College of Agriculture, Food & Environmental Sciences

Agricultural Sciences Bldg. (11), Room 211
Phone: 805.756.2161
http://cafes.calpoly.edu/
Dean: Andy Thulin
Executive Associate Dean: Richard A. Cavaletto
Associate Dean: Nanine Van Draanen
Associate Dean: Chris Dicus
Assistant Dean: Russ Kabaker

Academic Programs

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The College of Agriculture, Food and Environmental Sciences (CAFES) offers programs reflecting the growing diversity of choices available and skills required in modern agriculture, life sciences, and related professions.

Mission Statement

The College of Agriculture, Food and Environmental Sciences uses a “learn by doing” approach to prepare leaders in agriculture, food systems, natural resources, and life sciences who are equipped to address the diverse needs of society.

Learning Outcomes

All students who complete a program in CAFES should be able to:

- Demonstrate expertise and the use of technology in their respective discipline.
- Demonstrate effective oral and written communication skills.
- Make choices based on an understanding of personal and professional ethics and respect for diversity of people and ideas.
- Recognize leadership principles and skills.
- Evaluate and solve problems using critical thinking.
- Demonstrate an appreciation for sustainability and global perspectives.

Students take courses in their major field beginning with their first quarter of enrollment. This early exposure to their major provides them with knowledge to supplement that gained in other coursework in basic sciences, mathematics and the liberal arts. Moreover, it allows students to evaluate whether or not the curriculum selected is appropriate to their interests and abilities. Taking courses in the major throughout the academic program fosters personal contact with faculty and other students having common interests but varied backgrounds.

The students’ early involvement in their major field, combined with the faculty’s close contacts with schools, private industry, governmental agencies, and nonprofit organizations provide excellent opportunities for student internships during their junior or senior years. Other opportunities which enhance education, provide financial assistance, and help prepare students for the job market include enterprise projects, scholarships, and work-study jobs.

CAFES faculty are experts in their disciplines, and are dedicated to teaching. They are eager to help students learn, are readily available for consultation and are proud of their close relationship with students.

Academic advising is provided to all students through Academic Advising Centers and their major department in the college. Each student is assigned a faculty advisor. Students are encouraged to meet with their advisors quarterly to plan their schedule, review curriculum information, discuss career opportunities, and receive information on internships, enterprise projects and co-ops. Academic advising centers and resources provide guidance on university and college policies and procedures including course transfers, substitutions and other general information.

Student clubs are active in every department. The 43 clubs, most of which are affiliated with national professional organizations, provide an excellent forum for student and faculty interactions. Active club members may practice leadership skills, and attend national, state
and local professional meetings, as well as participate in a variety of professional and social events.

**Agricultural Lands and Outdoor Laboratories**

Nearly 5,000 acres of agricultural production, processing and research land and facilities are available for student use at Cal Poly. These facilities provide students with unique opportunities for hands-on experiences which augment classroom instruction.

The campus farm includes a dairy, beef center, horse, sheep, swine and poultry units, horse training and show arenas, an animal nutrition center, meat processing center, veterinary clinic and rodeo facilities. Also available are irrigated and dryland fields for annual crops, orchards and vineyards, an irrigation demonstration field, erosion research facility, large-scale composting operation, hoop houses, arboretum, wholesale and retail nurseries, putting greens and turf research plots, a wine lab, and greenhouses. Eleven acres of certified organic farmland support our organic farming program.

**Other Labs and Special Facilities**

Special facilities include several microcomputer laboratories, laboratories with modern equipment for soil-plant-water testing, engineering testing and manufacturing shops, complete food processing units for dairy products, meats, fruit and vegetables, and four biotechnology and embryology laboratories.

**Santa Cruz County Properties**

The 3,200 acre Swanton Pacific Ranch and 600 acre Valencia Creek forest in Santa Cruz County were generously donated by Al Smith, alumnus of Cal Poly's former Crop Science Department. These properties provide students with an opportunity to live and work on a commercial farm with forestry, watershed management, cattle and organic crop production activities. The lands also support a wide range of research topics for undergraduate and graduate students.

