Then and Now

Buttermaking in 1915 (above)
Today’s Dairy Science students may conduct research in areas such as cheese chemistry and technology, and bioseparation processes, in the state-of-the-art facilities in the Dairy Products Technology Center (DPTC). Students learn how to manage a processing plant and the science and technology of manufacturing milk, cheese, butter, ice cream, and cottage cheese. They are also involved in the distribution and marketing of the dairy products. In addition, the plant is used for new product development and for processing research.

Student producers at Swanton Pacific Ranch (left)
The College of Agriculture operates the 3,200 acre Swanton Pacific Ranch in Santa Cruz County which has been generously donated by Al Smith, alumnus of the Crop Science Department. This unit provides students with an opportunity to live and work on a commercial ranch. Ongoing commercial operations include timber harvests, a natural beef, cow-calf operation, stocker cattle on a weight-gain contract, and organic fruit and vegetable production.

These facilities provide students with unique opportunities for hands-on experiences which augment the instruction received in the classroom.

Photos courtesy of College of Agriculture and University Archives
The College of Agriculture offers programs reflecting the growing diversity of choices available and skills required in modern agriculture and its related professions.

Students take courses in their major field beginning with their first quarter of enrollment. This early exposure to their major provides them with knowledge of immediate interest 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 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.

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.

Faculty in the College of Agriculture 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.

The Agriculture Education Department provides an additional program to credential candidates who wish to become secondary school teachers of Agriculture. In partnership with the Brock Center for Agricultural Communication, the department also offers an agricultural communication emphasis.

The Master of Business Administration degree with an Agribusiness Specialization is offered by the College of Business in conjunction with the Agribusiness Department.

### FACILITIES

The College of Agriculture facilities include a 6,000 acre farm having beef cattle, dairy cattle, horse, sheep, swine and poultry units, rodeo and horse show arenas, a horse training track, vineyards, irrigated and non-irrigated fields for various crops, citrus groves, avocado and deciduous orchards, an arboretum, and greenhouses. The college facilities also include several microcomputer laboratories, a market news information facility, an irrigation demonstration field, reservoirs, an agroforestry demonstration plot, 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.

The College of Agriculture also operates the 3,200 acre Swanton Pacific Ranch in Santa Cruz County which has been generously donated by Al Smith, alumnus of the Crop Science Department. This unit provides students with an opportunity to live and work on a commercial farm with forestry, cattle and crop production activities.

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**ACADEMIC PROGRAMS**

<table>
<thead>
<tr>
<th>Program</th>
<th>Degree(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Business</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Agricultural Communication</td>
<td>Minor</td>
</tr>
<tr>
<td>Agricultural Science</td>
<td>BS</td>
</tr>
<tr>
<td>Agricultural Systems Management</td>
<td>MS</td>
</tr>
<tr>
<td>Agriculture</td>
<td>BS</td>
</tr>
<tr>
<td>Animal Science</td>
<td>BS</td>
</tr>
<tr>
<td>BioResource &amp; Agricultural Engineering</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Crop Science</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Dairy Science</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Earth Science</td>
<td>BS</td>
</tr>
<tr>
<td>Environmental Horticultural Science</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Food Science</td>
<td>BS</td>
</tr>
<tr>
<td>Forestry and Natural Resources</td>
<td>BS</td>
</tr>
<tr>
<td>Forestry Sciences</td>
<td>MS</td>
</tr>
<tr>
<td>Fruit Science</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Geographic Information Systems for Agriculture</td>
<td>Minor</td>
</tr>
<tr>
<td>Land Rehabilitation</td>
<td>Minor</td>
</tr>
<tr>
<td>Military Science</td>
<td>Minor</td>
</tr>
<tr>
<td>Nutrition</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Ornamental Plant Production</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Plant Protection Science</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Poultry Management</td>
<td>Minor</td>
</tr>
<tr>
<td>Recreation Administration</td>
<td>MS</td>
</tr>
<tr>
<td>Soil Science</td>
<td>BS, Minor</td>
</tr>
<tr>
<td>Water Science</td>
<td>Minor</td>
</tr>
<tr>
<td>Wine and Viticulture</td>
<td>Minor</td>
</tr>
</tbody>
</table>

The College of Agriculture also offers minor programs in:

- Wine and Viticulture
- Water Science
- Soil Science
- Ornamental Plant Production
- Plant Protection Science
- Poultry Management
- Recreation Administration
- Environmental Horticultural Science
- Food Science
- Agriculture
- Land Rehabilitation
- Military Science
- Nutrition
- Ornamental Plant Production
- Plant Protection Science
- Poultry Management
- Recreation Administration
- Soil Science
- Water Science
- Wine and Viticulture

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**2001-2003 Cal Poly Catalog**
All of these facilities are for student use. They provide students with unique opportunities for hands-on experiences which augment the instruction received in the classroom.

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

**Major.** The 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.** Courses in agriculture 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.

**Electives.** Course selection in this area 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 extra- and co-curricular activities as part of their preparation for admission to Cal Poly's College of Agriculture. 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 will be explained by the instructor at the first meeting of the class.

**AGRICULTURAL ENTERPRISE PROJECT FACILITIES**
The College of Agriculture utilizes the student enterprise program of the Cal Poly Foundation to provide practical experience which supplements the regular production courses. This enterprise program leads to a fuller understanding of important production and managerial problems in agriculture.

The College of Agriculture operates a campus farm which, with its equipment, buildings and livestock, is available to students for their use in conducting a wide variety of agricultural enterprise projects.

The Animal Science Department conducts student enterprise projects with beef cattle, swine, sheep, horses and poultry. The stock utilized by our students represents the best bloodlines in the nation.

The beef program includes registered herds of 150 cows, stocker programs averaging 200 head, a 300-head performance test facility, a 200-head feedlot, and 15-20 show steers. These cattle are managed in a variety of settings from environmentally controlled confinement to our 3,000 acre native range operation. The cattle are dispersed over six different ranches away from the campus core and four distinct areas on campus. These animals and facilities are utilized for student projects including cow-calf, feedlot, stocker, performance, and show cattle operations.

The sheep section includes purebred flocks of 70 Suffolk and 35 Hampshire ewes and a commercial range flock of 185 whiteface ewes. The sheep are housed on one ranch of 600 acres near, but not on campus, and a group of pastures and facilities closer in. Students become involved in commercial ewe, lamb feeding, range ram, ram test, and show lamb projects.

The swine herd consists of two major breeds–Yorkshires and Hampshires. The facilities include a 10-unit farrowing house and outside lots and pastures for the brood sows. In addition there are 24 feeder units for student projects with capacity for approximately 20 market hogs per unit. Between 400 and 500 market hogs are produced in student projects each year.

The Foundation horse herd is made up of the Thoroughbred and Quarter Horse breeds. An approximate total of 60 head of broodmares, foals, yearlings and riding stock are housed at the horse unit facilities. Currently standing at stud are three stallions: two Quarter Horses and one Thoroughbred.

Emphasis is placed on basic horse handling and training procedures leading up to the breeding and training of two-year-olds for in-training sales. These sales expose students to professionals and their ideas and expose the industry to what we do at Cal Poly.

The poultry flocks comprise some 5,000 birds. Student projects involve mostly broiler production, started pullet production, and egg production--plus duck, geese, turkeys, and game birds on a limited basis. The equipment includes a modern incubator, egg-handling facilities, and brooding and rearing equipment. Students care for all of the operations under the supervision of technicians and faculty.

The Dairy Science herd includes purebred Jerseys and Holsteins. The dairy has all the necessary facilities for feeding, milking and bull raising, artificial insemination, and management practices. A separate dairy located on campus provides an opportunity for students with dairy projects. A modern dairy plant is also available for milk processing and manufacturing by-products.

The Food Science and Nutrition Department is equipped with a food operation pilot plant and meat processing facilities. The laboratories contain many types of pilot scale commercial processing equipment. Students process foods...
under faculty supervision. Some examples are: jams, condiments, fresh and processed meats, baked goods and specialty products. All food products manufactured by student enterprise projects and class work are marketed in the Campus Store.

The Natural Resources Management Department has faculty expertise and facilities available for raising Christmas trees and for agroforestry. Students conducting forestry projects learn all aspects of tree farming from establishment to marketing. A large, well-equipped greenhouse facility is available for raising tree seedlings. Also, a large area of redwood and mixed hardwood forest land is available for student projects on the Swanton-Pacific Ranch near Santa Cruz.

