including developing research questions, selecting methods, and the ethics of research. We will then examine the collection, analysis, and presentation of qualitative data.

Prerequisite: SOC 001 or ANTH 001 or POLI 001. Letter grade only.

SOC 175: Topics in Advanced Sociological Research Methods [4]
Provides students with advanced training in the process of sociological research. During the semester students will develop the skills and background knowledge needed to plan and organize sound research projects of their own, and critique others' research.

Prerequisite: SOC 001 and SOC 015, with a grade of B or better. Letter grade only. May be repeated for credit once.

SOC 180: Advanced Issues in Race and Ethnicity [4]
Examines in depth the main classical and modern explanations of the issues surrounding Race and Ethnicity. Issues include: Power; processes that create/maintain inequality, biological vs. social constructions of race, race and ethnicity in the age of conquest, race and ethnicity in modern society.

Prerequisite: SOC 001 or PUBP 001 or POLI 001 or ANTH 001. Letter grade only.

SOC 181: Chicanos in U.S. Society [4]
Aims to achieve a multi-disciplinary understanding of the processes and experiences currently facing the Chicana/o population in the United States.

Prerequisite: SOC 001 or ANTH 001 or POLI 001 or LIT 060. Letter grade only.

SOC 185: Topics in Sociology [4]
Intensive treatment of a special topic or problem in sociology.

Prerequisite: SOC 001. May be repeated for credit three times.

SOC 192: Internship in Sociology [1-4]
Provides oversight and structure for a student's internship in a field related to sociology in community organizations, professional research projects, etc. connected to the study of sociology. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of sociology.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

SOC 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

SOC 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SOC 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPANISH

No credit is allowed for completing a less advanced course after successful completion of a more advanced course in the foreign languages. This applies only to lower division foreign language courses, not upper division courses.

SPAN 001: Elementary Spanish I [4]
Introduction to speaking, reading, writing, and understanding Spanish. Classes will be conducted in Spanish.

Letter grade only.

SPAN 002: Elementary Spanish II [4]
Introduction to speaking, reading, writing, and understanding Spanish. Classes will be conducted in Spanish.

Prerequisite: SPAN 001 or equivalent score on the Spanish Placement Exam. Letter grade only.

SPAN 003: Intermediate Spanish I [4]
Review of Spanish grammar with emphasis on building speaking and writing skills and on readings to build cultural understanding. Classes conducted in Spanish.

Prerequisite: SPAN 002 or equivalent score on the Spanish Placement Exam. Letter grade only.

SPAN 004: Intermediate Spanish II [4]
Review of Spanish grammar with emphasis on building speaking and writing skills and on readings to build cultural understanding. Classes conducted in Spanish.

Prerequisite: SPAN 003 or equivalent score on the Spanish Placement Exam. Letter grade only.

SPAN 010: Spanish for Heritage Speakers I [4]
For native speakers with limited experience in grammar and composition. Emphasis on formal language study and writing. Classes and discussion conducted in Spanish.

Prerequisite: Passing score on the Spanish Placement Exam.

SPAN 011: Spanish for Heritage Speakers II [4]
For native speakers with limited experience in grammar and composition. Emphasis on formal language study and writing. Classes conducted in Spanish.

Prerequisite: SPAN 010.

SPAN 090X: Freshman Seminar [1]
Examination of a topic in Spanish.

May be repeated for credit.

SPAN 092: Internship in Spanish [1-4]
Provides oversight and structure for a student's internship in a field related to Spanish in community organizations, professional research projects, etc. connected to the study of Spanish. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Spanish.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

SPAN 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

SPAN 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPAN 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPAN 103: Spanish Composition and Conversation [4]
To develop a student's abilities to communicate in spoken and written Spanish, we emphasize the importance of the interaction between writer, reader, purpose and message. We focus on the four major modes of writing: description, narration, exposition and argumentation. Oral practice is also be a major component in this course.

Prerequisite: SPAN 004 or SPAN 011. Letter grade only.

SPAN 105: Hispanic Cultures I [4]
The cultures of the Hispanic world from an interdisciplinary perspective. Covers the period ending in the nineteenth century, emphasizing conversation and composition.

Prerequisite: SPAN 103 or consent of instructor.

SPAN 106: Hispanic Cultures II [4]
Hispanic cultural manifestations from an interdisciplinary perspective. Covers from the nineteenth century to the present, emphasizing conversation and composition.

Prerequisite: SPAN 103 or consent of instructor.

SPAN 110: Spanish Linguistics [4]
Introduction to the study of key areas of Spanish Linguistics such as the sound system, word form, syntactic patterns, the development of language, and regional and social variations.

Prerequisite: SPAN 103 or consent of instructor. Letter grade only.

SPAN 141: Spanish for Health Professionals [4]
Specialized Spanish vocabulary and expressions that health-care professionals need to communicate with Hispanic patients and to carry out research in that language. Includes the reading of medical essays and composition.

Prerequisite: SPAN 004 or SPAN 011 or equivalent score on the Spanish Placement Exam.

SPAN 142: Spanish for Business and Management [4]
Specialized Spanish vocabulary and expressions used to carry out business with Hispanic individuals or companies. Addresses cultural awareness and includes the reading of essays that deal with the course's topics. In addition, students learn how to write professional letters and other documents in Spanish.

Prerequisite: SPAN 004 or SPAN 011 or equivalent score on the Spanish Placement Exam.

SPAN 180: Topics in Hispanic Languages and Cultures [4]
In-depth study of Spanish Languages and/or Hispanic Culture. Possible topics include Latin American and Spanish Film, the Mexican Corrido, Gender and Latin American Popular Music.

Prerequisite: SPAN 103 or equivalent score on the Spanish Placement Exam. Permission of instructor required. Letter grade only. May be repeated for credit twice.

SPAN 192: Internship in Spanish [1-4]
Provides oversight and structure for a student's internship in a field related to Spanish in community organizations, professional research projects, etc. connected to the study of Spanish. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of Spanish.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

SPAN 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

SPAN 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

SPAN 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

UNDERGRADUATE STUDIES

USTU 010: Introduction to Undergraduate Studies [1]
Combining weekly, large-group, interactive lectures and small-group discussion sessions, we focus on topics related to navigating campus life and strategies for effective learning at UC Merced. Reflective writings and engagement in activities on campus that promote self-empowerment and academic success play key roles in this course.

Prerequisite: Freshman standing only or consent of instructor. Pass/No Pass grading only. May be repeated for credit twice.

USTU 092: Internship in Undergraduate Studies [1-4]
Provides oversight and structure for a student's internship in a field of undergraduate studies in community organizations, professional research projects, etc. connected to the study of undergraduate studies. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of undergraduate studies.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

USTU 110: Undergraduate Studies: Tutor Training [4]
Students will analyze and apply current and traditional pedagogy and best practices of tutoring undergraduates in different disciplines. Principles of active learning and strategies for managing peer groups will be examined in the context of tutoring diverse student populations. Applications of learning theory will occur in peer-critiqued practicums.

Prerequisite: WRI 110 or upper-division standing (at least 60 units). Letter grade only.

USTU 192: Internship in Undergraduate Studies [1-4]
Provides oversight and structure for a student's internship in a field of undergraduate studies in community organizations, professional research projects, etc. connected to the study of undergraduate studies. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of undergraduate studies.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

WORLD CULTURES AND HISTORY

WCH 100: Topics in Area Studies [4]
In-depth study of the history and cultural, political, and economic systems of a region.

May be repeated for credit three times.

WCH 190: World Cultures and History Proseminar: Research [4]
Capstone course for majors. Students conduct research under faculty supervision to culminate in a senior thesis. Required of all World Cultures and History majors.

Prerequisite: Senior standing. Pass/No Pass grading only.

WCH 191: World Cultures and History Proseminar: Senior Thesis [4]
Capstone course for majors. Completion of a senior thesis; extensive writing required. Required of all World Cultures and History majors.

Prerequisite: Senior standing and WCH 190. Letter grade only.

WCH 192: Public Research Project in World Cultures and History [1-4]
Directed individual or group project designed around need of an external agency for research and public communication on an issue of vital public interest. End product may be in the form of a written report, interpretive text for the public, website, etc. Extensive writing is required.

Letter grade only.

WCH 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

WCH 198: Upper Division Directed Group Study [1-5]
Directed group study and research, under the direction of WCH faculty.

Permission of instructor required. Letter grade only. May be repeated for credit three times.

WCH 199: Upper Division Individual Study [1-5]
Directed individual study and research, under the direction of WCH faculty, in area not normally covered in the WCH curriculum.

Permission of instructor required. Letter grade only. May be repeated for credit.

WCH 200: The University as an Institution [4]
Provides students with the capacity to critically analyze the university as an institution embedded in American society. Students address issues such as the corporate funding of university research, the relationship between academia and foreign policy, and what happens when professors write controversial books.

Letter grade only.

WCH 201: Research Proseminar [4]
Introduces graduate students to the different methods of research employed in the disciplines represented in World Cultures and History. Students work on specific topics pertaining to their research, and they approach them using a variety of those methods covered in class.

Letter grade only.

WCH 202: Theories and Methods in the Study of Cultures [4]
Seminar introduces graduate students to the wide variety of theories and methods employed in the disciplines represented in World Cultures and History. It also serves to prepare students for their Comprehensive Examination. Students work with members of the Examination Committee to compose reading lists tailored to their research interests.

Letter grade only. May be repeated for credit once.

WCH 203: The Historian's Craft [4]
Various techniques of research and writing used by historians, from Thucydides to the so-called

revisionists of today's "culture wars," and the changing audience of the historian.

Letter grade only.

WCH 210: Topics in California Studies: Constructing California [4]
Major texts that have helped to construct our understanding of and attitude toward California's environment, with an interdisciplinary emphasis that includes publications in environmental policy and law, conservation, quality assessment, landmark legal and historical cases, as well as fiction, poetry and non-fiction.

Letter grade only.

WCH 211: Mindscapes: Ecology of Cultural Landscapes [4]
Focus on the methodologies of research aimed to interpret, reconstruct and communicate cultural landscapes according to an eco-anthropological approach: the ecosystem is constructed through relations between organisms and environment. Examples and case studies of heritage and archaeological landscapes from Asia, Africa and Europe will be analyzed and interpreted.

Letter grade only.

WCH 220: Chicano/a Literature [4]
Multidisciplinary analysis of Chicano/a literature. Main aspects covered include: Chicano/a literary history (including issues of canonicity and reception), bilingualism and literature (including both stylistic and sociolinguistic approaches), ethnicity and race, gender parameters, the aesthetics of the borderlands, class and regional variations, migration and diaspora, film and folklore, and the journalistic tradition.

Letter grade only. May be repeated for credit twice.

WCH 221: U.S. Latino/A Literature [4]
In-depth study of U.S. Latino/a literature and its history. Through the analysis of works from different genres, the student is exposed to the main themes, techniques, styles, etc. used by Latino/a authors. Students will present orally on selected topics and secondary bibliography, and they will write an original research paper.

Letter grade only.