**Experiential Learning**

Students have many opportunities to participate in experiential learning activities which exemplify Cal Poly's "learn by doing" philosophy. For example, more than 80% of CAFES classes include laboratories or activity sessions. Enterprise projects offer students practical experience in animal, plant, and food production, processing, and research. Some of these are financially backed by the Cal Poly Corporation and offer students entrepreneurial experiences similar to those found in private industry.

**Courses**

The courses offered in each agricultural curriculum may be grouped into four areas:

**Major**

The major courses include a required cluster of courses in which the student expects to graduate. These courses constitute the core of specific preparation for the student's major field in agriculture.

**Support**

The support courses draw from courses in agriculture, life sciences, and closely allied fields which support and supplement the block of courses constituting the student's major.

**General Education**

Courses are selected from the physical and life sciences, mathematics, communications, arts and humanities, and social, political, and economic institutions. These courses furnish the student with background and support for agricultural courses as well as providing cultural background for the students' intelligent participation in a complex world society.

**Free Electives**

Course selection from electives is designed to provide freedom for students to pursue interests of their choosing in any university department.

**Recommended Preparation**

In addition to pursuing the CSU mandated entrance requirements, high school and community college students are encouraged to participate in co-curricular activities as part of their preparation for admission to majors in Cal Poly's College of Agriculture, Food and Environmental Sciences. These activities could include, but are not limited to, FFA, 4-H, leadership roles in school clubs, meaningful work experience and community organizations.

**Laboratory Safety**

Students are required to meet sanitation and safety regulations in laboratories. These regulations are explained by the instructor at the first meeting of the class.

**Agricultural Sciences Bldg., Room 211**

Phone: 805.756.2161

http://www.cafes.calpoly.edu/contact-graduate-programs

Associate Dean: Mark D. Shelton

mshelton@calpoly.edu

**General Characteristics**

Graduate studies in the College of Agriculture, Food and Environmental Sciences (CAFES) allow the student to pursue either a professional program designed to enhance the competencies of agricultural educators, or an academic program of graduate-level scholarly activities and research in one of several specializations. Graduates are prepared for:

- professional-level positions with business and industry,
- government, and foreign service in agriculture and related fields;
- continued graduate work at other institutions.

**Admission/Acceptance Requirements – MS Only**

- File an application for Graduate Admission via www.csumentor.edu/ (http://www.csumentor.edu) by the deadlines specified at http://admissions.calpoly.edu/applicants/
- Submit Graduate Record Exam (GRE) General Test scores electronically to Institution Code: R4038
- Three Letters of Recommendation

**Prerequisites**

For consideration as a graduate student, an applicant will have completed a bachelor’s degree from an accredited college/university with a minimum grade point average of 2.75 in the last 90-quarter units. An applicant who meets these standards but lacks prerequisite coursework may be admitted as a conditionally classified student and must make up any deficiencies before advancement to classified graduate standing.

All applicants who do not speak and write English as their primary language are required to complete the Test of English as a Foreign Language (TOEFL), taken within the last 2 years with a minimum score
of 550 (paper version), 213 (computerized version), or 80 (internet based). Submit scores electronically to Institution Code: 4038. This requirement does not apply if your country of citizenship is listed on Cal Poly Admissions website: http://admissions.calpoly.edu/applicants/international/checklist.html

Each program may list additional requirements for admission to the specific program.

Degree Requirements

Formal Study Plan. Graduate students must file the formal study plan for the degree with the CAFES Graduate Coordinator no later than the end of the quarter in which the 12th unit of approved courses is completed. The formal program of study must include at least 45 units of committee-approved graduate coursework; at least half of the units required by the committee as reflected on the formal study plan must be at the 500 level. Students should refer to the course descriptions in this catalog for credit limitations of individual courses; for example, total credit for AG 500, Individual Study, is limited to six units.

All candidates must meet the current Graduation Writing Requirement (http://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext). All Students are required to pass an oral comprehensive examination which is normally given during the final quarter of the program of study. A written comprehensive exam may also be required by the master's degree committee, but his is optional. For students in a thesis program the final oral comprehensive examination includes, but is not necessarily limited to, a defense of the thesis.