The Environmental Horticultural Science Department provides facilities consisting of fifteen greenhouses, six shade houses, extensive growing grounds, a sales area, a large plant tissue culture lab, extensive turf plots, disease and pest lab, and three large labs available for production. The unit has the latest equipment and machinery to facilitate student projects needs which encompass all phases of nursery and greenhouse production.

The Crop Science Department is well equipped with all types of machinery found on mechanized farms in California. All of the crop production and marketing operations are carried on under the supervision of the Crop Science Department through enterprise projects. Orchards, vineyards, crop land, fruit and vegetable packing facilities and marketing outlets are available for instructional purposes.

The Soil Science Department is equipped for the accurate analysis of soil and water with modern equipment and facilities. Under faculty supervision, Enterprise students have the opportunity to learn the management and operation of a soil and water testing program. The students provide soil and water data and information to home owners and growers for fertilizer practices in San Luis Obispo County.

AGRICULTURAL COMMUNICATION MINOR
Brock Center for Agricultural Communication
Agriculture Bldg. (10), Room 235, (805) 756-6138
This interdisciplinary minor will enhance the students’ ability to seek careers in dynamic professions associated with the agricultural industry, including print journalism, broadcast journalism, and public relations.

A key feature of this minor is an interdisciplinary approach. It is a cooperative effort between the College of Agriculture and the College of Liberal Arts and advised by faculty members assigned to the Brock Center for Agricultural Communication. Students have the opportunity to participate in the Cal Poly chapter of the national Agricultural Communicators of Tomorrow Association.

Required Courses
JOUR 203 News Writing and Reporting ............ 4
JOUR 205 Agricultural Communications ........... 4
SCOM 301 Business/Professional Communication. 4
AGED 404 Agricultural Leadership ................ 3

Elective Area .................................................. 15

College of Agriculture Majors:
Selected from adviser approved list. Minimum of 10 units must be at 300-400 level; two courses must be selected from JOUR, SCOM, ENGL.

Journalism, Speech Communications, and other Non-agriculture Majors:
Courses to be selected from adviser approved list.
A minimum of 10 units must be at 300-400 level

30

GEOGRAPHIC INFORMATION SYSTEMS FOR AGRICULTURE MINOR
An interdisciplinary program sponsored by three departments: BioResource and Agricultural Engineering, Natural Resources Management, 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 the technologies and society will benefit from improved management decisions. Students interested in this minor may come from the following majors: forestry and natural resources; crop science; soil science; landscape architecture; agricultural systems management; or animal science.

Required Courses

Graphical Communication (select one of the following tracks) ...................................................... 4/6
BRAE 133 Engineering Design Graphics (3) and
BRAE 151 CAD for Agric. Engr. (1); or
CE 114 Intro. CAD Civil & Environ. Engr (4); or
LA 111 3-D Graphics/Landscape Arch (4) and
LA 310 Intro Computing/Landscape Arch (2)

Surveying (select one of the following tracks) .............. 4
BRAE 237, 238 Engineering Surveying I, II (2)(2); or
BRAE 247 Forest Surveying (2) and
BRAE 238 Engineering Surveying II (2); or
BRAE 239 Engineering Surveying (4)

BRAE 345 Aerial Photogrammetry/Remote Sensing ..... 3
BRAE 446 CAD for Land Modeling ....................... 2
FNR/GEOG/LA 318 Applications in GIS ............... 3
FNR/BRAE/LA/CRSC 470 Selected Advanced Topics 3

Emphasis areas (select one) .............................. 11

Environmental Information Emphasis
BRAE 452 Boundary Law/Data Accuracy for GIS (3)
FNR 306 Natural Res Ecology/Habitat Mgt (4) or
BIO 325 General Ecology (4)
FNR 416 Environmental Impact Analysis (4)
Precision Agriculture Emphasis
CRSC 244 Precision Farming (4)
Select two of the following (7):
CRSC 410, 421, 445; PPSC 405, 431; SS 433;
VGSC 423

LAND REHABILITATION MINOR
Students completing the minor will 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 will 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.

Before being admitted to the minor, students must have successfully completed the following courses:
BOT 121 or BIO 114; SS 121; MATH 118
At least one-half of the units must be at the 300-400 level. Generally, courses required for the student's major degree cannot be counted toward the minor, except that courses selected in the required core may count in both the major and minor programs. This and other course exceptions must be approved by the minor coordinator. As a guideline, students should take at least 20 units from outside their major degree program.

Required core courses
Minimum of 14 units .......................... 14

Plant area (select one course):
BIO 152; BOT 238, 333; EHS 381

Soils area:
SS 321 Soil Morphology (4) or SS 440 Forest and Range Soils (4)

Ecological Principles (select one course):
BOT 326; FNR 306; AG 450

Project (select one course)
May be selected from Special Problem, Selected Advanced Topic, Senior Project or other course designation approved by the minor coordinator.

Coordinator approved electives
Minimum of 12 units .......................... 12
Select 4 courses from the following list:
ASCI 329; BIO 418; DOT 313, 324;
BRAE 340, 415; PPSC 221, 327;
EHS 124, 382; FNR/GEOG/LA 318;
FNR 307, 308, 408, 419, 420
MCRO 436; SS 202, 221

WATER SCIENCE MINOR
The Water Science 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.

Required core courses
BRAE 340 Irrigation Water Management ........ 4
SS 121 Introductory Soil Science .................... 4
FNR 408 Water Resource Law and Policy .......... 3

Select one emphasis area .................................. 13-18
Irrigation Emphasis (13)
BRAE 237 Engineering Surveying (2)
Select 11 units from the following:
BRAE 331, 405, 435, 440, 492

Water Policy Emphasis (17-18)
AGB 315 Land Economics (4)
FNR 435 Natural Resources Policy Analysis (4)
AGB 409 California Agricultural Law (3) or FNR 404 Environmental Law (3)
FNR 419 Watershed Mgt and Restoration (4)
SS 433 Land Use Planning (3)

Watershed Management Emphasis (16)
FNR 306 Natural Res Ecology/Habitat Mgt (4)
FNR 419 Watershed Management (4)
FNR 420 Advanced Watershed Hydrology (4)
SS 440 Forest and Range Soils (4)

WINE AND VITICULTURE MINOR
The goals of the minor are to educate students in the various aspects of wine and viticulture management, addressing knowledge of viticulture, enology, and marketing with skill areas of growing practices, winemaking and wine marketing. The minor is a cooperative effort between the Agribusiness, Food Science and Nutrition, and Crop Science departments, and is designed for students with majors from these departments.

Required core courses
AGB 443 Branded Wine Marketing .................. 4
AGB 444 Wine Compliance and Market Analysis .. 4
FRSC 231 Viticulture ................................... 4
FRSC 331 Advanced Viticulture ...................... 4
FNR 341 Wines and Fermented Foods ............... 3

Adviser approved electives .............................. 8
Select 8 units from the following:
AG 339; AGB 405, 406; BRAE 340/440;
PPSC 221; FRSC 414; FSN 274; SS 121, 221.

2001-2003 Cal Poly Catalog
College of Agriculture  

Master of Science in Agriculture

MS Agriculture with Specializations in:
- Agribusiness
- Agricultural Education
- Agricultural Engineering Technology
- Animal Science
- Crop Science
- Dairy Products Technology
- Environmental Horticultural Science
- Food Science and Nutrition
- General Agriculture
- Irrigation
- Soil Science

General Characteristics
Graduate studies in the College of Agriculture 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;
* agricultural teaching in secondary schools or community colleges; or
* continued graduate work at other institutions.

When to Apply
Application filing periods are given on page 95 of this catalog. To ensure adequate processing and full consideration, all application materials should be filed with the Cal Poly Admissions Office before the dates given below; nevertheless, applicants are encouraged to file during the initial filing period.

Fall Quarter ..................................................... July 1
Winter Quarter ........................................... November 1
Spring Quarter .............................................. March 1
Summer Quarter ............................................ April 1

Prerequisites
Consideration for admission to this program as a classified graduate student requires a minimum grade point average of 2.75 in the last 90 quarter units attempted. An applicant not meeting these academic standards, but who meets the basic university standard of a grade point average of 2.5 in the last 90 quarter units attempted may be considered for admission as a postbaccalaureate student; such admission does not constitute admission to graduate degree standing (refer to page 94). A change from postbaccalaureate status to graduate status requires application and additional processing through the university's admissions office.