WCH 225: Philosophy and Theory [4]
Seminar explores the interdisciplinary common ground between philosophy and literary theory. Authors studied may include Husserl, Heidegger, Gadamer, Iser, Jauss, Fish, Deleuze, Sartre, Wittgenstein, Kant, and Aristotle, among others. Course is complemented by a practical application of these theories to selected literary texts.

Letter grade only.

WCH 229: Critical Theory and Film [4]
Interdisciplinary study of contemporary literary theories and modern critical thought, and its potention for text and film analysis.

Letter grade only.

WCH 230: Topics in Humanities and New Media [4]
How emerging technologies are used to record, analyze and communicate information about history and culture; read critical theory in order to understand the characteristics of text, image, and interactive media; and survey the future challenges and prospects for new media in the humanities.

Letter grade only. May be repeated for credit.

WCH 231: The Great Depression in History and Literature [4]
Focusing on the turbulent decade of the 1930s, we use the lens of history and literature to explore how events from 1929-1941 helped shape modern America. Particular attention is paid to the impact of these years upon California and the West.

Letter grade only.

WCH 240: Topics in United States Social and Cultural History [4]
Selected topics in U.S. social and cultural history through a reading of both classic and newer studies in areas such as race, ethnicity, class, and gender. Students are exposed to both theoretical approaches to these issues as well as monograph case studies.

Letter grade only.

WCH 245: China and World History [4]
Topics concerning the middle period of imperial China, the world's most durable and successful agrarian empire. Second, course locates China in world history, raising historiographical questions about the study of a regional history in both a national and a global tradition.

WCH 248: Race, Empire, and US Foreign Policy [4]
U.S. foreign policy from the 1890s through the present using the lenses of empire and race. Students are introduced to theories and methods within the study of U.S. foreign policy in the course of studying events ranging from the Spanish American War of 1898 to the Iraq war.

Letter grade only.

WCH 250: The Cold War, 1941 - 1991 [4]
The political, cultural, and intellectual history of America's confrontation with Communist at home and abroad, from U.S. entry into the second World War to the collapse of the Soviet Union and its aftermath.

Letter grade only.

WCH 258: Hispanic and Anglo-American Modernisms [4]
Study through novel of principal characteristics of Hispanic Modernismo and Anglo-American Modernism. We examine the representation of the city in literature through the works of Pio Baroja, Valle Inclan, James Joyce and John Dos Passos, among others. Texts are analyzed through key urban literature historians/critics such as Lewis Mumford, Walter Benjamin, Raymond Williams, Burton Pike and Richard Lehan. Seminar is taught in English.

Letter grade only.

WCH 260: Social Memory [4]
Theoretical exploration of the practices, sites, and functions of social memory. Topics include the social construction of the past; how societies remember; the relationship between history and memory; collective identity; oral history; tradition and modernity; public memory; nostalgia; amnesia; and the politics of memory.

Letter grade only.

WCH 262: Material Culture [4]
Multidisciplinary examination of material objects and the role artifacts play in human social relations, identity, and representation in both the past and present. Explores the range of production and use of material objects, including theories of material culture, technology, identity, class, gender, value, style, meaning, memory, agency, commodification, collecting, and museums.

Letter grade only.

WCH 270: Transatlantic Utopias in Literature and Culture [4]
Comparative and trans spatial approach to examining Utopian constructions in literature. Using both primary sources such as novels, and secondary readings in theory and criticism, course seeks to examine the role such constructions play in historical and contemporary understandings of society.

Letter grade only. May be repeated for credit once.

WCH 280: American Nature Writing and Literature of the Environment [4]
Seeks to understand American attitudes toward natural and constructed landscapes by examining various modes of literary responses to the American environment, including poetry, nonfiction, and fiction. Attention is given to historical and political movements and texts.

Letter grade only.

WCH 290: Teaching Pedagogy and Practice [4]
Designed for graduate student teaching assistants. Discussion focuses on pedagogical issues such as grading, syllabus design and assignments, as well as on classroom practices. Students meet at frequent intervals, and they have the chance to meet with professors in their areas of expertise and to meet as a group.

WCH 291: Themes in Cultural Studies [4]
Exploration of various themes in cultural studies. Course reading list is drawn from foundational texts as well as contemporary writings drawn from feminist theory, gender studies, and critical theory.

Letter grade only.

WCH 295: Graduate Research [1-12]
Supervised research.

Permission of instructor required. May be repeated for credit.

WCH 296: Research MA Thesis [1-6]
Research and writing of M.A. thesis.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only.

WCH 297: Research for PhD Dissertation [2-12]
Research and writing of Ph.D. dissertation. At least one 297 course is required during each year following completion of qualifying examinations.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

WCH 298: Directed Group Study [1-12]
Group project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

WCH 299: Directed Independent Study [1-12]
Independent project under faculty supervision.

Permission of instructor required. Satisfactory/ Unsatisfactory grading only. May be repeated for credit.

WORLD HERITAGE

WH 001: Introduction to World Heritage [4]
Introduction to the concept of cultural and natural World Heritage. Topics include international policy in heritage management, the role of governments and organizations in identifying and protecting heritage, methods for documenting and interpreting heritage sites, and cultural and intellectual property ethics.

Discussion included.

WH 002: Cyber Heritage [4]
An examination of the new forms of communication and interpretation provided by web 2.0, viewed in the context of the creation of virtual heritage on the web. Second Life will be used to explore the social and technological dimensions and to experiment with a cyber-anthropological approach.

Letter grade only. Laboratory included.

WH 003: International Heritage [4]
Cultural heritage is studied in relation to legal and management issues, cultural heritage protection, and its principal organizations and institutions. Students will analyze the key principles and policies through the examination of international heritage institutions, conventions and charters.

Letter grade only. Discussion included.

WH 092: Internship in World Heritage [1-4]
Provides oversight and structure for a student's internship in a field of world heritage in community organizations, professional research projects, etc. connected to the study of world heritage. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of world heritage.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

WH 095: Lower Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

WH 098: Lower Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WH 099: Lower Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WH 100: Virtual Heritage and World Heritage [4]
Introduction to virtual heritage and world heritage, definitions and methods. Students learn how to describe, analyze, contextualize, preserve, and communicate information derived from heritage resources.

Prerequisite: WH 001 or consent of instructor.

WH 110: Reconstructing Ancient Worlds [4]
Methodological issues concerning the reconstruction and depiction of the ancient world; study of validation processes for virtual reconstruction; epistemological and anthropological issues. Techniques of documentation, reconstruction, 3D modeling, computer graphics, virtual reality.

Prerequisite: WH 001 or consent of instructor. Laboratory included.

WH 120: 3D-Digging [8-12]
Interprets an archaeological excavation in 3D using advanced technologies for recording and visualizing structures, objects and stratigraphies. 3D interpretation of an archaeological site creates new perspectives of research and training, with the experimental possibility to simulate archaeological data in a virtual environment.

Prerequisite: WH 001 or WH 002 or WH 003 or WH 110 or ANTH 003 or ANTH 001 or ANTH 130 or ANTH 149 or ANTH 134 or ANTH 140 or ANTH 142 or ANTH 146. Letter grade only.

WH 130: Introduction to Digital Archaeology [4]
Nowadays archaeology is a digital science: from the fieldwork to the laboratory, to the web or virtual reality systems, the data generate a very complex workflow. The course will involve the students in the comprehension of the impact of digital technologies in archaeology.

Prerequisite: WH 001 or WH 002 or WH 003 or WH 110 or ANTH 001 or ANTH 003 or ANTH 130 or ANTH 134 or ANTH 140 or ANTH 142 or ANTH 146. Permission of instructor required. Letter grade only.

WH 140: Cultural Heritage Policy and Practice [4]
Critical examination of the legal, practical, and ethical aspects of cultural heritage management in the United States and abroad. Topics include cultural resource management in public and private contexts, participation of stakeholders, the application of anthropological knowledge, and public outreach.

Prerequisite: ANTH 003 or WH 001 or junior standing or consent of instructor.

WH 192: Internship in World Heritage [1-4]
Provides oversight and structure for a student's internship in a field of world heritage in community organizations, professional research projects, etc. connected to the study of world heritage. Requires students to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of world heritage.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

WH 195: Upper Division Undergraduate Research [1-5]
Supervised research.

Permission of instructor required. May be repeated for credit.

WH 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WH 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRITING

WRI 001: Academic Writing [4]
Development of critical reading, thinking, and academic writing ability. Intensive practice in analysis of college-level texts and in expository writing and revision. Section placement based on the student's UC Entry Level Writing Requirement Exam score. Completion with a grade of C or better meets University of California Entry Level Writing Requirement.

Letter grade only.

WRI 001A: Intensive Academic Writing [2]
For students who are repeating WRI 1, or students entering with AWPE scores of 4 or lower, we provide an intensive focus on academic language, including grammar, vocabulary, and editing practices.

Letter grade only. Not available for academic credit.

WRI 010: College Reading and Composition [4]
Development of college-level skills in effective use of language, analysis and argumentation, organization and strategies for creation, revision and editing.

Prerequisite: WRI 001 or passing score on the entry level analytical Writing Placement Exam or equivalent. Letter grade only.

WRI 011: Supplemental Instruction [1]
Supervised by a supplemental instructor, students will complete 1 unit of additional work on reading and writing aligned with the curriculum of another lower division Writing Program course (e.g., WRI 010) or writing-intensive course (e.g., CORE 001).

Permission of instructor required. Letter grade only. May be repeated for credit once.

WRI 025: Introduction to Creative Writing [4]
Introduction to the craft of writing poetry, fiction, and creative non-fiction. Students study literary devices and style by considering a variety of texts by published authors. In addition, we provide an opportunity to explore their own imaginative participation in the world around them. They also compose poems, short stories, and literary essays.

Prerequisite: WRI 010. Letter grade only.

WRI 030: Introduction to Professional Writing [4]
Students develop proficiency in forms of written communication typical in academic and professional settings. In addition, students perform critical analyses of texts within a variety of rhetorical modes. Assignments emphasize responsible and ethical practices in writing to communicate in the professional world.

Prerequisite: WRI 010. Letter grade only.

WRI 092: Internship in Writing [1-4]
Provides oversight and structure for a student's internship in a field related to writing in community organizations, professional research projects, etc. connected to the study of writing. Students are required to write an original research

paper or relevant product that demonstrates how the internship advanced their knowledge of writing.

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

WRI 095: Lower Division Undergraduate Research [1-5]

Supervised research.

Permission of instructor required. May be repeated for credit.

WRI 098: Lower Division Directed Group Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRI 099: Lower Division Individual Study [1-5]

Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRI 100: Advanced Writing [4]

Follows WRI 010 and continues to have an interdisciplinary emphasis. However, the emphasis is on the development of style, voice and syntax within writing projects. This could be considered a pre-professional writing course, and it includes readings and writing in creative nonfiction as well as writing for popular and academic periodicals.

Prerequisite: WRI 025 or WRI 030. Letter grade only.

WRI 101: Writing in the Disciplines: Psychology [4]

Intended for psychology majors and majors in closely related disciplines, this course refines a student's ability to analyze, synthesize, and explain complex information by producing professional written texts and oral reports for appropriate audiences. Using APA style, each student will also collaborate on a research project.