Thesis

The thesis is based on independent, supervised research. Students should contact individual departments to determine the availability of funding support for their research. The final copy of the thesis must meet the standards explained in the “Manual of Instructions for the Preparation and Submission of the Master’s Thesis or Master's Project” available from the Cal Poly Research and Graduate Programs Office. At least one course in statistical methods and/or experimental design is required of students in a thesis based curriculum.

A copy of the thesis or project report must be received and reviewed by the Thesis Editor in the Graduate Programs Office. Upon completion of any required corrections, the student submits the electronic thesis/project report to the DigitalCommons@CalPoly, a digital archive for the University. These steps must be completed before the degree is awarded.

Graduate Student Continuous Enrollment Policy

Effective Fall Quarter 2009, graduate students are required to maintain continuous enrollment from the time of first enrollment in a graduate program until completion of the degree. Continuous enrollment is defined as being enrolled during Fall, Winter, and Spring quarters each year. All graduate students must be enrolled the quarter they graduate. Therefore, a student graduating Summer quarter must be enrolled during the summer. Students can maintain continuous enrollment either by being enrolled as a regular student; obtaining approval for an education or medical leave prior to the quarter when such a leave would begin; or by registering in a special course designated for this purpose, during quarters in which they are not regularly enrolled. The special course GS 597 is taken through Cal Poly Extended Education. Credits in GS 597 do not count toward meeting degree requirements. Students who fail to fulfill this continuous enrollment requirement will not be permitted to graduate even if all degree requirements have been completed until payment has been made for all quarters of non-enrollment. This requirement is not retroactive to terms prior to Fall 2009. For further information and a registration form, visiting the Extended Education (http://www.extended.calpoly.edu) website.

MS Agriculture, Specialization in Animal Science

The program provides students with an interdisciplinary, science-based program, where students develop basic scientific knowledge, apply that knowledge to a research project, then write and defend a thesis. An individual's coursework and research project is focused based upon his or her interests and goals in Animal Science, and under the guidance of the advisor and thesis committee.

Additional prerequisites: Prospective students are required to:

- submit a cover letter identifying interests, goals and experience relevant to the MS program, and
- submit a résumé

MS Agriculture, Specialization in BioResource and Agricultural Systems

Students have the opportunity to focus their MS program on the application of bioresource and agricultural systems. Graduates will be prepared to enter a career in a variety of areas including production agriculture, consulting, regulatory compliance, equipment sales and technical support, etc.

Topics under the bioresource area may include:

- Agricultural and Food Processing Waste Management
- Renewable Energy

Topics under the agricultural systems area may include:

- California Production Agriculture and Food Systems
- Precision Agriculture
- Automation and Mechanization in Agriculture

The multidisciplinary nature of these programs will allow students to select electives in departments throughout the university with adviser approval.

MS Agriculture, Specialization in Crop Science

For students with undergraduate preparation in plant agriculture and/ or plant science. Current research is focused primarily in applied fruit crop physiology, vegetable breeding and physiology, sustainable fruit and vegetable production, viticulture, plant pathology, integrated pest management, and postharvest technology, including sustainable packaging and packaging safety. Thesis required.

MS Agriculture, Specialization in Dairy Products Technology

An applied program for students who desire to use their academic preparation in food science and nutrition, dairy science, microbiology, chemistry, engineering, biochemistry and related fields to address applied research questions of impact to the field of dairy science and technology. The program requires the demonstration of strong analytical thinking, effective oral and written communication, and
project management. Coursework and thesis experience are designed with flexibility to enhance and increase proficiency in scientific methods while enriching students’ overall preparation to enter the workforce. Graduates enter research and development positions with major food companies, leadership positions in dairy food processing and other allied areas, or further graduate study for the Ph.D. Students have opportunity to work on funded research projects of the Dairy Products Technology Center and interact with multidisciplinary teams of scientists from throughout the world. International students are encouraged to apply. Additional prerequisites: Prospective students are required to:

• submit a cover letter identifying interests, goals and experience relevant to the MS program, and
• submit a résumé

**MS Agriculture, Specialization in Environmental Horticulture Science**

For students with undergraduate preparation in horticulture and/or plant science. Current research is focused primarily in applied plant physiology, nursery and potted plant production, sustainable landscape development and maintenance, and integrated pest management. Thesis required.