An applicant meeting the grade point requirement for classified graduate status, but who is deficient in background courses in agriculture, natural resources and/or related support disciplines may be considered for admission as a conditionally classified graduate student. Before such a student is advanced to classified graduate status, deficiencies in prerequisites must be removed and satisfactory academic performance in a graduate program must be demonstrated by the completion of no fewer than 12 units of specified courses with a minimum grade point average of 3.0. Courses taken to remove deficiencies in prerequisites will not count toward the unit requirement for the degree.

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), with a minimum score of 550, and the Test of Written English (TWE), with a minimum score of 4.5.

Program of Study
The MS Agriculture program includes the following specializations: Agribusiness, Agricultural Education, Agricultural Engineering Technology, Animal Science, Crop Science, Dairy Products Technology, Environmental Horticultural Science, Food Science and Nutrition, Forestry Sciences, General Agriculture, Irrigation, and Soil Science. The General Agriculture specialization provides students with the opportunity to focus their graduate study in one of several additional areas, including: Agricultural Communication, Animal Science or Crop Science. Although the program offers several specializations, there is a single degree; students may not earn more than one Master of Science degree in the College of Agriculture.

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 curriculum.

Graduate students must file the formal program of study for the degree with the Graduate Studies Coordinator of the College of Agriculture 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 minimum units required 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. Students also should refer to the Graduate Program Guidelines available from the Graduate Studies Coordinator. At least one course in statistical methods and/or experimental design is required of students in a thesis curriculum.

All candidates must meet the current Graduation Writing Requirement; see page 100. All students, whether completing a thesis or project, 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 this is optional. For students in a thesis program, the final oral comprehensive examination will include, but not necessarily be limited to, a defense of the thesis.

MS Agriculture, Specialization in AGRIBUSINESS

Designed to enhance the agribusiness management, commodity marketing, and technical skills of graduate students with interests in international and domestic agribusiness. Prerequisites: Bachelor's degree with coursework in macroeconomics, microeconomics, mathematics, and statistics.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGB 433/435/422</td>
<td>4</td>
</tr>
<tr>
<td>AGB 450 Agricultural Strategy Formulation</td>
<td>4</td>
</tr>
<tr>
<td>AGB 460 Research Methodology in Agribusiness or SS 501 Research Planning</td>
<td>2/4</td>
</tr>
<tr>
<td>AGB 510 International Development and Agribusiness</td>
<td>4</td>
</tr>
<tr>
<td>AGB 514 Agribusiness Managerial Leadership and Communication</td>
<td>4</td>
</tr>
<tr>
<td>FNR 532 Forestry Applications in Biometrics and Econometrics</td>
<td>4</td>
</tr>
<tr>
<td>AGB 543 Agricultural Policy and Program Analysis</td>
<td>4</td>
</tr>
<tr>
<td>AGB 554 Food Systems Marketing</td>
<td>4</td>
</tr>
<tr>
<td>AGB 555 Technological and Economic Change in Agriculture</td>
<td>4</td>
</tr>
<tr>
<td>AGB 563 International Agribusiness Trade: Cases and Theory</td>
<td>4</td>
</tr>
<tr>
<td>AGB 599 Thesis in Agribusiness</td>
<td>6</td>
</tr>
<tr>
<td>Restricted elective</td>
<td>4</td>
</tr>
</tbody>
</table>

Select 12 units from the following:

Committee approved elective at the 400/500 level

48/50

MS Agriculture, Specialization in AGRICULTURAL EDUCATION

Provides students with the opportunity to focus their graduate study in Agricultural Education, and is generally taken concurrently with the credential program.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGED 539 Internship</td>
<td>6</td>
</tr>
<tr>
<td>AGED 520 Program Development in Agric. Education</td>
<td>3</td>
</tr>
<tr>
<td>AGED 522 Instructional Program in Agric. Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Restricted electives</td>
<td>33</td>
</tr>
</tbody>
</table>

Any 400- and 500-level courses approved by the student's graduate committee. No fewer than 11 units must be at the 500 level. Students are required to complete one year of successful teaching or graduate level internship prior to the written and oral examinations.

45

MS Agriculture, Specialization in AGRICULTURAL ENGINEERING TECHNOLOGY

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG 599 Thesis</td>
<td>6</td>
</tr>
<tr>
<td>BRAE 521 Systems Analysis of Agric. Systems</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 522 Instrumentation Control/Microprocessors</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 533 Irrigation Project Design</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 581 Graduate Seminar Agric. Engineering</td>
<td>3</td>
</tr>
<tr>
<td>400-500 level research methods course</td>
<td>3</td>
</tr>
<tr>
<td>Restricted electives</td>
<td>15</td>
</tr>
</tbody>
</table>

At least 9 units must be in computer related coursework; remaining units shall include at least 6 units at the 500 level.

Electives

45

400-500 level courses

MS Agriculture, Specialization in ANIMAL SCIENCE

An interdisciplinary, science-based program, whereby students gain a scientific foundation and then learn to apply it to improve production in commercial animal species.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCI 402 Domestic Animal Endocrinology</td>
<td>3</td>
</tr>
<tr>
<td>ASCI 410 Ultrasonography</td>
<td>1</td>
</tr>
<tr>
<td>ASCI 500 Individual Study in Animal Science</td>
<td>6</td>
</tr>
<tr>
<td>VS 438 Systemic Animal Physiology</td>
<td>4</td>
</tr>
<tr>
<td>STAT 512 Statistical Methods</td>
<td>4</td>
</tr>
<tr>
<td>Select 12 units from the following</td>
<td>12</td>
</tr>
<tr>
<td>ASCI 402 Domestic Animal Endocrinology (4)</td>
<td></td>
</tr>
<tr>
<td>ASCI 410 Ultrasonography (1)</td>
<td></td>
</tr>
<tr>
<td>ASCI 500 Individual Study in Animal Science (6)</td>
<td></td>
</tr>
<tr>
<td>VS 438 Systemic Animal Physiology (4)</td>
<td></td>
</tr>
<tr>
<td>STAT 512 Applied Experimental Design and Regression Models (4)</td>
<td></td>
</tr>
</tbody>
</table>
CHEM 528 Nutritional Biochemistry (3)
BIO 431 General and Cellular Physiology (4)
AGED 426 Presentation Methods in Agricultural Communication (3)
ZOO 405 Vertebrate Development (5)

Electives (400–500 level courses) …………………………… 13
(Note: A minimum of 23 of the 45 total units must be at the 500 level.)

45

MS Agriculture, Specialization in
CROP SCIENCE
Research currently is focused primarily in postharvest technology, viticulture, and integrated pest management, with additional work being done in other areas, including agronomy, horticulture, and precision farming.

Required Courses
CRSC/VGSC 521/FRSC 436/PPSC 405 ………………… 4
CRSC 581 Graduate Seminar …………………………… 3
CRSC 599 Thesis ………………………………………… 6
400- or 500-level research methods course …………… 3

Restricted electives ……………………………………… 29
Any 400- and 500-level courses, approved by the student's graduate committee. A minimum of 23 units must be at the 500 level.

45

MS Agriculture, Specialization in
DAIRY PRODUCTS TECHNOLOGY

Required Courses
DSCI 401 Physical and Chemical Properties of Dairy Products ……………………………………… 4
DSCI 522 Bioseparation Processes in Dairy Product Technology ……………………………………… 4
DSCI 570 Selected Topics in Dairy Science ………………… 3
DSCI 571 Selected Adv. Lab in Dairy Science ………………… 3
DSCI 581 Graduate Seminar in Dairy Science ………………… 3
DSCI 599 Thesis ………………………………………… 6
STAT 513 Applied Experimental Design and Regression Models ……………………………………… 4

Restricted electives ……………………………………… 18
Any 400- and 500-level courses, approved by the student's graduate committee.

45

MS Agriculture, Specialization in
ENVIRONMENTAL HORTICULTURAL SCIENCE
For students interested in careers in teaching, applied research positions in industry, or to students planning on continuing on for a Ph.D. It would also appeal to foreign students interested in an American graduate degree, particularly since California is internationally famous for its horticulture industry.

Required Courses
EHS 500 Individual Study ………………………………… 3
EHS 570/571 Selected Topics …………………………… 3
SS 501 Research Planning ………………………………. 4
STAT 512 Statistical Methods ……………………………. 4
EHS 599 Thesis ………………………………………….. 6

Restricted electives ……………………………………… 25
Any 400- and 500-level courses approved by the student's graduate committee. A minimum of 3 units must be at the 500 level.