Prerequisite: WRI 010 or consent of instructor. Letter grade only.

WRI 105: Grammar and Style [4]

Basic principles of language study, including the key distinction between classifying and explaining linguistic forms and functions. Building on these principles of language study, students analyze texts of various genres and formats, ranging from literary to conversational to disciplinary discourse. No prior knowledge of grammar or linguistics is required.

Prerequisite: Junior standing and WRI 010. Letter grade only.

WRI 110: Tutor Training [4]

Students develop, understand and practice professional ethics as they gain experience in the tutoring process. The theoretical and practical parameters of how students learn to write, and pedagogies for working with second language students, and a diverse student population, including students with learning disabilities are addressed through readings, reflective journals, research, writing projects and a practicum.

Prerequisite: WRI 100. Letter grade only.

WRI 115: Topics in Science Writing [4]

To better understand the difficult process of explaining technical information in clear, accessible, non-technical language, students read widely in the scientific literature, including works by established science journalists and by prominent scientists who have written for the general public. Oral presentations and group projects complement various writing tasks.

Prerequisite: WRI 100. Letter grade only. May be repeated for credit twice.

WRI 116: Science Writing in Natural Sciences [4]

To improve their command of scientific discourse, students in the School of Natural Sciences read widely in scientific literature, including research published in established scientific journals and articles or books by prominent scientists who have written for the general public. Oral presentations and group projects complement various writing tasks.

Prerequisite: WRI 010. Permission of instructor required for non-science majors. Letter grade only.

WRI 117: Writing for the Social Sciences and Humanities [4]

Analysis and practice of various research methods and forms of writing in the social sciences and humanities including qualitative/ethnographic, quantitative, interpretive and theoretical. Writing projects such as literature reviews, proposals, case studies, scientific reports, interviews. Attention to disciplinary resources, formal conventions, graphics and style.

Prerequisite: (WRI 025 or WRI 030) and WRI 100. Letter grade only.

WRI 118: Management Communication Theory and Practice [4]

Students analyze and demonstrate effective managerial communication skills, with an emphasis on public speaking, presentations, and writing. Topics include business ethics, media relations, intercultural communication, interviewing, persuasion, and the visual representation of data. Extensive work in impromptu oral and written communication in various managerial, organizational, interpersonal situations.

Prerequisite: WRI 010 and ECON 001. Letter grade only.

WRI 119: Writing for Engineering [4]

Intensive practice in the presentation of technical subject matter. Students survey the range of audiences to which engineering communities respond, and explore variations in the style and logic of written discourse within the profession. Assignments may include technical reports, design projects, project proposals, press releases, oral presentations, and collaborative projects.

Prerequisite: WRI 010. Letter grade only.

WRI 120: Rhetorical Theory [4]

Intensive study in classical and contemporary theories of written rhetoric. The course will enable students to analyze, criticize and deploy rhetorical strategies via readings in rhetorical theory, application of theory to the criticism of texts, and the imitation and production of arguments.

Prerequisite: WRI 100 or consent of instructor. Letter grade only.

WRI 125: Topics in Creative Writing [4]

Provides an opportunity to pursue advanced work in creative writing. Each section focuses on one genre: poetry, fiction, drama, or creative nonfiction. Workshop format with a focus on student writing.

Prerequisite: WRI 100. Letter grade only. May be repeated for credit twice.

WRI 130: Topics in Professional Writing [4]

Specialized instruction in one aspect of Professional writing. Topics include, but are not limited to, Journalism, Technical Writing, Copy-Editing, Writing for the Internet, and Research for Writers. Class provides practical instruction in "real-world" writing scenarios, considering important factors such as clarity, tone, audience, ethics, and context.

Prerequisite: WRI 100. Letter grade only. May be repeated for credit twice.

WRI 131: Journal Production [1-2]

Intended for students working on the Undergraduate Research Journal, we examine issues of journal production in print and electronic forms, including editorial analysis of texts and principles of revision. Course work is adjusted to match each student's experience in publication.

WRI 100 recommended. May be repeated for credit four times.

WRI 140: Topics in Ethnic Writing [4]

Refines students abilities to analyze, synthesize, apply, and explain complex rhetorical forms for appropriate audiences. Intensive study in theories of oral and written rhetoric related to Chicana/o rhetorical discourses. The course emphasizes readings in rhetorical theory, criticism, and formal argument. Students will also submit a cumulative writing portfolio.

Prerequisite: WRI 100 or consent of instructor. Letter grade only.

WRI 141: Writing Narrative for Archaeology [4]

Integrates archaeological knowledge with narrative and analytical writing. Students develop research and writing skills while learning to use and disseminate knowledge gained by producing creative, culturally sensitive, and factually supported texts.

Prerequisite: ANTH 003 and WRI 010 or consent of instructor. Letter grade only.

WRI 150: Seminar in Creative Writing [4]

In this advanced workshop students will produce creative and critical work in one of the following genres: fiction, playwriting, poetry, or creative nonfiction.

Prerequisite: Junior standing and WRI 100 and (WRI 125 or WRI 130). Letter grade only. May be repeated for credit once.

WRI 155: Seminar in Professional Writing [4]

This seminar is based on case studies representing different contexts of professional writing. Specific attention will be devoted to technical writing for the representation of complex information in a form that is accessible to general readers. Elements of translation theory will also be reviewed.

Prerequisite: WRI 100 and WRI 130. Letter grade only.

WRI 160: Seminar in Editing [4]

This workshop course on editing examines grammar and style, documentation, manuscript solicitation, selection and review, as well as generating manuscripts. Concerns fundamental to editing, such as consistency of voice, integrity of the author's concepts, and use of multiple languages, will be included as part of the editorial process.

Prerequisite: WRI 100 and WRI 130 or consent of instructor. Letter grade only.

WRI 192: Internship in Writing [1-4]
Provides oversight and structure for a student's internship in a field related to writing in community organizations, professional research projects, etc. connected to the study of writing. Students are required to write an original research paper or relevant product that demonstrates how the internship advanced their knowledge of writing.

Prerequisite: Junior standing. Permission of instructor required. Pass/No Pass grading only. May be repeated for credit twice.

WRI 195: Upper Division Undergraduate Research [1-4]
Supervised research.

Permission of instructor required. May be repeated for credit.

WRI 198: Upper Division Directed Group Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

WRI 199: Upper Division Individual Study [1-5]
Permission of instructor required. Pass/No Pass grading only. May be repeated for credit.

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Carol Tomlinson-Keasey, Chancellor Emerita
1942-2009

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Licenciatura, Universidad de Sevilla; Ph.D., University of California, Santa Barbara

Second language acquisition, Hispanic women's literature, Hispanic culture, Puerto Rican literature and culture

ANDRES AGUILAR

Assistant Professor, School of Natural Sciences

B.S., Humboldt State University; Ph.D., University of California, Los Angeles

Molecular evolutionary/population genetics and conservation genetics

MARK ALDENDERFER

Dean of School of Social Sciences, Humanities and Arts, and Professor, School of Social Sciences, Humanities and Arts

B.A., Wake Forest University; M.A., Ph.D., Pennsylvania State University

Comparative archeological anthropology that examines the emergence of social inequality and subsequent long-term cultural transformation of forager societies, and cultural adaptations within high-elevation montane regions

KEITH E. ALLEY

Executive Vice Chancellor and Provost, and Professor, School of Natural Sciences

B.S., D.D.S., M.S., Ph.D., University of Illinois

Developmental neuroscience focusing on cellular mechanisms that assure scaling of neuronal populations with the targets they innervate, neuromuscular maturation and plasticity

PAUL ALMEIDA

Associate Professor, School of Social Sciences, Humanities, and Arts

B.A., University of California, Santa Cruz; M.A., University of New Mexico; Ph.D. University of California, Riverside

Social movement dynamics in historical and comparative perspective, to explain the conditions associated with the levels, forms, and outcomes of social movement activity in lesser-developed countries

SUSAN AMUSSEN

Professor, School of Social Sciences, Humanities and Arts

A.B., Princeton University; A.M., Ph.D., Brown University

Early Modern England, Women's History, especially early modern European Atlantic History

DAVID ARDELL

Assistant Professor, School of Natural Sciences

A.B., Harvard College; Ph.D., Stanford University

Computational biology of gene expression systems: their structure, function, evolution, and coevolution with genomes, functional and evolutionary bioinformatics of RNA and proteins, evolutionary genomics of prokaryotes

ROGER C. BALES

Professor, School of Engineering, and Director, Sierra Nevada Research Institute

B.S., Purdue University; M.S., University of California, Berkeley; M.S., Ph.D., California Institute of Technology

Hydrology, snow and ice, hydrochemistry, climate impacts on water resources, climate changes over polar ice sheets

MIRIAM BARLOW

Assistant Professor, School of Natural Sciences

B.S., University of Utah; M.S., Ph.D., University of Rochester

Evolution of bacteria, predicting the evolution of antibiotic resistance, testing evolutionary theory

IRENEE R. BEATTIE

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Tufts University; M.A., Ph.D., University of Arizona

Education, racial/ethnic and gender inequality, adolescent transitions to adulthood, law/policy

J. MICHAEL BEMAN

Assistant Professor, School of Natural Sciences

B.S., Yale University; Ph.D., Stanford University

Linking microbial ecological patterns to biogeochemical processes with a specific focus on the nitrogen cycle in coastal systems

ASMERET BERHE

Assistant Professor, School of Natural Sciences

B.Sc., University of Asmara; M.Sc., Michigan State University; Ph.D., University of California, Berkeley

Biogeochemistry, soil science, effect of changing environmental conditions on vital soil processes, especially the cycling and fate of essential elements in the critical zone

HARISH BHAT

Assistant Professor, School of Natural Sciences

A.B., Harvard University; Ph.D., California Institute of Technology

Applied mathematics, dynamical systems and applied analysis, waves in discrete/inhomogeneous/dispersive media, numerical analysis, and scientific computing

FRANCOIS BLANCHETTE

Assistant Professor, School of Natural Sciences

B.Sc., Universite de Montreal; Ph.D., Massachusetts Institute of Technology

Fluid mechanics and related numerical methods, focusing on sedimentation and multiphase flows

KATHERINE BROKAW

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Illinois Wesleyan University; B.A., M.A., University of Cambridge; Ph.D., University of Michigan

Early modern and medieval drama and poetry; performance theory; Shakespeare in contemporary performance; music in drama and poetry; religion and ritual.