**MS Agriculture, Specialization in Food Science and Nutrition**

For students with undergraduate preparation in food science, nutrition, or other science-based curricula. A thesis is required. Research areas vary with faculty expertise and interest; refer to Food Science and Nutrition Department and College of Agriculture, Food and Environmental Sciences web pages for more information on faculty research. Graduates are prepared for further study in doctoral programs or for responsible positions in nutrition and food industries.

**MS Agriculture, Specialization in Irrigation**

The program requires the demonstration of strong analytical thinking, effective oral and written communication, and project management. Additional prerequisites:

• B.S. or B.A. with proficiency in basic chemistry and math.
• Students must have successfully completed at least one undergraduate class in general irrigation, soil science, crop science, calculus, and hydraulics, plus be familiar with spreadsheets.

Students may complete prerequisite courses at Cal Poly if necessary.

**MS Agriculture, Specialization in Plant Protection Science**

For students with undergraduate preparation in plant agriculture, plant science, biological sciences, and/or ecology. Current research is focused on pest biology, tritrophic interactions, invasive species, integrated pest management, biological control and plant disease management. Projects provide the opportunity to conduct field and/or laboratory experiments with corporate stakeholders for career enhancement. Curriculum and research allows students to develop more diverse or specialized skill sets for post-graduate employment and/or opportunity to obtain required coursework for state licensing. Thesis required.

**MS Agriculture, Specialization in Recreation, Parks, and Tourism Management**

The Recreation, Parks, and Tourism Management specialization provides students with advanced study for management positions in the leisure industry or to pursue a career in higher education. The program currently focuses on applied social science research related to tourism, event management, and outdoor recreation management. Prerequisite: In order to develop an academic background in this discipline, students who have not completed a B.S./B.A. degree in Recreation, Parks and Tourism Administration may be required to take the following courses: and .

**MS Agriculture, Specialization in Soil Science**

Provides graduate level knowledge and skills for soils interpretation and management, for teaching, or for continuation into a PhD program. Department facilities include modern instrumentation, laboratories, and a glasshouse. Students have access to several thousand acres of agricultural, forest, and range lands. Graduates meet educational requirements for professional certification by the American Registry of Certified Professionals in Agronomy, Crops, and Soils, and as Certified Professional Erosion and Sediment Control Specialists.

**MS Engineering, Specialization in Water Engineering**

The College of Engineering and the BioResource and Agricultural Engineering Department jointly offer the Water Engineering Specialization under the M.S. Engineering. Please see College of Engineering (http://catalog.calpoly.edu/collegesandprograms/collegeofengineering) section of this catalog for more information.

**Agricultural Communication Minor**

Brock Center for Agricultural Communication
Agriculture Bldg. 10, Room 235
Phone: 805.756.2892
Coordinator: Megan Silcott

Completion of this interdisciplinary minor enhances students’ ability to be successful in dynamic professions associated with the agricultural industry, including print journalism, broadcast journalism and public relations.

The minor is a cooperative effort between the College of Agriculture, Food and Environmental Sciences (CAFES) and the College of Liberal Arts (CLA). Students are advised by faculty members assigned to the Brock Center for Agricultural Communication. Student participation in the Cal Poly chapter of the national Agricultural Communicators of Tomorrow (ACT) is encouraged.

**Environmental Studies Minor**

Please see the College of Science and Mathematics (http://catalog.calpoly.edu/collegesandprograms/
An interdisciplinary program sponsored by three departments in CAFES: BioResource and Agricultural Engineering, Natural Resources Management and Environmental Sciences, and Horticulture and Crop Science. New technologies of geographic information systems (GIS), global positioning systems (GPS), and orthophotography (uniform scale aerial photographs) are revolutionizing the management of resources. There are great employment opportunities for those who understand these technologies. Students interested in this minor may come from the following majors: forestry and natural resources, crop science, soil science, landscape architecture, agricultural systems management, bioresource and agricultural engineering, animal science or earth sciences. Students from any major are welcome to take this minor.