45

MS Agriculture, Specialization in
FOOD SCIENCE AND NUTRITION

Required Courses
FSN 581 Graduate Seminar …………………………… 3
FSN 599 Thesis ………………………………………….. 6
SS 501 Research Planning or other 400-500 level research methods course ………………… 2-4
STAT 512 Statistical Methods ……………………………. 4

Adviser approved electives (400–500 level courses) ………………… 28-30

45

MS Agriculture, Specialization in
GENERAL AGRICULTURE
The General Agriculture Specialization provides students with the opportunity to focus their graduate study in one of several areas, including Agricultural Communication, and Recreation, Parks and Tourism Management.

Required Courses
AG 539 Internship or AG 599 Thesis …………………………. 6
400- or 500-level research methods course ………………… 3
Any 581 Graduate Seminar offered in College of Agriculture ……………………………………… 3

Restricted electives ……………………………………… 33
Any approved 400- and 500-level courses. No fewer than 11 units must be at the 500 level.

45

MS Agriculture, Specialization in
IRRIGATION
Prerequisite: B.S. in a technical field of agriculture, or a B.A. with proficiency in basic chemistry, advanced algebra and trigonometry. All students must have had at least one undergraduate class in general irrigation, soil science, and crop science, plus be familiar with computer spreadsheet usage. Students may complete prerequisite courses at Cal Poly if necessary.

Required Courses
BRAE 405 Chemigation ………………………………… 1
BRAE 435 Drainage or
BRAE 437 Conservation Engineering ………………… 3
BRAE 438 Drip/Micro Irrigation ……………………… 4
BRAE 440 Agricultural Irrigation Systems …………… 4
BRAE 492 Pumps and Pump Drivers or
BRAE 531 Water Wells ………………………………. 3

2001-2003 Cal Poly Catalog
BRAE 500 Individual Study ........................................ 3
BRAE 533 Irrigation Project Design ......................... 4
Any 581 Graduate Seminar offered in College of
Agriculture .................................................................. 3
BRAE 599 Thesis ..................................................... 6
400-500 level research methods course .................. 3
Electives ..................................................................... 11
400-500 level courses approved by the student's
graduate committee. A minimum of 23 units of
500-level coursework is required 45

MS Agriculture, Specialization in
SOIL SCIENCE
Prerequisite: B.S. degree in Soil Science, related field or
physical or biological sciences, or a B.A. degree with
proficiency in the basic sciences (chemistry, physics,
botany, biology, and statistics). A computer science or
computer applications course is required. Students may
complete prerequisite courses at Cal Poly if necessary.

Required Courses
SS 501 Research Planning ....................................... 4
SS 508 Landscape Management-Erosion Control ...... 3
SS 522 Advanced Soil Fertility .............................. 3
SS 581 Graduate Seminar in Soil Science .............. 3
SS 582 Advanced Land Management .................. 3
SS 599 Thesis ...................................................... 6
Electives ..................................................................... 23
400-500 level courses approved by the graduate
commitee. At least 6 units of electives must be
from outside of the College of Agriculture. 45

MBA, Specialization in
AGRIBUSINESS
The College of Business and the Agribusiness Department
jointly offer an Agribusiness Specialization in the Master of
Business Administration program. The program is part of
the two-year MBA curriculum and requires the completion
of six graduate classes taught by the Agribusiness
Department (see page 180, the College of Business).
Information and application materials may be obtained by
writing to the MBA Coordinator, College of Business.

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 section of
this catalog for more information.
Agribusiness

Department Chair, Kenneth C. Scott

James J. Ahern    Neal MacDougall
William H. Amspacher    Robert E. McCorkle
Renny J. Avey    Jay E. Noel
M. LeRoy Davis    Nancy C. Ochs
Phillip M. Doub    David J. Schaffner
Douglas G. Genereux    Robert C. Thompson
Lynn L. Hamilton    Marlin D. Vix
Wayne H. Howard    Marianne M. Wolf

ACADEMIC PROGRAMS

BS Agricultural Business
Agribusiness Minor

The BS program in Agricultural Business emphasizes management preparation for careers in agribusiness as part of the world’s food system. The food system encompasses all the direct functions such as inputs to producers, production, processing, distribution, and marketing. Emphasis is placed on the support functions such as finance, domestic policy, and international policy. The curriculum is based on a solid background in production agriculture.

CONCENTRATIONS

In addition to the required major courses in agricultural business, students select one of the following concentrations or individualized course of study based upon their interests and career goals.

Agribusiness Finance and Appraisal. The study of economic, legal and real estate principles in the investment, development and mortgaging of agricultural real estate. Employment opportunities are available with a variety of institutions such as the Farm Credit System, Farm Service Agency, commercial banks, and large insurance companies. Careers may include loan officer, fee appraiser, financial officer, and agricultural real estate management and sales.

Agribusiness Marketing. Coursework includes the analysis of marketing methods and planning, sales forecasting, and research design for agribusiness. Career opportunities involve the marketing, advertising, distribution, and sales of farm products.

Agribusiness Policy. Coursework includes the analysis of agricultural resource allocation issues with emphasis on policies that impact the production of food and fiber. Typical careers include policy analysts and lobbyists for agribusiness, farm organizations, commodity associations, agribusiness trade associations, government regulatory agencies, and federal and state legislatures.

Farm and Ranch Management. Graduates frequently return to manage the increasingly complex operations of the family farm or find career opportunities with a large-scale farm or ranch operation. The study of farm and ranch management, including factors that influence profits and efficiency, accounting procedures and agricultural tax laws and preparation.

International Agribusiness Management. The opportunity for studying global agricultural production, marketing, trade policies and factors influencing U.S. exports of agricultural commodities and products. In addition to the required curriculum, students are encouraged to develop competency in a second language and complete an internship experience outside of the U.S.

Individualized Course of Study. Students have the option of choosing one of the above concentrations or developing an individualized course of study with adviser and department head approval. The agribusiness sector is changing rapidly with the evolution of biotechnology and information technology. Students are encouraged to explore these and other topics by developing a program of study that reflects individual talents and interests.

Graduate Program

Cal Poly offers a Master of Science degree in Agriculture with a specialization in Agribusiness. Please refer to the MS Agriculture section of the College of Agriculture. A specialization in Agribusiness is also offered in the MBA program; please refer to the Graduate Programs section of the College of Business.

BS AGRICULTURAL BUSINESS

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

AGB 101 Introduction to Agribusiness .................. 4
AGB 202 Sales, Communication, Leadership .......... 4
AGB 212 Agricultural Economics ....................... 4
AGB 213 Agricultural Economic Analysis ............. 4
AGB 301 Food and Fiber Marketing ................... 4
AGB 310 Agribusiness Credit and Finance .......... 4
AGB 312 Agricultural Policy ......................... 4
AGB 401 Managing Cultural Diversity in Agricultural Labor Relations (USCP) .................. 4
AGB 460 Research Methodology in Agribusiness ................................................. 2
AGB 461 Senior Project ......................................................................................... 2
Concentration courses (see below) ....................................................................... 28

SUPPORT COURSES
BUS 207 Business Law ......................................................................................... 4
BUS 212 Financial Actg for Nonbusiness Majors ................................................. 4
CHEM 110 World of Chem/Essentials (B3 & B4) ................................................. 4
Life science elective with lab (B2*) ....................................................................... 4
1 ECON 222 Macroeconomics (D2)* ................................................................. 4
2 MATH 118 Pre-Calculus Algebra or MATH 221 Calculus for Business & Econ.(B1)* 4
STAT 221 Probability/Statistical Inference (B1)* ................................................ 5
ASCI 231 or PM 145 or DSCI 230 .................................................................. 3/4
SS 121 Introductory Soil Science ..................................................................... 4
FRSC 131/230/231 or CRSC 131/230 or VGSC 230 or EHS 121 ....................... 4
Agricultural science electives ............................................................................. 16/17
16/17 units in Agriculture with course prefixes other than AGB, AGED, REC, MSC. No more than 4 units from courses with AG prefix (AG 210, AG 301 and AG 371 do not satisfy units in this area). No more than 4 units from Enterprise Projects and Special Problems. At least 3 of these units should be selected from 300-400 classes

GENERAL EDUCATION (GE)
72 units required; 20 units are in Support.
See page 79 for complete GE course listing.
Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)
A1 Expository Writing ......................................................................................... 4
A2 Oral Communication ....................................................................................... 4
A3 Reasoning, Argumentation, and Writing ..................................................... 4