PAUL BROWN

Professor, School of Social Sciences, Humanities and Arts

B.S. (2), University of California, Santa Barbara; M.S., Ph.D., University of Wisconsin, Madison

Health Economics, Comparative Effectiveness, and Health Services Research

LINDA CAMERON

Professor, School of Social Sciences, Humanities and Arts

B.S., University of California, Santa Barbara; M.S., Ph.D., University of Wisconsin, Madison

Health Psychology, Environmental Psychology

GREGG CAMFIELD

Professor, School of Social Sciences, Humanities and Arts

A.B., Brown University; Ph.D., University of California, Berkeley

Nineteenth-century American literature and culture, Mark Twain, American literary sentimentalism

ELLIOTT CAMPBELL

Assistant Professor, School of Engineering

B.S., M.S., Stanford University; Ph.D., University of Iowa

Sustainable energy, ecological design, bioenergy

STEFANO CARPIN

Associate Professor, School of Engineering

Laurea in Ingegneria Informatica, Ph.D., University of Padova, Italy

Robot algorithms, robot motion planning, randomized and distributed algorithms, cooperative multi robot systems, rescue robotics, Internet based simulations

MIGUEL CARREIRA-PERPINAN

Associate Professor, School of Engineering

B.Sc., M.Sc., Technical University of Madrid Spain; B.Sc., U.N.E.D. University, Spain; Ph.D., University of Sheffield, UK

Artificial intelligence, machine learning

ALBERTO E. CERPA

Assistant Professor, School of Engineering

Engineer Degree, Buenos Aires Institute of Technology; M.S. (2), University of Southern

California; Ph.D., University of California, Los Angeles

Computer networking and distributed systems, wireless sensor networks, topology control, wireless radio channel measurement and characterization, programming models, development of wireless test beds, Internet protocols, operating systems issues

YIHSU CHEN

Assistant Professor, Schools of Engineering and Social Sciences, Humanities and Arts

B.S., Tunghai University; M.S., Harvard University; Ph.D., Johns Hopkins University

Energy and environmental modeling, policy and health effect analyses

RAYMOND Y. CHIAO

Professor Emeritus, Schools of Natural Sciences and Engineering

B.A., Princeton University; Ph.D., Massachusetts Institute of Technology

Experimental and theoretical studies of nonlinear and quantum optics, gravitational radiation, nonlinear parametric effects, general relativity, the interaction of matter waves with gravity waves

WEI-CHUN CHIN

Assistant Professor, School of Engineering

B.S., M.S., National Tsing-Hua University, Taiwan; M.S.E., Ph.D., University of Washington

Cellular signaling, cellular engineering, polymer gel assembly, biopolymer gels

JINAH CHOI

Assistant Professor, School of Natural Sciences

B.S., University of California, Los Angeles; Ph.D., University of Southern California

Hepatitis C virus (HCV) and the mechanism of synthesis and functions of novel HCV proteins that are produced by programmed translational frame shifting, as well as how HCV replication might be regulated by endogenous and exogenous agents

MICHELLE M. CHOUINARD

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Berkeley; M.A., Ph.D., Stanford University

Mechanisms of conceptual change in the context of conversational interaction, the role of children's questions in conceptual development, development of biological knowledge, language acquisition, word learning

MICHAEL CLEARY

Assistant Professor, School of Natural Sciences

B.S., University of California, Davis; Ph.D., Stanford University

Stem cell biology

CARLOS COIMBRA

Associate Professor, School of Engineering

B.S. (2), University of Brasilia; M.S., Instituto Superior Tecnico of Lisbon; Ph.D., University of California, Irvine

Particle dynamics, stability of fluids, variable order modeling, turbulent multi-phase mixing layer, computational fluid dynamics, combustion

MICHAEL E. COLVIN

Professor, School of Natural Sciences and holder of the Art Kamangar Endowed Chair in Biology

S.B. (2), Massachusetts Institute of Technology; Ph.D., University of California, Berkeley

Computational and systems biology, biotechnology, computational chemistry

MARTHA H. CONKLIN

Professor, School of Engineering

B.A., Mount Holyoke College; M.S., Ph.D., California Institute of Technology

Biogeochemistry, metal cycling, surface water/shallow groundwater interactions, organic chemical distribution in soil and groundwater, chemical processes in snow, K-12 environmental education

LILIAN DAVILA

Assistant Professor, School of Engineering

B.S., M.S., Ph.D., University of California, Davis

Materials structure and simulations, nanoscale materials, environmental materials

MICHAEL DAWSON

Assistant Professor, School of Natural Sciences

B.Sc., University of Newcastle-Upon-Tyne, England; M.Sc., University of York, England; Ph.D., University of California, Los Angeles

Assembly of evolution of communities, population dynamics in relation to climate change, evolution of morphology and behavior at micro- and macro-evolutionary scales

BENOIT DAYRAT

Assistant Professor, School of Natural Sciences

M.S., Ecole Normale Supérieure, Paris; Ph.D., University of Paris VII and National Museum of Natural History

Understanding strategies for macroevolutionary transitions between aquatic and terrestrial habitats, taxonomy approaches that integrate phylogeography, genomics, and paleontology to examine lineages of species

ROBIN DELUGAN

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., Ph.D., University of California, Berkeley

Nation-state identity, globalization, immigration, transnationalism

SARAH DEPAOLI

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., California State University, Sacramento; Ph.D., University of Wisconsin, Madison

Quantitative Psychology

GERARDO C. DIAZ

Assistant Professor, School of Engineering

B.S., Universidad de Santiago de Chile; M.S., Ph.D., University of Notre Dame

Energy conversion systems, dynamic simulation and control of thermal systems, absorption chillers and heat pumps, vapor compression systems with alternate refrigerants

KYLE DODSON

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Texas, Austin; M.A., Ph.D., Indiana University

Political sociology, quantitative methodology, social change, religion and science, social stratification, and comparative sociology

YARROW DUNHAM

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Barbara; M.S., Ph.D., Harvard University

Child representation in social group concepts, automatic social judgment, social cognition, cognitive development

ARIEL ESCOBAR

Professor, School of Engineering

Bachelor's degree, ENET 28 "Republica Francesa", CONET; Electronic Engineer, Universidad Tecnologica Nacional, Argentina; Ph.D., University of the Republic (PEDECIBA) R.O.U.

Cardiac signaling, development of new optical and spectroscopic techniques for studying the subcellular dynamics of second messengers using fluorescent probes

KEVIN FELLEZS

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., San Francisco State University; Ph.D., University of California, Santa Cruz

U.S. national popular culture, African American music cultures (primarily jazz), Asian American popular culture, Pacific Island/ Hawaiian studies

HENRY JAY FORMAN

Professor, School of Natural Sciences

B.A., Queens College; Ph.D., Columbia University

Signal transduction, antioxidants and redox signaling, lung disease

MAURIZIO FORTE

Professor, School of Social Sciences, Humanities and Arts

Bachelor's degree, University of Bologna, Italy; Ph.D., University of Rome "La Sapienza", Italy

Digital and landscape archaeology and spatial technologies

CAROLIN FRANK

Assistant Professor, School of Natural Sciences

M.Sc., Uppsala University School of Engineering; Ph.D., Uppsala University

Evolutionary genomics of prokaryotes and fungi, evolution of host-parasite interactions, marine genomics and metagenomics

MARCOS GARCIA-OJEDA

Assistant Professor, School of Natural Sciences

B.S., University of Illinois; M.A., University of California, Santa Cruz; Ph.D., Stanford University

Stem cell research, cell biology, immunology, biotechniques, virology

TEAMRAT GHEZZEHEI

Assistant Professor, School of Natural Sciences

B.S., University of Asmara; Ph.D., Utah State University

Soil and environmental physics, multiphase flow and mechanics of porous media

SAYANTANI GHOSH

Assistant Professor, School of Natural Sciences

B.Sc., St. Stephen's College, India; B.A.,University of Cambridge; M.S., Ph.D., University of Chicago

Nanodevices, solid state materials, quantum information, optical science

JAN GOGGANS

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., California State University, Sacramento; Ph.D., University of California, Davis

American literature, American nature writing and literature of the environment, California literature and culture, literature of the Central Valley, literature and culture of the Great Depression, literature and photography

AJAY GOPINATHAN

Assistant Professor, School of Natural Sciences

M.Sc., Indian Institute of Technology, Kanpur; Ph.D., University of Chicago

Cell motility, actin bundle dynamics

QINGHUA GUO

Assistant Professor, School of Engineering

B.S., M.S., Peking University, China; Ph.D., University of California, Berkeley

Methodological and applied aspects of geographical information science

LAURA HAMILTON

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., DePauw University; M.A., Ph.D., Indiana University

Family and educational systems as factors that shape social stratification processes associated with gender, sexuality, and social class

THOMAS HANSFORD

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., Saint Mary's College of Maryland; Ph.D., University of California, Davis

Politics of the federal judiciary, campaigns and elections

THOMAS C. HARMON

Professor, School of Engineering

B.S., Johns Hopkins University; M.S., Ph.D., Stanford University

Contaminant transport in aquatic systems, soil and groundwater remediation, development and use of environmental sensors

STEPHEN HART

Professor, School of Natural Sciences

B.S., University of California, Berkeley; M.S., Duke University; Ph.D., University of California, Berkeley

Soil microbial ecology, global change, terrestrial biogeochemistry, ecosystem ecology, natural resources

NIGEL HATTON

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Virginia Tech; M.F.A., University of San Francisco; M.A., M.J., University of California, Berkeley; M.A., Ph.D., Stanford University

Nineteenth and twentieth century American and African American literature and culture, transnational American studies, literature and philosophy, Søren Kierkegaard, global human rights.

JASON HEIN

Assistant Professor, School of Natural Sciences

B.Sc., Ph.D., University of Manitoba, Winnipeg, Canada

Synthetic organic chemistry

EVAN HEIT

Professor, School of Social Sciences, Humanities and Arts

B.S.E., B.A., University of Pennsylvania; Ph.D., Stanford University

Categorization, inductive reasoning, recognition memory, computer simulation and mathematical modeling, intuitive statistical judgment

GREGG HERKEN

Professor Emeritus, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Cruz; Ph.D., Princeton University

History, American diplomatic history, nuclear history, history of Cold War

MATTHEW HIBBING

Acting Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Iowa; Ph.D., University of Illinois

American politics, political behavior, political psychology, public opinion, biology and politics, personality and political behavior, physiological traits and political attitudes, ideology, and perceptions of political opposition

E. DANIEL HIRLEMAN

Dean, School of Engineering

B.S.M.E., M.S.M.E., Ph.D., Purdue University

Laser/optical sensors and measurement methods for: surface defect and microfeature characterization; early detection of biohazards including chem/bio agents and food-borne pathogens; semiconductor manufacturing; combustion; and fluid mechanics. Global engineering education, cross-cultural global teams, and assessment.