Indigenous Studies in Natural Resources and the Environment Minor

An interdisciplinary minor sponsored by the departments of Natural Resources Management and Environmental Sciences and Ethnic Studies. For more information, see the Natural Resources Management and Environmental Sciences (http://catalog.calpoly.edu/collegesandprograms/collgeoagriculturefoodenvironmentalsciences/naturalresourcesmanagementenvironmentalsciences) section.

Land Rehabilitation and Restoration Ecology Minor

Natural Resources Management & Environmental Resources Department
Bldg. 180, Room 515
Phone: 805.756.1691
Coordinator: Chip Appel

Students completing the minor gain skills in recognizing, assessing, and treating disturbed lands for numerous purposes, including erosion and sediment control, water quality improvement, habitat restoration, and aesthetic enhancement. They develop proficiency in plant identification and selection, soil properties and processes, and ecological principles, and also learn to set criteria and judge the feasibility, prudence, efficiency, and effectiveness of rehabilitation efforts.

Each student is required to complete a hands-on rehabilitation or restoration field project that provides practical experience in recognizing, assessing, and treating a landscape disturbance. Before beginning the treatment phase, the student must prepare a written plan that includes a problem assessment, treatment design, anticipated outcome, and budget. This plan must be approved by the faculty advisor and the minor coordinator before land treatment begins.

Project may be carried out individually or in small groups. Contact the minor coordinator for more details.

Rangeland Resources Minor

Animal Science
Bldg. 10, Room 141
Phone: 805.756.2419
Coordinator: Marc R. Horney

This interdisciplinary minor prepares students for careers in the science and management of semi-arid grasslands, shrublands, and savannas. This is an entry point into a wide range of careers in extensive agriculture (range and pasture-based livestock production), and environmental conservation - including wildlife and natural resource management. Students will learn purposes for and methods of assessing the health and productivity of rangeland ecosystems, and how to manage the herbivorous animals that depend on them. Coursework in the minor will give students an understanding of the interactions of plants, animals, water, soil and landscape features in these ecosystems. This minor will help prepare students for careers with land and wildlife management agencies at the state and federal level, and conservation organizations, as scientists, resource specialists, and managers. It can also strengthen a graduate's opportunities in the private sector as agricultural or environmental consultants, ecologists, wildlife biologists, wildland managers, ranch managers, and other natural resource management specialists.

Completion of this minor meets the basic educational requirements for California Certified Rangeland Manager (CRM) licensing program (http://casrm.rangelands.org/HTML/certified.html).

Sustainable Agriculture Minor

Horticulture and Crop Science
Bldg. 11, Room 235
Phone: 805.756.5382
Coordinator: David Headrick

Students approach modern agricultural problems from a holistic perspective, emphasizing agricultural planning integrated with ecological principles. Through experience in sustainable agricultural practices, students learn about a farm/ranch in the context of an agro-ecosystem: a system whose processes and relationships can be manipulated to allow production with fewer adverse environmental impacts and external inputs. Students develop knowledge and skills involving holistic management, crop production, and adaptive decision-making in a hands-on environment. The minor is available to all Cal Poly students.

Water Science Minor

BioResource and Agricultural Engineering
Bldg. 08, Room 101
Phone: 805.756.2378
Irrigation Emphasis Coordinator: Stuart W. Styles
Natural Resources Management and Environmental Sciences
Bldg. 180, Room 209
Phone: 805.756.2702
Water Policy/Watershed Management Emphasis Coordinator:
Christopher G. Surfleet

The minor emphasizes one of three areas of study: irrigation, water policy, or watershed management. In California, 85% of the developed water is used for irrigation. Irrigation water use and management have tremendous impacts upon ground water quality, power usage, crop yields, surface water supplies and quality, drainage problems, and water availability for transfer to urban uses. For students interested in the environment and water, the Water Science minor provides marketable skills.