Area B Science and Mathematics (no additional units required)
B1 Mathematics/Statistics * 8 units in Support................................................. 0
B2 Life Science * 4 units in Support .................................................................. 0
B3 Physical Science * 4 units in Support ........................................................... 0
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)
C1 Literature ......................................................................................................... 4
C2 Philosophy ...................................................................................................... 4
C3 Fine/Performing Arts .................................................................................... 4
C4 Upper-division elective .................................................................................. 4
Area C elective (Choose one course from C1-C4) ........................................... 4

Area D/E Society and the Individual (16 units)
D1 The American Experience (40404) .............................................................. 4
D2 Political Economy * 4 units in Support ......................................................... 0
D3 Comparative Social Institutions .................................................................. 4
D4 Self Development (CSU Area E) ................................................................. 4
D5 Upper-division elective .................................................................................. 4

Area F Technology Elective (upper division)
(4 units) .............................................................................................................. 4

ELECTIVES ....................................................................................................... 43 7

Units reduced effective Winter 2004 486 180

CONCENTRATIONS or
INDIVIDUALIZED COURSE OF STUDY (select one)

Agribusiness Finance and Appraisal
AGB 322 Principles of Farm Management ......................................................... 4
AGB 324 Agric. Property Management and Sales ........................................... 4
AGB 326 Farm Appraisal .................................................................................... 4
AGB 331 Farm Accounting ................................................................................ 4
AGB 410 Agricultural Lending .......................................................................... 4
ECON 337 Money, Banking, and Credit ........................................................... 4
Adviser approved electives: AGB/BUS (300-400 level) or foreign language (any level) ......................................................... 4

Agribusiness Marketing Concentration
AGB 318 Global Agricultural Marketing/Trade ............................................... 4
AGB 323 Agribusiness Managerial Accounting .............................................. 4
AGB 405 Agribusiness. Marketing Research Methods .................................. 4
AGB 406 Agribusiness Marketing Planning .................................................... 4
AGB 421 Agribusiness Operations Analysis or AGB 433 Agricultural Price Analysis ......................................................... 4
AGB 450 Agribusiness Strategy Formulation .................................................. 4
Adviser approved electives: AGB/BUS (300-400 level) or foreign language (any level) ......................................................... 4

Agribusiness Policy Concentration
AGB 307 World Food Economy ........................................................................ 4
AGB 315 Land Economics ............................................................................... 4
AGB 323 Agribusiness Managerial Accounting .............................................. 4
AGB 412 Advanced Agricultural Policy ............................................................ 4
AGB 421 Agribusiness Operations Analysis or AGB 435 Linear Programming in Agriculture ......................................................... 4
AGB 433 Agricultural Price Analysis ............................................................... 4
Adviser approved electives: AGB/BUS (300-400 level) or foreign language (any level) ......................................................... 4

AGB majors: AGB 212 is prerequisite for ECON 222, not ECON 221.

MATH 116 and MATH 117 will substitute for MATH 118 and are taught at a slower pace for those who need more review. Upon completion of both MATH 116 and MATH 117, a student will receive 4 units of GE credit for Area B1.
Farm and Ranch Management
AGB 321 Farm Records ........................................ 4
AGB 322 Principles of Farm Management .......... 4
AGB 331 Farm Accounting .................................. 4
AGB 433 Agricultural Price Analysis ................. 4
AGB 435 Linear Programming in Agriculture ....... 4
AGB 456/457/458 Crop/Livestock/Dairy
Management Problems ....................................... 4
Adviser approved electives: AGB/BUS (300-400
level) or foreign language (any level)............... 4

International Agribusiness Management
BUS 302 International and Cross Cultural Mgt ...... 4
AGB 307 World Food Economy ........................... 4
AGB 318 Global Agricultural Mktg and Trade ...... 4
AGB 323 Agribusiness Managerial Accounting ..... 4
AGB 422 Logistics in Global Agribusiness or
BUS 433 International Business Finance ........... 4
AGB 451 Strategy and Cases in International
Agribusiness ...................................................... 4
Area study concentration elective ........................ 4
To be selected from approved courses in
anthropology, history, humanities, and foreign
languages

AGRIBUSINESS MINOR
In today's ever more complex, technology-driven world, it
is a necessity for any graduate in agriculture to have some
exposure to marketing, personnel management, financial
management, budgeting, and economics if they are to
succeed. The minor is designed to give students in the
College of Agriculture this opportunity. Interested students
must apply for acceptance into the minor through the
Agribusiness Department.

Required courses
AGB 212 Agricultural Economics ...................... 4
AGB 301 Food and Fiber Marketing ................... 4
AGB 310 Agribusiness Credit and Finance .......... 4
AGB 401 Managing Cultural Diversity in
Agricultural Labor Relations (USCP) ............... 4
BUS 212 Financial Accounting for Nonbusiness
Majors or AGB 321 Farm Records ..................... 4

Additional courses ........................................... 8
The student will choose 8 additional units of AGB
courses (not including AGB 101, 200, 339, 400)
with prior approval by AGB Minor Coordinator.

Individualized Course of Study
Adviser and department head pre-approval of
courses is required ........................................... 28

Interdisciplinary Minors
The department participates in offering the interdisciplinary
minor in Wine and Viticulture. Please see College of
Agriculture section for more information.
Agricultural Education & Communication

Department Office
Agriculture Bldg. (10), Room 244
(805) 756-2803

Department Head, Glen R. Casey
Robert A. Flores Sarah M. Stephens
William C. Kellogg J. Scott Vernon
Joseph E. Sabol

ACADEMIC PROGRAMS

BS Agricultural Science

The Agricultural Education and Communication Department offers a Bachelor of Science degree in Agricultural Science with a choice of one of seven concentrations. The program also offers 26/27 units of adviser approved electives which may be selected from one of three career pathways: preparation of teachers of agriculture for the public secondary schools of California, professional preparation in agricultural communication, or international agriculture.

The teaching credential program provides for early field experience and professional education coursework in the undergraduate curriculum. Specialized preprofessional and professional courses are offered for undergraduate and graduate students.

Postbaccalaureate work is required of students seeking the Single Subject in Agriculture or Home Economics, and Agricultural Specialist credentials. Students interested in teaching agriculture may receive a B.S. degree in any of the agricultural science, production or management fields. Coursework toward the teaching credential should be started early in order to complete the total curriculum most effectively. A single subject credential in Home Economics is available for Home Economics graduates or graduates from related programs.

Student teaching is a vital part of the graduate program for agriculture and the home economics credential. Candidates must complete a minimum of 45 units of postgraduate coursework necessary for the "clear" teaching credential. For more information see, Teaching Credential Programs.

In association with the Brock Center for Agricultural Communication, selected interdisciplinary courses in Journalism, Graphic Communications, English, Speech Communication and Agriculture make up the Agricultural Communication minor. Career preparation includes a breadth and depth in agriculture along with foundations in journalism and an industry internship. The Brock Center for Agricultural Communication provides students the opportunity for industry linkages and professional preparation in this rapidly growing career area.

The International Agriculture Career Area includes a breadth and depth of agricultural subjects, an industry internship, language and cultural immersion, and minor in International Relations to form the basis for entering the global agricultural work place. The department works with each student to provide a dynamic, intensive and practical course of study, giving graduates the knowledge and creativity to develop innovative programs and approaches to food, fiber and environmental systems in a global society.

Agricultural Education courses taken at the graduate level may be used to fulfill many of the units required for the MS Agriculture with a specialization in Agricultural Education. Detailed information may be obtained in the office of the Dean of the College of Agriculture or in the Agricultural Education and Communication Department.

CONCENTRATIONS

Agricultural Mechanics. Designed to develop knowledge and ability necessary to perform agricultural mechanical operations and processes.

Agricultural Products and Processing. Principles and practices involved in the science of post harvest technology of agricultural products.

Agricultural Supplies and Services. Study of the consumable supplies and services needed in the production and post harvest phases of agriculture.

Animal Science. Principles and practices related to the economic use of resources in the production of livestock and poultry.

Crop and Soil Science. Principles and practices related to the economic use of resources in the culture and production of agricultural plants.

Forestry and Natural Resources. Principles and practices involved in the conservation, multiple use or improvement of natural resources.

Ornamental Horticulture. Principles and practices involved with the culture of plants used for ornamental or aesthetic purposes.
Graduate Programs  
Cal Poly offers a Master of Science degree in Agriculture with a specialization in Agricultural Education, and a specialization in General Agriculture which provides the opportunity to focus in the area of Agricultural Communication. Please refer to the MS Agriculture section of the College of Agriculture.