LINDA HIRST

Associate Professor, School of Natural Sciences

B.Sc., Ph.D., Manchester University, UK

Experimental biophysics, soft condensed matter physics, molecular self-assembly and structure-function relationships

MICHAEL HOYT

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., State University of New York at Geneseo; M.A., Emerson College–Tufts University School of Medicine; M.A., Ph.D., Arizona State University

Health psychology from a biobehavioral perspective, focusing on interactions between psychological, social, and biological influence on adjustment and quality of life in terminal patients

HAIFENG HUANG

Assistant Professor, School of Social Sciences, Humanities, and Arts

B.A., Zhejiang University, China; M.P.P., University of California, Berkeley; M.A., Ph.D., Duke University

Political roles of new media and central local relations and principal agent problems of authoritarian politics

KATHLEEN HULL

Assistant Professor, School of Social Sciences, Humanities and Arts

M.A., University of Calgary; B.A., Ph.D., University of California, Berkeley

Cultural impact of colonial encounters of the native people in North America, interplay of demography and culture, ethnicity and ethnogenesis in pre-literate societies

BOAZ ILAN

Associate Professor, School of Natural Sciences

B.Sc., Ph.D., Tel Aviv University

Mathematics involved with real-world phenomena, with application to such areas as the control of intense laser beams and high-precision measurements of frequency and time, numerical computation

ROBERT INNES

Professor, School of Social Sciences, Humanities and Arts and holder of the Tony Coelho Endowed Chair in Public Policy

B.A., M.B.A., Ph.D., University of California, Berkeley

Environmental economics, law and economics, industrial organization, agricultural policy and markets, finance

ERIN JOHNSON

Assistant Professor, School of Natural Sciences

B.Sc., Carleton University, Ottawa, Canada; Ph.D., Queen's University, Kingston, Canada

Development and application of density-function theory

MARCELO KALLMANN

Associate Professor, School of Engineering

B.S., State University of Rio de Janeiro; M.S., Federal University of Rio de Janeiro; Ph.D., Swiss Federal Institute of Technology

Geometric modeling, computer graphics, computer animation, autonomous agents, robotics, artificial intelligence

SHAWN E. KANTOR

Professor, School of Social Sciences, Humanities and Arts and holder of the County Bank Endowed Chair in Economics

B.A., University of Rochester; M.S., Ph.D., California Institute of Technology

Political economy, law and economics, U.S. economic history, economic development, public economics

ANNE MYERS KELLEY

Professor, School of Natural Sciences

B.S., University of California, Riverside; Ph.D., University of California, Berkeley

Resonance Raman spectroscopy and microscopy, molecular photochemistry and photophysics, organic materials for nonlinear optics, modeling of spectroscopic data

DAVID F. KELLEY

Professor, School of Natural Sciences

B.S., Whitworth College; Ph.D., University of Washington

Spectroscopy and dynamics of semiconductor nanoparticles, ultrafast spectroscopy of excited states and reactive intermediates, solvation effects on proton and electron transfer reactions, vibrational dynamics of gas phase molecules

CHRISTOPHER KELLO

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of Rochester; Ph.D., University of California, Santa Cruz

Speech and reading processes, coordinative bases of cognitive systems

ARNOLD D. KIM

Associate Professor, School of Natural Sciences

B.S., Northwestern University; M.S., Ph.D., University of Washington

Wave propagation in random media, light propagation in tissues, wireless communications, scientific computing, asymptotic and perturbation methods

LARA KUEPPERS

Assistant Professor, School of Natural Sciences

B.S., M.S., Stanford University; Ph.D., University of California, Berkeley

Ecosystem feedbacks to climate change, species composition and ecosystem function, regional climate models, climate change policy

YUE LEI

Lecturer, PSOE, School of Natural Sciences

B.S., Peking University, Beijing, China; M.S. California Institute of Technology; Ph.D., Massachusetts Institute of Technology

Low-dimensional topology and geometry, geometric analysis, index theory, eta invariant and its applications

DOROTHY LELAND

Chancellor

B.A., M.A., Ph.D., Purdue University

Contemporary continental philosophy

VALERIE J. LEPPERT

Associate Professor, School of Engineering

B.A. (2), California State University, Sonoma; Ph.D., Northwestern University

Electron microscopy, nanomaterials for application in technology and the environment

ANDY LIWANG

Associate Professor, School of Natural Sciences

B.A., University of California, Berkeley; Ph.D., University of Washington

Structure and function of circadian clock proteins

PATRICIA LIWANG

Professor, School of Natural Sciences

B.S., Massachusetts Institute of Technology; Ph.D., Harvard University

Structure and function of anti-HIV Chemokines

IGNACIO LOPEZ-CALVO

Professor, School of Social Sciences, Humanities and Arts

B.A., Universidad Complutense, Madrid, Spain; M.A., California State University Los Angeles; M.A., Ph.D., University of Georgia

Nineteenth and twentieth century Latin American narratives with an emphasis on the cultural production of the Caribbean and the Southern Cone, Chicano literature and culture

JENNIFER LU

Assistant Professor, School of Engineering

B.S., Shanghai University; M.S., Drexel University; M.S., Ph.D., University of Michigan

Nanotechnology, nanofabrication

YANBAO MA

Assistant Professor, School of Engineering

B.S., University of Science and Technology of China, Hefei; M.S., Institute of Mechanics, Chinese Academy of Sciences, Beijing; Ph.D., University of California, Los Angeles

Fluid mechanics with emphasis on multi-scale, multi-physics flows ranging from microfluidic systems to macro-scale aerodynamics and hydrodynamics

SEAN MALLOY

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Berkeley; M.A., Ph.D., Stanford University

War and morality, American political history, utopian and extremist movements in the 1930s, the domestic sources of U.S. foreign policy, the ways in which economics, religion and culture shape Americans' interactions with the rest of the world

JENNIFER MANILAY

Assistant Professor, School of Natural Sciences

B.A., University of California, Berkeley; Ph.D., Harvard University

Mechanisms that control cell fate decisions in the immune system, the development of T lymphocytes, important components of immune defense against pathogens

ROUMMEL MARCIA

Assistant Professor, School of Natural Sciences

B.S., Columbia University, New York; Ph.D., University of California, San Diego

Scientific computation, large-scale optimization, interior-point methods, numerical analysis, global optimization, mathematical biology, compressed sensing, signal processing

MANUEL M. MARTIN-RODRIGUEZ

Professor, School of Social Sciences, Humanities and Arts

Licenciatura, Universidad de Sevilla; M.A., University of Houston; Ph.D., University of California, Santa Barbara

Cross-disciplinary perspectives from cultural, ethnic and film studies, border studies, textual recovery, intra-cultural difference, the Hispanic context of Chicano/Chicana literature, popular culture and the mass media.

ASHLIE MARTINI

Assistant Professor, School of Engineering

B.S., Ph.D., Northwestern University

Molecular modeling of nanoscale interfaces, simulation-based interface design, fluid power tribology

TEENIE MATLOCK

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., California State University, Fresno; Ph.D., University of California, Santa Cruz

Cognitive science, psycholinguistics, spatial cognition, metaphor, semantics, gesture

KARA E. MCCLOSKEY

Assistant Professor, School of Engineering

B.S., M.S., Ohio State University; Ph.D., Ohio State University and Cleveland Clinic Foundation

Engineering principles, such as analysis and design, as they apply to the advancements being made in stem cells and tissue engineering, cardiovascular cell lineage

MONICA MEDINA

Associate Professor, School of Natural Sciences

B.S., Universidad de Los Andes, Bogota, Columbia; Ph.D., University of Miami

Phylogenetics and organelle genome evolution of marine invertebrate animals, genomics of coral-zooxanthellae symbioses in Caribbean reefs

CARRIE MENKE

Lecturer, PSOE, School of Natural Sciences

B.S., University of Tennessee, Knoxville; M.S., Ph.D., University of California, Irvine

Chemical and materials physics

ERIK MENKE

Assistant Professor, School of Natural Sciences

B.S., Colorado State University; Ph.D., University of California, Irvine

Alternative energy including improving solar cells and producing carbon neutral fuel sources

MATTHEW MEYER

Associate Professor, School of Natural Sciences

B.S., University of Kansas, M.S., University of Wisconsin, Ph.D., Texas A&M University

Research on using temperature-dependent isotope effects as a probe for enzyme dynamics in soybean lipoxygenase-1

JUAN MEZA

Dean, School of Natural Sciences

B.S., M.A., Ph.D., Rice University

Nonlinear optimization with an emphasis on methods for parallel computing

KEVIN A. MITCHELL

Associate Professor, School of Natural Sciences

B.S., Carnegie Mellon University; M.A., Ph.D., University of California, Berkeley

Nonlinear dynamics and classical/quantum chaos, semi-classical phase-space techniques, topological and geometric methods for low-dimensional systems, the geometric/Berry phase and gauge theory

MICHAEL MODEST

Professor, School of Engineering and holder of Keith and Elinor Shaffer/Betty Lou George Chair in Engineering

Dipl.-Ing., Technical University of Munich, Germany; M.S., Ph.D., University of California, Berkeley

Radiative heat transfer and laser machining of ceramics

NATHAN MONROE

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Barbara; M.A., Ph.D., University of California, San Diego

American political institutions, role of political parties and organizational institutions within Congress, legislative politics

RUTH MOSTERN

Associate Professor, School of Social Sciences, Humanities and Arts

B.S., Georgetown University, M.A., Ph.D., University of California, Berkeley

Geography and state power in Middle Period China, georeferencing, the digital mapping of historical and cultural phenomena

HOLLEY MOYES

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Florida State University; M.A. Florida Atlantic University; Ph.D., State University of New York at Buffalo

Archaeological anthropology addressing the place of ideology and ritual in the ascendance and decline of elite power and authority

TODD NEUMANN

Assistant Professor, School of Social Sciences, Humanities and Arts

B.S., M.A., Miami University; Ph.D., University of Arizona

Applied microeconomics, industrial organization, labor economics/program evaluation, economic history

SHAWN D. NEWSAM

Assistant Professor, School of Engineering

B.S., University of California, Berkeley; M.S., University of California, Davis; Ph.D., University of California, Santa Barbara

Image processing, computer vision, pattern recognition, machine learning, content based information retrieval, digital libraries, data mining

STEPHEN NICHOLSON

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Los Angeles; M.A., Ph.D., University of California, Davis

Political behavior in the United States, Direct democracy on political outcomes, divided partisan control of government on public opinion and political behavior, effects of issues on Latino political behavior, media effects on trust in government

DAVID NOELLE

Assistant Professor, Schools of Engineering and Social Sciences, Humanities and Arts

B.S., University of California, Los Angeles; M.A., Ph.D., University of California, San Diego

Computational cognitive neurosciences, connectionism, cognitive control, learning, concept formation, working memory, cognitive neuroscience, cognitive psychology, machine learning, artificial intelligence

ROBERT S. OCHSNER

Senior Lecturer SOE, Director of the Karen Merritt Writing Program, School of Social Sciences, Humanities and Arts, and Director of Center for Research on Teaching Excellence

B.A., Western Washington University; M.A., Ph.D., University of California, Los Angeles

Social and cultural issues of teaching "white" English, a research focus that joins ESL theory with social constructionist insights about the power relationships between teacher and student or among diverse students in groups

PEGGY A. O'DAY

Professor, School of Natural Sciences

B.S., University of California, Davis; M.S., Cornell University; Ph.D., Stanford University

Aqueous, surface and environmental geochemistry, biogeochemistry and transport of inorganic contaminants in natural systems, geochemical applications of spectroscopy and microscopy, chemistry in hydrothermal systems

DAVID M. OJCIUS

Vice Provost for Academic Personnel, Professor, School of Natural Sciences, and holder of the Presidential Chair in Biology

B.A., Ph.D., University of California, Berkeley

Infection by intracellular pathogens, particularly chlamydia trachomatis, interaction between infected cells and the immune system mechanisms of cell death, innate immunity