CONTINUING EDUCATION IN AGRICULTURE  
Cal Poly and the Agricultural Education and Communication Department play an active role in the professional development and continuing education of high school and community college teachers of agriculture. Instructional staff and facilities are provided for workshops and training programs cooperatively sponsored by the University and the State of California. The campus offers an annual summer skills program. The content varies, depending upon the needs and desires of the teachers, as expressed through the California Agricultural Teachers’ Association. Cal Poly faculty provide up-to-date training in the technical phases of agriculture and offer instruction in teaching methods.

BS AGRICULTURAL SCIENCE  
- 60 units upper division  
- 2.0 GPA  
- = Satisfies General Education requirement

MAJOR COURSES  
- AGED 202 Intro. to Agricultural Education ........... 2  
- AGED 404 Agricultural Leadership ..................... 3  
- AGC 426 Presentation Methods in Agricultural Communication or AGED 438 Instructional Processes in Agricultural Education .................. 3  
- AGED 460 Research Methodology in Agricultural Education and Communication .................. 1  
- AGED/AGC 461 Senior Project .......................... 2  
- AGED/AGC 462 Senior Project .......................... 2  
- AGB 202 Communication, Leadership and Management Skills for Agribusiness .................. 4  
- AGB 301 Food and Fiber Marketing ..................... 4  
- AGB 401 Managing Cultural Diversity in Agricultural Labor Relations (USCP) ............... 4  
- ASCI 231 General Animal Science ....................... 3  
- BRAE 121 Agricultural Mechanics ...................... 2  
- BRAE 141 Agricultural Machinery Safety ............. 3  
- BRAE 340 Irrigation Water Management ............... 4  
- CRSC 230 Agronomic Crop Production ................. 4  
- DSCI 230 General Dairy Husbandry ..................... 4  
- FNR 201/FSN 230/DSCI 231/AG 450 ...................... 3/4  
- FRSC 230 California Fruit Growing or VGSC 230 Introduction to Vegetable Science ...... 4  
- EHS 230 Environmental Horticulture .................. 4  
- PM 145 Introduction to Poultry Management ........ 4  
- SS 121 Introductory Soil Science ...................... 4  
- Concentration courses (see below) .................... 22

SUPPORT COURSES  
- CHEM 110 World of Chem/Essentials (B3 & B4)* 4  
- Adviser approved restricted electives ............... 27  
- 12-20 units must be 300-400 level depending on concentration. Career area programs may be selected from teaching agriculture, agricultural communication, or international agriculture.

GENERAL EDUCATION (GE)  
- 72 units required; 4 units in Support.  
- See page 79 for complete GE course listing.  
- Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)  
- A1 Expository Writing .................................... 4  
- A2 Oral Communication ................................... 4  
- A3 Reasoning, Argumentation, and Writing ........ 4

Area B Science and Mathematics (12 units)  
- B1 Mathematics/Statistics ................................ 8  
- B2 Life Science ............................................. 4  
- B3 Physical Science * 4 units in Support .......... 0  
- B4 One lab taken with either a B2 or B3 course 4

Area C Arts and Humanities (20 units)  
- C1 Literature ............................................... 4  
- C2 Philosophy .............................................. 4  
- C3 Fine/Performing Arts ................................. 4  
- C4 Upper-division elective ............................. 4  
- Area C elective (Choose one course from C1-C4)... 4

Area D/E Society and the Individual (20 units)  
- D1 The American Experience (40404) .......... 4  
- D2 Political Economy .................................... 4  
- D3 Comparative Social Institutions ................. 4  
- D4 Self Development (CSU Area E) ................. 4  
- D5 Upper-division elective ............................ 4

Area F Technology Elective (upper division)  
- (4 units) .................................................... 4

ELECTIVES ....................................................... 7

CONCENTRATIONS (select one)  
Agricultural Mechanics  
- BRAE 124 Small Engines ............................. 2  
- BRAE 237 Engineering Surveying I ................. 2  
- BRAE 321 Agricultural Safety ......................... 3  
- BRAE 335 Internal Combustion Engines ........... 4  
- IME 155 Industrial Welding Technology .......... 1  
- BRAE electives (7 units at 300-400 level) ....... 10

86/87
Agricultural Products and Processing
DSCI 231 General Dairy Manufacturing ................. 4
ASCI 211 Meats ....................................................... 3
FRSC/VGSC 421 Postharvest Tech. Horticultural Crops .................................................. 3
FRSC/VGSC 425 Postharvest Tech. Horticultural Crops Lab .................................................. 1
DSCI/FSN electives (6 units at 300–400 level) ...... 11

22

Agricultural Supplies and Services
AGB 212 Agricultural Economics ........................... 4
AGB 310 Agribusiness Credit and Finance ............. 4
AGB 312 Agricultural Policy .................................... 4
AGB electives (2 units at 300–400 level) ................. 10

22

Animal Science
Select two: ASCI 141/142/143 .................................... 4,4
ASCI 220 Intro Animal Nutrition and Feeding ......... 4
DSCI 330 Artificial Insemination and Embryo Biotechnology ................................................. 4
ASCI/DSCI/PM electives (300–400 level) ............... 6

22

Crop and Soil Science
CRSC/FRSC/VGSC 230 (Select course not taken in major column) ........................................ 4
SS 202 Soil and Water Conservation ....................... 4
PPSC 311 Insect Pest Management .......................... 4
SS 221 Fertilizers ................................................. 4
CRSC/FRSC/VGSC/SS electives (300–400 level) .......... 6

22

Forestry and Natural Resources
BIO 227 Wildlife Conservation Biology ............... 4
BIO 228 Wildlife Conservation Laboratory .............. 1
FNR 202 Environmental Management .................. 3
FNR 208 Dendrology ............................................. 4
FNR 306 Natural Resource Ecology and Habitat Management .............................................. 4
FNR electives (300–400 level) ................................. 6

22

Ornamental Horticulture
EHS 123 Landscape Installation and Maintenance .. 4
EHS 124 Plant Propagation .................................... 4
EHS 125 Florist Practices I .................................... 3
EHS electives (10 units at 300–400 level) ............... 11

22
Animal Science

Department Head, Andrew J. Thulin
Gene A. Armstrong          William E. Plummer
Jonathan L. Beckett        Robert T. Rutherford
M. Steven Daugherty        Kenneth C. Scotto
Michael H. Hall            Dale A. Smith
Roger M. Hunt              Robert Spiller
Michael W. Lund            Robert D. Vance
Jaymie J. Noland           Rudy A. Wooten

Affiliate Faculty:
Brent G. Hallock, Soil Scientist
Edwin H. Jaster, Dairy Scientist

ACADEMIC PROGRAMS

BS Animal Science
Poultry Management Minor

The Bachelor of Science degree in Animal Science prepares students for many career opportunities. The major coursework combines scientific theory and practical applications for animal production. In consultation with their faculty advisers, students select electives according to their interests. Students may select coursework in one of the following areas: livestock production, poultry management, agribusiness, meats/muscle science, teaching agriculture, agricultural communication, resource management, pre-veterinary medicine/graduate school, and zoo and exotic animal care.

In addition, the department offers a wide assortment of extra- and co-curricular activities including five different student clubs and a nationally competitive livestock judging and horse judging teams. Students participate in organizing and conducting special meetings, seminars and field days sponsored by the department.

The department maintains beef cattle, horses, sheep, swine, and poultry. These animal operations are supported by an on-campus veterinary clinic, meat processing facilities, and a feed manufacturing plant. Some of the nation's most noted bloodlines can be found within the registered breeds on campus, where artificial insemination and embryo transfer are commonly used. By actively participating in the management of the herds and flocks, students simulate the larger commercial operations of the industry. The enterprise system is another valuable experience for students, and industry internships are strongly encouraged.

The department has an active role in the management of the Swanton-Pacific Ranch and is developing environmentally sound resource management practices including intensive controlled grazing, multiple species grazing and using the grazing animal as a tool to enhance the total environment of the ranch. Cal Poly's Animal Science major provides the knowledge and understanding to apply new technologies for the fast-changing, technology-driven world in which we live. Our focus is to help students build a plan for personal and professional growth. Students develop the ability to apply and manage technology, and they also learn how to be team players, with the ability to solve problems utilizing leadership and professional communication skills. Most importantly, we teach students how to learn so they can adapt to the future.

Graduate Program

Cal Poly offers a Master of Science degree in Agriculture with a specialization in Animal Science. Please refer to the MS Agriculture section of the College of Agriculture.

BS ANIMAL SCIENCE

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

- ASCI 101 Introduction to the Animal Sciences........ 2
- ASCI 141 Market Beef Production........................ 4
- ASCI 142 Swine Science................................ 4
- ASCI 143 Systems of Sheep Production.................. 4
- ASCI 144 Equine Science................................ 4
- ASCI 220 Intro. Animal Nutrition and Feeding .... 4
- ASCI 304 Animal Breeding................................ 3
- ASCI 401 Reproductive Physiology...................... 4
- ASCI 420 Animal Nutrition............................... 3
- ASCI 461 Senior Project................................ 2
- ASCI 462 Senior Project................................ 2
- ASCI 463 Undergraduate Seminar........................ 2
- ASCI 476 Issues in Animal Agriculture ............... 3
- ASCI 211 Meats........................................... 3
- PM 145 Introduction to Poultry Management .......... 4
- VS 223 Anatomy and Physiology of Farm Animals .... 4

Select two of the following: ASCI 311, 312, 313, 314; PM 250, 360 ................................................. 6

Adviser approved electives ..................................... 34

May be selected from: livestock production, poultry, agribusiness, meats/muscle science, teaching agriculture, agricultural communication, resource management, pre-veterinary/graduate school, and zoo and exotic animal care. At least 60 units must be 300-400 level; of those at least 27 must be in major column.
SUPPORT COURSES

BIO 151 Introduction to Biology or
    BIO 111 General Biology (B2 & B4)* .................... 5/4
BIO 302 Human Genetics or
    BIO 303 Genetics ........................................... 3
CHEM 111/127 Survey of Chemistry (B3&B4)* .... 5/4
CHEM 312 Survey of Organic Chemistry or
    CHEM 316 Organic Chemistry (transfer equivalents CHEM 212, 216) ......................... 5
MATH 118 Pre-Calculus Algebra (B1)* ................ 4

20-22

GENERAL EDUCATION (GE)

72 units required; 12 units are in Support.
See page 79 for complete GE course listing.
Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)
    A1 Expository Writing ................................... 4
    A2 Oral Communication .................................. 4
    A3 Reasoning, Argumentation, and Writing ........... 4

Area B Science and Mathematics (4 units)
    B1 Mathematics/Statistics * 4 units in Support .... 4
    B2 Life Science * 4 units in Support ................. 0
    B3 Physical Science * 4 units in Support .......... 0
    B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)
    C1 Literature ................................................. 4
    C2 Philosophy .............................................. 4
    C3 Fine/Performing Arts .................................. 4
    C4 Upper-division elective ................................ 4
    Area C elective (Choose one course from C1-C4) ... 4

Area D/E Society and the Individual (20 units)
    D1 The American Experience (40404) ................ 4
    D2 Political Economy ..................................... 4
    D3 Comparative Social Institutions ..................... 4
    D4 Self Development (CSU Area E) ..................... 4
    D5 Upper-division elective ................................ 4

Area F Technology Elective (upper division)
    (4 units) .................................................... 4

60

POULTRY MANAGEMENT MINOR

The Poultry Management minor prepares students for a wide variety of positions in the commercial poultry industry and in many allied services related directly to the industry. Career opportunities are many and varied.

Students have an opportunity to conduct enterprise projects in the production of market eggs, hatching eggs, meat birds, replacement pullets, turkey, and game birds, which give them valuable experience in production techniques as well as exposure to a number of business activities related to production. Advanced students may have opportunities to study special topics related to problems in management of commercial poultry flocks.

The program is supported by a state-of-the-art poultry production facility. Cal Poly's new Poultry Unit is now considered one of the best in the Western United States; it will accommodate 14,000 layers, 7,000 replacement pullets, 7,000 broilers, 2,500 breeding hens, and 2,500 chickens/turkeys for testing and research purposes. These production facilities allow students to gain hands-on learning which complements their formal class work, and provides real-world experience.

Required courses

PM 145 Introduction to Poultry Management ........ 4
PM 250 Poultry Processing ................................... 3
PM 330 Poultry Production Management ............. 4
PM 340 Poultry Anatomy, Physiology Diseases .... 4
PM 345 Poultry Business Management ............... 4
ASCI 350 Applied Nonruminant Nutrition ............ 4

Electives ......................................................... 5

To be chosen from:
    AG 339; AGB 310; ASCI 384; BUS 212;
    ENGL 310; BUS 346; FSN 275, 278,
    323, 334, 335; PM 290/490, 360

10
BioResource & Agricultural Engineering

Department Office
Agricultural Engineering Bldg. (08), Room 101
(805) 756-2378, FAX: (805) 756-2626

Department Head, Kenneth H. Solomon
Charles M. Burt          Rollin D. Strohman
Richard A. Cavaletto     Robert E. Walker
Samantha J. Gill         Douglas W. Williams
L. Joe Glass             James B. Zetzsche, Jr.
M. Stephen Kaminaka      Mark A. Zohns

ACADEMIC PROGRAMS

BS Agricultural Systems Management
BS BioResource and Agricultural Engineering

The BioResource and Agricultural Engineering Department offers two programs leading to a Bachelor of Science degree: BioResource and Agricultural Engineering and Agricultural Systems Management.

The BioResource and Agricultural Engineering Department is an engineering-based educational organization consisting of professionals whose mission is the study, teaching, and practice of engineering and systems management support for agriculture. The Department is nationally recognized as a leader in this field, and for balancing theory with application and principle with practice.

Department facilities include well-equipped laboratories for hydraulic systems, evaluation and testing of power units, fabrication of agricultural machinery, agricultural electrical systems, design and construction of agricultural structures, photogrammetry, microcomputers and controllers.

Outdoor facilities include a water delivery unit with multiple pumping systems and operational canals, a field for evaluation of various irrigation systems including an operating linear move and land for experience in the mechanical production of farm products and safe operation of agricultural machinery.

Students are encouraged to participate in the student clubs of the department. The Agricultural Engineering Society is involved in a broad range of activities and services including Open House displays. The student branch of the American Society of Agricultural Engineers offers professional and extracurricular activities.

BS Agricultural Systems Management
The mission of the Agricultural Systems Management program is to provide a "Learn by Doing" undergraduate educational experience that will prepare students for systems management practice in support of agriculture and related industries throughout the West.

Students receive broad agricultural training with a business and management emphasis in one of the following areas: plant production, livestock production, food and fiber processing, environmental information management, water/irrigation, and processing and manufacturing.

Students have the opportunity to develop management expertise through interdisciplinary experiences in agricultural technology and business oriented coursework.

The objectives of the Agricultural Systems Management program are to produce graduates who:

♦ are successful in technical, business, or management positions within agriculture or related industries; and

♦ are "industry ready" to undertake technological, business, or management projects and make significant contributions from day one on the job; or

♦ are enrolled in an advanced degree program and are successful at graduate studies should they choose to pursue them.

Agricultural Systems Management graduates demonstrate a knowledge and understanding of basic agricultural technologies and agribusiness principles necessary for technical operations and business management careers in agriculture and related industries; an understanding of modern science and practice within a specialized agricultural area of interest; and ability to apply quantitative, analytical processes for developing solutions to technological, business or management problems associated with production, processing, or the distribution of products and support services in agriculture and related industries; an understanding of the interconnected "systems" of agriculture; and ability to safely and properly handle the materials, machines, sensors, tools and techniques of modern agricultural or technical operations; and an ability to communicate and perform as effective agricultural systems management professionals in the solution of problems crossing discipline or cultural boundaries.

Career opportunities are available in the manufacturing, sales, and service of agricultural equipment and machinery; management and production of animals and crops; processing of food and fiber; and management of water/irrigation facilities. The program is recognized by the American Society of Agricultural Engineers.
BS BioResource and Agricultural Engineering

The bioresource/agricultural engineer represents the most general type of engineer, adept at utilizing electrical and mechanical energy sources, water resources, and designing structural units. The curriculum features a unique combination of engineering and applied science coursework, with a focus on preparing graduates for practice in professional engineering.

The mission of the BioResource and Agricultural Engineering program is to provide a "Learn by Doing" undergraduate educational experience that will prepare students for engineering practice in support of agriculture and related industries throughout the West.

The objectives of the BioResource and Agricultural Engineering program are to produce graduates who:

- are successful in engineering practice within agriculture or related industries; and
- are "industry ready" to undertake engineering projects and make significant contributions from day one on the job; or
- are enrolled in an advanced degree program and are successful at graduate studies should they choose to pursue them.