RUDY MARTIN ORTIZ

Associate Professor, School of Natural Sciences

B.A., M.Sc., Texas A&M University; Ph.D., University of California, Santa Cruz

Endocrine physiology, physiological adaptations in water and electrolyte homeostasis and fat metabolism during extreme conditions such as prolonged fasting and altered gravitational load

NÉSTOR OVIEDO

Assistant Professor, School of Natural Sciences

D.V.M., Universidad Centroccidental "Lisandro Alvarado", Venezuela; M.Sc., Venezuelan Institute for Scientific Research (IVIC); Ph.D., IVIC/University of Utah

Tissue regeneration, morphogenesis, role of stem cells in regulating tissue homeostasis and regeneration of missing parts in adults

SHOLEH QUINN

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Barbara; M.A., Ph.D., University of Chicago

Middle Eastern history, history of Iran, Islamic civilization, women in the Middle East, Central Asian history, Historiography, Early Modern empires

DUNYA RAMICOVA

Professor, School of Social Sciences, Humanities and Arts

B.F.A., Goodman School of Drama; M.F.A., Yale University School of Drama

Costume design for theatre, opera, ballet, dance, film and television, history of costume design, history of clothing and fashion, drawing, watercolor painting

LINDA-ANNE REBHUN

Associate Professor, School of Social Sciences, Humanities and Arts

A.B., Mount Holyoke College; M.A., Ph.D., University of California, Berkeley

Cultural phenomena, women's and gender studies, Latin American studies, Agrarian studies

CRISTIAN H. RICCI

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., California State University, Los Angeles; M.A., Ph.D., University of California, Santa Barbara

Nineteenth and twentieth century Spanish literature, nineteenth and twentieth century Spanish-American literature, Portuguese literature, golden age and colonial literature

WOLFGANG ROGGE

Associate Professor, School of Engineering

Dipl. Ing., Technical University, Berlin, Germany; M.S., Ph.D., California Institute of Technology

Air pollution science and engineering

FLORIN RUSU

Assistant Professor, School of Engineering

B.Eng., Technical University of Cluj-Napoca, Romania; M.Sc., Ph.D., University of Florida

Databases in general, with a particular focus on large scale data management, data aggregation and approximation methods; data streaming; approximate query processing; online aggregation.

MICHAEL SCHEIBNER

Assistant Professor, School of Natural Sciences

M.S., University of New Mexico; Diplom Physiker, Dr. Rer. Nat., University of Würzburg, Germany

Light-matter interactions on a nanometer scale with a focus on coupling phenomena of nanostructures and resulting applications

ROSE SCOTT

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Boston University; M.A., Ph.D., University of Illinois

Developmental psychology, child psychology, psychological reasoning, cognitive development, infancy, and language acquisition

WILLIAM R. SHADISH

Professor, School of Social Sciences, Humanities and Arts

B.A., Santa Clara University; M.S., Ph.D., Purdue University

Clinical psychology, experimental and quasi experimental design, meta-analysis, program evaluation, psychology of science

JAY SHARPING

Assistant Professor, School of Natural Sciences

B.S., University of Wisconsin, Whitewater; M.A., Rose-Hulman Institute of Technology; Ph.D., Northwestern University

Non-linear fiber optics, atomic and molecular optics, quantum optics, carbon annotates

MARIO SIFUENTEZ

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., University of Oregon; M.A., Ph.D., Brown University

Comparative ethnic studies, race and labor in Latin America, Asian Pacific Americans and the Pacific Rim, Western History

SUZANNE SINDI

Assistant Professor, School of Natural Sciences

B.A., California State University, Fullerton; M.S., Ph.D., University of Maryland, College Park

Applied non-linear dynamics, computational biology, and genomics

ANNA SONG

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Michigan, Ann Arbor; Ph.D., University of California, Davis

Adolescent decision making relating to their health and well-being

MICHAEL SPIVEY

Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Santa Cruz; Ph.D., University of Rochester

Language/vision interaction, sentence processing, spoken word recognition, visual memory, visual attention, visual imagery, problem solving, eye movements, neural networks and dynamical systems

JIAN-QIAO SUN

Professor, School of Engineering

B.S., Huazhong University of Science and Technology; M.S., Ph.D., University of California, Berkeley

Bio-mechanics, bio-medical engineering

LIN TIAN

Assistant Professor, School of Natural Sciences

B.S., Tsinghua University; M.S., Beijing University; Ph.D., Massachusetts Institute of Technology

Theoretical studies of quantum information and quantum computation

MAYYA TOKMAN

Assistant Professor, School of Natural Sciences

B.S., University of California, Los Angeles; Ph.D., California Institute of Technology

Mathematical modeling of nonlinear phenomena, numerical analysis, scientific computing

SAMUEL J. TRAINA

Vice Chancellor for Research, Dean of the Graduate Division, Professor, Schools of Natural Sciences and Engineering and holder of the Ted and Jan Falasco Chair in Earth Sciences and Geology

B.S., Ph.D., University of California, Berkeley

Surface, colloidal, and complexation chemistry in soils, sediments and natural waters, remediation of contaminated soils and sediments

JESSICA TROUNSTINE

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of California, Berkeley; M.A., Ph.D., University of California, San Diego

Political institutions, elite political behavior, elections, representation

MENG-LIN TSAO

Assistant Professor, School of Natural Sciences

B.S., M.S., National Taiwan University; Ph.D., Ohio State University

Organic chemistry, chemical biology

NELLA VAN DYKE

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of Michigan; M.A., Ph.D., University of Arizona

Political sociology, social movements, sexuality, gender, hate crime

PETER VANDERSCHRAAF

Associate Professor, School of Social Sciences, Humanities and Arts

B.S., Loyola Marymount University; M.S., Ph.D., University of California, Irvine

Political philosophy, game theory, ethics

JACK VEVEA

Interim Vice Provost for Undergraduate Education and Associate Professor, School of Social Sciences, Humanities and Arts

B.A., M.S., San Francisco State University; A.B., University of California, Berkeley; Ph.D., University of Chicago

Innovation of statistical methods to address problems that cannot be solved by conventional techniques

CHRISTOPHER VINEY

Professor, School of Engineering

B.A., Ph.D., Cambridge University

Biomolecular materials (design of materials synthesis, assembly, processing and physical optimization strategies based on examples from nature), physical science and engineering of polymers and liquid crystals (structure-property-processing relationships)

JAN WALLANDER

Professor, School of Social Sciences, Humanities and Arts

B.A., Ashland College; M.S., Ph.D., Purdue University

Health psychology, pediatric psychology

SHI-PU WANG

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., M.A., Indiana University, Bloomington; Ph.D., University of California, Santa Barbara

History and theory of 20th century American Art with concentration on American artists of Asian origin, study of the role that national, cultural, and/or ethnic identity plays in the work of artists, the impact that US Cold War cultural programs played in the development of new art trends in Asia since World War II

SIMON WEFFER-ELIZONDO

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Chicago; M.A., Ph.D., Stanford University

Understanding the linkages between collective action and urban inequality, the effect of collective action rates on voting rates, examining the spatial dynamics and issues in neighborhood mobilization

ANTHONY WESTERLING

Associate Professor, Schools of Engineering and Social Sciences, Humanities and Arts

B.A., University of California, Los Angeles; Ph.D., University of California, San Diego

Research efforts to model climatic influences on wildfire and on water and energy resources, working with policy makers to explore alternatives for building sustainable resource management structures

ALEXANDER WHALLEY

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., University of Western Ontario; M.A., University of British Columbia; Ph.D., University of Maryland, College Park

Labor economics, macroeconomics, applied econometrics

KATIE L. WINDER

Assistant Professor, School of Social Sciences, Humanities and Arts

B.A., Lewis and Clark College; Ph.D., Johns Hopkins University

Applied microeconomics, labor economics, economics of gender and discrimination, economics of welfare and poverty

ROLAND WINSTON

Professor, Schools of Engineering and Natural Sciences

B.S., M.S., Ph.D., University of Chicago

Solar power and renewable energy, elementary particle physics, non-imaging optics

J. ARTHUR WOODWARD

Professor Emeritus, School of Social Sciences, Humanities and Arts

B.S., Wake Forest University; M.A., Ph.D., Texas Christian University

Experimental design, statistical genetics, applied statistics and psychometrics

JEFF R. WRIGHT

Professor, School of Engineering

B.A., B.S.E., M.S.E., University of Washington; Ph.D., Johns Hopkins University

Water resources and environmental management, design and implementation of computer-based spatial decision support systems for civil infrastructure, transportation, water resources, land resources engineering and management

MING-HSUAN YANG

Assistant Professor, School of Engineering

B.S., National Tsing-Hua University, Taiwan; M.S., University of Southern California and University of Texas at Austin; Ph.D., University of Illinois at Urbana-Champaign

Computer vision, pattern recognition, machine learning, artificial intelligence, robotics, image processing, cognitive science

TAO YE

Assistant Professor, School of Natural Sciences

B.S., Peking University; M.S., Ph.D., University of Pittsburgh

Nanoscale science, bioanalysis

JEFFREY YOSHIMI

Associate Professor, School of Social Sciences, Humanities and Arts

B.A., University of California Berkeley; M.A., Ph.D., University of California, Irvine

Philosophy of mind, philosophy of cognitive science, phenomenology (especially Husserl), neural networks

ADJUNCT FACULTY

DARIO BOFFELLI

Assistant Adjunct Professor, School of Natural Sciences

B.S., University of Rome 'La Sapienza'; Ph.D., Swiss Federal Institute of Technology (ETH)

Primate comparative genomics, role of gene regulatory sequences

M. PILAR FRANCINO

Assistant Adjunct Professor, School of Natural Sciences

B.S., National Autonomous University of Mexico; M.S., Ph.D., University of Rochester

Bacterial genomes

GABRIELA LOOTS

Assistant Adjunct Professor, School of Natural Sciences

B.S., University of California, Irvine; Ph.D., University of California, Berkeley

Developmental genomics with emphasis on skeletal and limb development

PAUL MAGLIO

Associate Adjunct Professor, School of Social Sciences, Humanities and Arts

S.B., Massachusetts Institute of Technology; M.S., Ph.D., University of California, San Diego

Cognitive science management in regards to the studies of work, models of web programming, and human-computer interaction

ALEKSANDR NOY

Associate Adjunct Professor, School of Natural Sciences

B.A., Moscow State University; M.S., Ph.D., Harvard University

Nanosynthesis, single-molecule imaging and measurements

WILLEM J.M. Van BREUGEL

Adjunct Professor Emeritus, School of Natural Sciences

Ingeniur degree, Eindhoven University; Ph.D., Leiden University

Distant massive galaxies, the effects of their central super-massive black holes on the galaxy-formation process, the formation and evolution of the largest structures known in the Universe: clusters of galaxies

Appendix

ACCREDITATION

The University of California, Merced is accredited by the Western Association of Schools and Colleges.

Counseling and Psychological Services is accredited by APPIC (Association of Psychology Postdoctoral and Internship Centers).

CLERY ACT AND CRIME STATISTICS

"Safety Matters" is UC Merced's annual security report. This publication offers information about our police department, campus crime statistics and a wealth of information about safety and security. It can be found at police.ucmerced.edu/docs/sm.pdf or to learn more about UC Merced's annual crime statistics at ope.ed.gov/security/.

REGISTER TO VOTE

The 1998 reauthorization of the federal Higher Education Act includes a requirement that higher education institutions make a "good faith effort" to make mail voter registration forms available to all enrolled students. This federal legislation supports the campus' longstanding goals of engendering leadership and citizenship among the student body.

UC Merced provides students with several options for registering to vote. Voter registration forms are available at the Students First Center and a link to information is available using the student portal.

POLICY ON ANIMAL SUBJECTS

Graduate: As part of their right to academic freedom, graduate course instructors at UC Merced reserve the right to grade students on the basis of hands-on work with living organisms and biological materials, in accordance with all applicable ethical standards and laws. Students must be informed of course requirements and grading policies at the beginning of each graduate course, but graduate course instructors are not required to provide alternate assignments if students object to assignments that require hands-on work with living organisms and biological materials.

Undergraduate: As part of their right to academic freedom, undergraduate course instructors at UC Merced reserve the right to grade students on the basis of hands-on work with living organisms and biological materials, in accordance with all applicable ethical standards and laws. Students must be informed of course requirements and grading policies at the beginning of each undergraduate course. Where possible within the context of existing course objectives, instructors may offer alternatives to animal use; this may not be possible, and they are not required to provide alternate assignments if students object to hands-on work with living organisms and biological materials.

CALIFORNIA RESIDENCY AND NONRESIDENT SUPPLEMENTAL TUITION

(Updated information on California Residency requirements can be found via the UC Merced Office of the Registrar website at registrar.ucmerced.edu.)

Supplemental Tuition for Nonresident Students

If you have not been living in California with intent to make it your permanent home for more than one year immediately before the residence determination date for each semester in which you propose to attend the University, you must pay non-resident supplemental tuition in addition to all other fees. The residence determination date is the day instruction begins at the University of California, Merced.

Law Governing Residence

The rules regarding residence for tuition purposes at the University of California are governed by the California Education Code and implemented by the Standing Orders of The Regents of the University of California. Under these rules, adult citizens and certain classes of aliens can establish residence for tuition purposes. There are also particular rules that apply to the residence classification of minors (see below).

Who is a California Resident?

If you are an adult student (over 18 years of age) you may establish residence for tuition purposes in California if: (1) you are a U.S. citizen, (2) you are a permanent resident or other immigrant; or (3) you are a non-immigrant who is not precluded from establishing a domicile in the U.S. Non-immigrants who are not precluded from establishing domicile in the U.S. include those who hold valid visas of the following types: A, E, G, H-1, H-4, I, K, L, N, NATO, O, R, T, U or V.

To establish residence for tuition purposes, you must satisfy the following 3 conditions:

1. Physical presence: You must be physically present in California for more than one year (366 days) immediately prior to the residence determination date of the term for which resident classification is requested. You must have come here with the intent to make California your home as opposed to coming to this state to go to school. Physical presence within the state solely for educational purposes does not constitute the establishment of California residence, regardless of the length of your stay. Continuous physical presence isn't mandatory, but a student who leaves California after establishing residence must demonstrate that he/she intended to remain a California resident, and that his/her principal place of residence has been in California. It's the burden of the student to clearly demonstrate retention of California residence during periods of absence from the state. The physical presence requirement will be extended until the student can demonstrate a concurrence of both physical presence and intent for one full year.

2. Intent to become a California resident: Demonstrate through objective documentation that your physical presence was coupled with the intent to make California your permanent home. Intent is evaluated as an independent element of residence, separate from physical presence, and is demonstrated by establishing residential ties in California, and relinquishing ties to the former place of residence. You must demonstrate your intention to make California your home by severing your residential ties with your former state of residence and establishing those ties with California. If these steps are delayed, the one-year duration period will be extended until you have demonstrated both presence and intent for one full year. Indications of your intent to make California your permanent residence include:

- California driver's license or a California ID Card
- Voter registration card or affidavit from Registrar of Voters
- California-based bank accounts or CA branches based in other states
- California car registration and car insurance card
- Paying California income taxes as a resident, including taxes on income earned outside California

- Housing contracts, monthly rental agreements, lease or proof of property ownership
- Credit and memberships with California merchants, religious affiliations, clubs, gyms
- Proof of your belongings moved into California such as moving van, bill of lading
- Proof of utilities established in your name such as phone, gas, electric, and cable TV
- Designating California as your permanent address on all school, employment, and/or military record.

The absence of these indicia in other states during any period for which you claim residence can also serve as an indication of your intent. Your intent will be questioned if you return to your former state of residence when the university is not in session. Documentary evidence is required and all relevant indications will be considered in determining your classification.

A student who is in the state solely for educational purposes will NOT be classified as a resident for tuition purposes regardless of the length of his or her stay.

3. Financial independence: Students under age 24 who didn't attend the university prior to fall 1993 and are not dependent on a California resident parent who meets the university's requirements for residence for tuition purposes (one year physical presence with intent to remain in the state), also must meet the university's financial independence requirement in addition to the 366-day physical presence and intent requirements. Note: This requirement makes it extremely difficult for most undergraduates who do not have a parent living in California to qualify for classification as a resident at a UC campus. This includes transfer students from community colleges and other post-secondary schools in California.

You are considered financially independent if you meet all of the following criteria. You:

1. Are unmarried, and

2. Were not claimed as a dependent for tax purposes by either parent or any other individual for the current and two tax years immediately preceding the quarter for which classification as a resident is requested, and

3. Can demonstrate self-sufficiency for the current and two preceding tax or calendar years.

- To verify financial independence (self-sufficiency/ self-support), the student must document his or her income and verify that he or she was not claimed as an exemption by parents or anyone else for the two years prior to the request for residence.
- The student is also required to present a budget showing how he or she is able to be supported by the funds claimed.
- Self-support is defined as money which can be officially documented that the student has earned through his or her own employment, commercial loans, financial aid, savings and/ or other loans obtained with the student's own credit, without a cosigner. Parent PLUS loans cannot be considered self-support.
- Loans or gifts from relatives, associates, or friends, regardless of the terms, are considered financial assistance and cannot be included as student income when determining self-support. Non-institutional loans or funds that are "gifted" to the student by a relative, associate, or friend, through a "college fund," savings, trust, or other financial vehicle, will not be considered if the funds were established after the student's 14th birthday.
- If the student's income is a trust account established prior to the student's 14th birthday, the student must also verify that he or she has complete control of the trust, that the funds available at the time of origination were sufficient to allow the student to be entirely self-supporting, and that the trust has been in use to support the student. Copies of yearly beginning balances, withdrawals, deposits, and ending balances of the trust account(s) will be required. Non-verifiable income cannot be considered.
- Residing in California with an aunt, uncle, grandparent, or friend who provides the student with room and board cannot be considered self-support, even if that person meets the UC residence requirement. "Bartering" for free room and board or other services or necessities will be considered financial assistance.

The financial independence requirement will not be a factor in residence determination if you are a student who is financially dependent upon a California resident parent who meets the university's requirements for residence for tuition purposes (one year physical presence with intent to remain in the state). Financial independence will be implied for residence determination if you meet one of the following criteria. You:

- Have natural or adoptive parent(s), upon whom you are financially dependent, who meet the requirements for California residence for purposes of tuition and fees, or
- Are at least 24 years of age by Dec. 31 of the calendar year of the term for which classification is requested, or
- Are a veteran of the U.S. Armed Forces, or
- Are a ward of the court or both parents are deceased, or
- Have a legal dependent other than a spouse or registered domestic partner, or
- Are a married student, or a registered domestic partner, or a graduate student or professional student, AND you were not claimed as an income tax deduction by any individual for the one tax year immediately preceding the term for which resident classification is requested, or
- Are a graduate or professional school student who was not claimed as an income tax deduction by either parent or any other individual for the tax year immediately preceding the term for which classification as a resident is requested, or
- Are a graduate or professional student who is employed at UC 49% or more time (or awarded the equivalent in university-administered funds, e.g., grants, stipends, fellowships) in the term for which resident classification is requested, or
- You reached the age of majority (18 years) in California while your parents were residents (for tuition purposes) of this state AND California resident parents leave the state to establish a residence elsewhere, AND you continue to reside in the state of California after the parents' departure. If you are an adult when you enter the state, you must live with the California-resident parent(s) for 366 days and you and parent(s) both must have established residence prior to the time the parents leave the state.

General Rules Applying to Minors

If you are an unmarried minor (17 or under), the residence of the parent(s) with whom you live is considered to be your residence. If you have a living parent, you cannot change your residence by your own act, by the appointment of a legal guardian, or by the relinquishment of a parent's right of control.

If you lived with neither parent, your residence is that of the parent with whom you last lived. Unless you are a minor alien present in the U.S. under the terms of a non-immigrant visa which precludes you from establishing domicile in the U.S., you may establish your own residence when

both your parents are deceased and a legal guardian has not been appointed. If you derive California residence from a parent, that parent must satisfy the one-year durational residence requirement.

Specific Rules Applying to Minors

Divorced/Separated Parents

You may be able to derive California residence status from a California resident parent, if you move to California to live with that parent on or before your 18th birthday. If you begin residing with your California parent after your 18th birthday, you will be treated like any other adult student coming to California to establish residence.

Parent of Minor Moves from California

You may be entitled to resident status if you are a minor U.S. citizen or eligible alien whose parent(s) was a resident of California who left the state within one year of the residence determination date if:

- You remained in California after your parent(s) departed
- You enroll in a California public postsecondary institution within one year of the departure of your parent(s) and
- Once enrolled, you maintain full time continuous attendance at a post-secondary institution.. Financial independence will not be required in this case.

Self-Supporting minor

If you are a minor (under the age of 18 by the residence determination date) self-supporting and have lived in California for more than one year immediately prior to the residence determination, you may be eligible for classification as a resident for tuition purposes.

Two-Year Care and Control

You may be entitled to resident status if you are a U.S. citizen or eligible alien and you have lived continuously with an adult who is not your parent for at least two years prior to the residence determination date. The adult with whom you are living must have been responsible for your care and control for the entire two-year period and must have been residing in California during the one year immediately preceding the residence determination date.

EXEMPTIONS FROM NONRESIDENT TUITION

1. Members of the U.S. Armed Force

Member of the U.S. Armed Forces Stationed in California on Active Duty*
An undergraduate student is entitled to a resident classification for as long as the student maintains the eligibility requirements. A graduate or professional student will be eligible for a resident classification for two years, by which time he or she must fulfill the UC residence requirements in order to maintain his or her residence status.

Students assigned for educational purposes to a state-supported institution of higher education are not eligible for this provision. You must provide the residence deputy on campus with a statement from your commanding officer or personnel officer stating that your assignment to active duty in California is not for educational purposes. The letter must include the dates of your assignment to the state.

Former Member of the U.S. Armed Forces Stationed in California on Active Duty*
An undergraduate or graduate student who is a former member of the Armed Forces of the United States stationed in California who was on active duty for more than one year immediately prior to being discharged from the Armed Forces may be eligible for a resident classification for the length of time he or she lives in this state after being discharged up to the minimum time necessary to become a resident (366 days).

2. Dependents of Members of the U.S. Armed Force

Dependent of Member of the U.S. Armed Forces Stationed in California on Active Duty*
An undergraduate student who is the spouse, registered domestic partner, or dependent child of a member of the military is entitled to a resident classification for as long as the student maintains the eligibility requirements. A graduate or professional student who is the spouse, registered domestic partner, or dependent child of a member of the military will be eligible for a resident classification for one year, by which time he or she must fulfill the UC residence regulations in order to maintain his or her resident status.

Those who may qualify for an exemption from nonresident supplemental tuition*: (based on federal law - The Higher Education Opportunity Act of 2008): An undergraduate or graduate student who is a member of the Armed Forces of the United States on active duty for a period of more than 30 days and whose domicile or permanent duty station is in California, or the spouse, registered domestic partner, or dependent child of such member of the Armed Forces, is entitled to an exemption from nonresident tuition. Student must be continuously enrolled at the University, notwithstanding a subsequent change in the permanent duty station to a location outside of California. *As of the residence determination date for the term.

3. Child, spouse, or registered domestic partner of a faculty member

To the extent funds are available, if you are an unmarried dependent child under age 21, the spouse, or registered domestic partner of a member of the University faculty who is a member of the Academic Senate, you may be eligible for a waiver of nonresident supplemental tuition. Confirmation of the faculty member's membership on the Academic Senate must be secured each semester before this waiver is granted.

4. Child, spouse, or registered domestic partner of a University employee

You may be entitled to resident classification if you are a full-time University employee, or the unmarried dependent child, spouse, or registered domestic partner of a full-time University employee who is assigned to work outside of California (e.g., Los Alamos National Laboratory, UC Center in Washington, D.C.). A review will be conducted each term to verify continuation of the applicable status.

5. Child, spouse, or registered domestic partner of a deceased public law enforcement or fire suppression employee

You may be entitled to a waiver of nonresident supplemental tuition if you are the child, spouse, or registered domestic partner of a deceased public law enforcement or fire suppression employee who was a California resident at the time of his or her death and who was killed in the course of fire suppression or law enforcement duties.

6. Dependent Child of a California Resident (divorced / separated parents)

A student who has not been an adult resident of California for more than one year, and who is the dependent child of a California resident who has been a resident

for more than one year immediately prior to the residence determination date, may be entitled to a waiver of the nonresident supplemental tuition until the student has lived in California for the minimum time necessary to become a resident so long as continuous attendance is maintained at an institution.

7. Native American Graduates of a Bureau of Indian Affairs high school

If you are a graduate of a California high school operated by the Federal Bureau of Indian Affairs, you may be eligible for an exemption from the nonresident fee.

8. Employee of a California Public School District

Any person holding a valid credential authorizing service in the public schools of the state of California who is employed by a school district in a full-time certificate position may be eligible for a nonresident supplemental tuition waiver.

9. Student Athlete in Training at the U.S. Olympic Training Center

Any amateur student athlete in training at the United States Olympic Training Center in Chula Vista may be eligible for a waiver of nonresident supplemental tuition until he or she has lived in the state the minimum time necessary to become a resident

10. Graduate of a California High School

California Assembly Bill 540 (AB540) provides that students meeting certain requirements will qualify to pay in-state fees. You may be entitled to this exemption from nonresident supplemental tuition if you attended high school in California for three (3) or more years and graduated from a California high school. Submitting the AB 540 does not mean automatic qualification. A Statement of Legal Residence must also be submitted.

11. Surviving dependent of a California resident killed in the Sept. 11, 2001, terrorist attack

A student who was a dependent of a California resident who was killed in the Sept. 11, 2001, terrorist attacks on the World Trade Center, the Pentagon Building, or the crash of United Airlines Flight 93 may be eligible. (Eligible students must meet the financial need requirements for the Cal Grant A program.)

12. Recipient of the Congressional Medal of Honor

Any undergraduate student who is a recipient of a Congressional Medal of Honor or who is the child of a recipient may be eligible. The recipient must be a California resident and the student may not be older than 27, and must have an annual income that does not exceed the national poverty level. If the medal recipient was a parent who died, the parent must have been a California resident at the time of his or her death.

Temporary Absences

If you are a nonresident student who is in the process of establishing a residence for tuition purposes and you return to your former home during non-instructional periods, your presence in the state will be presumed to be solely for educational purposes, and only convincing evidence to the contrary will rebut this presumption. (A student who is in the state solely for educational purposes will not be classified as a resident for tuition purposes regardless of the length of stay.)

If you are a student who has been classified as a resident for tuition purposes and you leave the state temporarily, your absence could result in the loss of your California residence. The burden will be on you (or your parents if you are a minor) to verify that you did nothing inconsistent with your claim of a continuing California residence during your absence.

Steps that you (or your parents) should take to retain a California residence include:

1. Continue to claim California residence and address on all records such as educational, employment, or military.

2. Retain your California voter's registration and absentee ballot.

3. Maintain a California driver's license and car registration, or change them back within the time prescribed by law.

4. Return to California during all your breaks, vacations, holidays, etc.

5. Continue to satisfy California tax obligations. (Note: if you are claiming California residence, you are liable for payment of income taxes on your total income from the date you establish residence in the state, including income earned in another state or country.)

Petitioning for Resident Classification

At least a year before you start your first semester of classes, begin the process of becoming a California resident. Establish a physical presence by living in California for 366 days prior to the first day of instruction you wish to be a resident. Establish your intent to become a California resident by changing your ties immediately from your previous residence to this state. Meet one of the financial independence requirements.

Time Limitation on Providing Documentation

If additional documentation is required for a residence classification but is not readily accessible, you will be allowed until the end of the applicable semester to provide it. You are liable for payment of fees when they are due. Petitioning for a change of status does not alter the fee payment deadline.

Incorrect Classification

If you were incorrectly classified as a resident, you are subject to a nonresident classification and must pay all unpaid nonresident supplemental tuition. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to University discipline. Resident students who become nonresidents must immediately notify the residency deputy.

Inquiries and Appeals

Inquiries regarding residence requirements, determination and/or recognized exceptions should be directed to the Residence Deputy, Office of the Registrar, at UC Merced (209-228-2734). To appeal a decision you have 30 days from your residence determination to submit a completed Application to Appeal along with a copy on your nonresident decision by email: residency.appeal@ucop.edu; FAX: 510-987-9757, Attention: Residency Analyst or by MAIL: Residency Analyst, UC Office of the General Counsel, 1111 Franklin Street, 8th Floor, Oakland, CA 94607-5200.

Privacy Notice

All information requested on the Statement of Legal Residence form is required by the authority of Standing Order 110.2 (a)-(d) of the Regents of the University of California for determining whether you are a legal resident for tuition purposes. The Office of the Registrar maintains the requested information. You have the right to inspect university records containing the residence information requested on the form.

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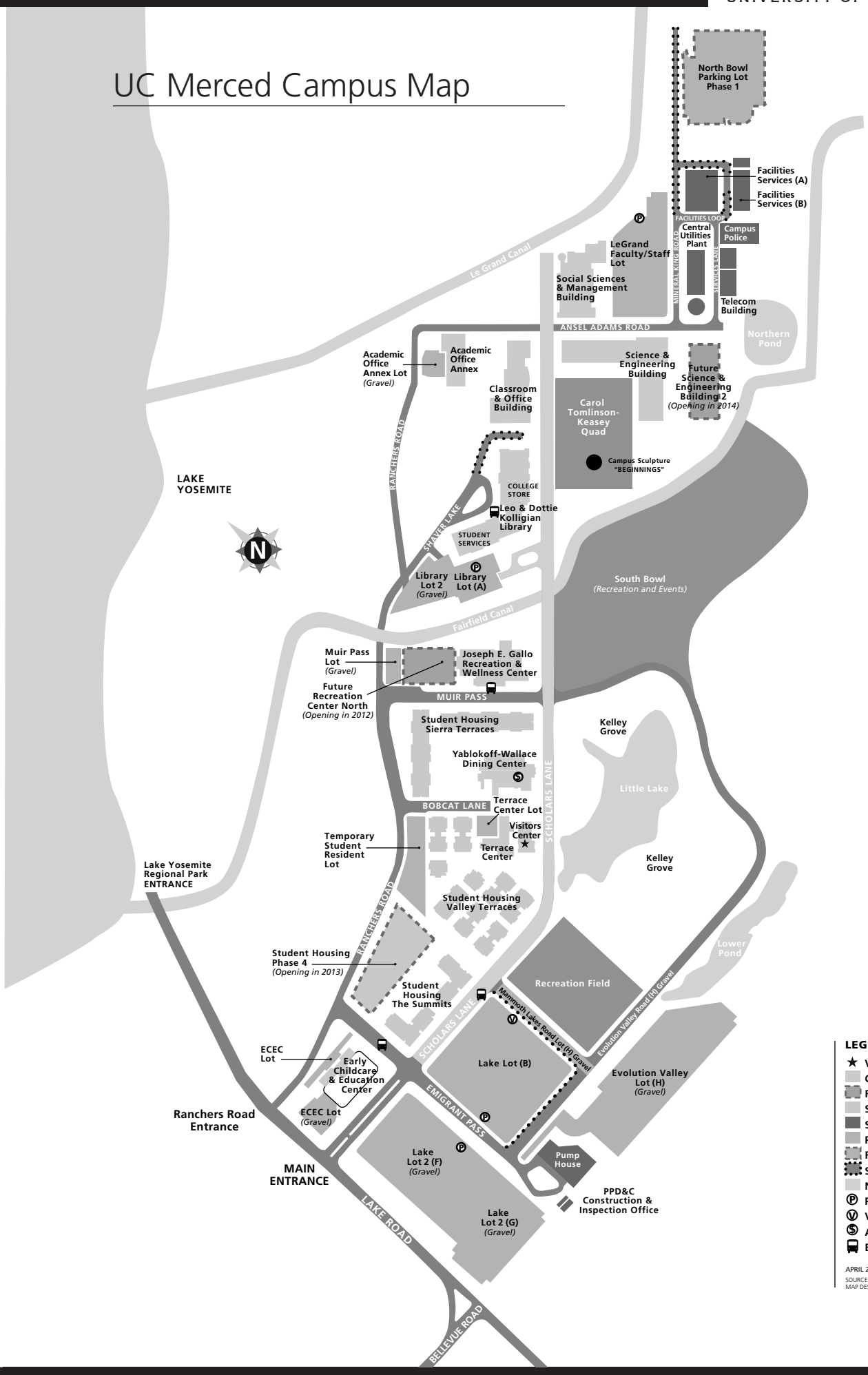
UC Merced Campus Map



LEGEND

- ★ Visitors Center
- Campus Buildings
- Future Construction
- Student Housing
- Service and Support
- Parking
- Future Parking
- Service Roads
- No Vehicles *(except buses up to Muir Pass)*
- Ⓟ Parking Permit Dispenser
- Ⓥ Visitors Center Parking
- Ⓢ ATM
- Bus Stop

APRIL 2011

SOURCE: Physical Planning Design & Construction Office;
MAP DESIGN: Office of Communications