BioResource and Agricultural Engineering graduates demonstrate a knowledge and understanding of the basic mathematics, physical and engineering sciences necessary for modern agricultural engineering practice; the ability to design components, systems or processes to meet specified objectives, including prudent use of resources; an understanding of their professional and ethical responsibilities as agricultural engineers, including the societal impact of engineering solutions and the need to engage in life-long learning; the ability to plan, design, execute and evaluate engineering solutions to problems/projects that are real, practical and of a complexity representative of projects encountered in beginning professional practice; and the ability to communicate and perform as effective engineering professionals in both individual and team-based project environments.

Cal Poly's "learn by doing" philosophy is emphasized by the numerous design-centered laboratories and the senior project. In the senior design project, which is completed in a three-quarter set of capstone courses, students demonstrate their understanding of engineering knowledge and their ability to apply that knowledge creatively to practical problems.

Career opportunities exist in the design, evaluation and management of systems -- irrigation, drainage, hydrology, soil conservation; farm machinery; food processing; and agricultural environments. The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Minors

The department participates in offering interdisciplinary minors in Water Science and Geographic Information Systems. Please see College of Agriculture section for more information.

Graduate Programs

Cal Poly offers the MS in Agriculture with specializations in Agricultural Engineering Technology and in Irrigation, and the MS in Engineering with a specialization in Water Engineering. Please see College of Agriculture and College of Engineering sections for more information.

BS AGRICULTURAL SYSTEMS MANAGEMENT

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
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<td>Careers in Bioresource/Agric. Engr</td>
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<td>Laboratory Skills and Safety</td>
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<td>BRAE 142</td>
<td>Agric Power and Machinery Mgt</td>
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<td>BRAE 203</td>
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<td>Hydraulic/Mechanical Power Systems</td>
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<td>BRAE 402</td>
<td>Agricultural Materials</td>
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<td>BRAE 418</td>
<td>Agricultural Systems Management I</td>
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<td>BRAE 425</td>
<td>Computer Controls for Agriculture</td>
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<td>BRAE 432</td>
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<td>BRAE 461</td>
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<td>Adviser approved electives</td>
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Selected from: plant production, livestock production, food processing, environment information management, water/irrigation, agricultural waste management, process and manufacturing, or teaching agriculture

SUPPORT COURSES

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<td>CHEM 110 World of Chemistry - Essentials or CHEM 111 Survey of Chemistry (B3 &amp; B4)*</td>
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<tr>
<td>ENGL 148 Reasoning, Argumentation, and Technical Writing (A3)*</td>
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</table>
MATH 118 Pre-Calculus Algebra (B1)*................. 4
MATH 119 Pre-Calculus Trigonometry (B1)*........... 4
PHYS 121 College Physics ...................................... 4
SS 121 Introductory Soil Science.......................... 4
Agribusiness Minor ............................................. 28
Animal or plant production course...................... 3

**GENERAL EDUCATION (GE)**
72 units required; 16 units are in Support.
→See page 79 for complete GE course listing.
→Minimum of 12 units required at the 300-400 level.

**Area A Communication (8 units)**
A1 Expository Writing ........................................... 4
A2 Oral Communication ............................................ 4
A3 Reasoning, Argumentation, and Writing * 4 units in Support ........................................... 0

**Area B Science and Mathematics (4 units)**
B1 Mathematics/Statistics * 8 units in Support ...... 0
B2 Life Science.................................................... 4
B3 Physical Science * 4 units in Support............. 0
B4 One lab taken with either a B2 or B3 course

**Area C Arts and Humanities (20 units)**
C1 Literature ..................................................... 4
C2 Philosophy ..................................................... 4
C3 Fine/Performing Arts ....................................... 4
C4 Upper-division elective .................................... 4
Area C elective (Choose one course from C1-C4) ... 4

**Area D/E Society and the Individual (20 units)**
D1 The American Experience (40404) .................. 4
D2 Political Economy ............................................ 4
D3 Comparative Social Institutions ..................... 4
D4 Self Development (CSU Area E) ...................... 4
D5 Upper-division elective .................................... 4

**Area F Technology Elective (upper division)**
(4 units)............................................................. 4

**ELECTIVES** .................................................... 0

**BS Agricultural Systems Management - by Year**

**Freshman**
BRAE 128 Careers in Bioresource/Agric. Engr. .... 2
BRAE 129 Laboratory Skills and Safety.............. 1
BRAE 133 Engineering Design Graphics .............. 3
BRAE 141 Agricultural Machinery Safety ............. 3
BRAE 142 Agricultural Power/Machinery Mgt. ...... 4
BRAE 151 CAD for Agricultural Engineers .......... 1
CHEM 110 World of Chemistry - Essentials or
CHEM 111 Survey of Chemistry (B3 & B4) ....... 4
PHYS 121 College Physics ................................... 4
AG 250/CSC 110/CSC 111/CSC 113 .................... 3
ENGL 134 Writing: Exposition (A1) .................. 4
MATH 118, 119 Pre-Calc Algebra/Trig (B1) ....... 4,4
SCOM 101 or SCOM 102 Speech (A2) ................. 4
Animal or plant production elective ................. 3

**Sophomore**
BRAE 203 Agricultural Systems Analysis .......... 3
SS 121 Introductory Soil Science ....................... 4
ENGL 148 Reasoning, Argumentation, and
Technical Writing (A3) ..................................... 4
PSY 201/202 General Psychology (D4) ............ 4
Life science elective (B2) ................................. 4
Philosophy elective (C2) ..................................... 4
Fine and performing arts elective (C3) ............ 4
Agribusiness electives ...................................... 16

**Junior**
BRAE 301 Hydraulic/Mechanical Power Systems .... 4
BRAE 321 Agricultural Safety ............................ 3
BRAE 324 Princ. of Agricultural Electrification ... 4
BRAE 325 Agricultural Energy Systems .............. 3
Adviser approved electives ............................ 13
Agribusiness electives ..................................... 12
The American experience elective (D1) ............ 4
Political economy elective (D2) ....................... 4
Literature elective (C1) ..................................... 4

**Senior**
BRAE 402 Agricultural Materials Science .......... 3
BRAE 418, 419 Agricultural Systems Mgt. I, II .... 4,4
BRAE 425 Computer Controls for Agriculture ...... 3
BRAE 432 Agricultural Buildings ..................... 4
BRAE 460, 461, 462 Senior Project .................... 1,2,2
Arts and humanities elective (Area C) .............. 4
Literature, philosophy, arts (300-400) (C4) ....... 4
Comparative social institutions (D3) ............... 4
Society and the individual (300-400) (D5) ......... 4
Technology elective (Area F) ......................... 4
Adviser approved electives ............................ 6

**TOTAL UNITS** .................................................. 187
BS BIORESOURCE AND AGRICULTURAL ENGINEERING

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

**MAJOR COURSES**

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<tr>
<th>Course Code</th>
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<th>Units</th>
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<td>Careers in Bioresource &amp;Ag Engr.</td>
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<td>BRAE 129</td>
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<td>BRAE 216</td>
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<td>Intro Mechanical Systems-Agric</td>
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<td>Principles of Irrigation</td>
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<td>BRAE 237</td>
<td>Engineering Surveying I</td>
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<td>BRAE 312</td>
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<td>BRAE 328</td>
<td>Measurements/Computer Interfacing</td>
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<td>BRAE 415</td>
<td>Hydrology</td>
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<td>BRAE 421, 422</td>
<td>Equipment Engineering</td>
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<td>BRAE 433</td>
<td>Agricultural Structures Design</td>
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**SUPPORT COURSES**

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<td>CE 201</td>
<td>Strength of Materials or CE 204, 205</td>
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<td>CE 206</td>
<td>Strength of Materials Laboratory</td>
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<tr>
<td>CHEM 124</td>
<td>General Chemistry for the Engineering Disciplines (B3/B4)*</td>
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<td>General Chemistry for the Engineering Disciplines (Add’l Area B)*</td>
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<td>ECON 201</td>
<td>(D2)*</td>
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<td>Technical Writing for Engineers (A3)*</td>
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<td>MATH 141, 142</td>
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<td>MATH 241</td>
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<td>Engineering Statics</td>
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<td>ME 212</td>
<td>Engineering Dynamics</td>
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<td>ME 302</td>
<td>Thermodynamics</td>
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<td>PHYS 206</td>
<td>Instrument/Experimental Physics</td>
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<tr>
<td>PHYS 256</td>
<td>Electrical Measurements Lab</td>
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<td>SS 121</td>
<td>Introductory Soil Science</td>
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<tr>
<td>STAT 312</td>
<td>Statistical Methods-Engr. (B6)*</td>
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**GENERAL EDUCATION (GE)**

- 72 units required; 36 units are in Support.
- See page 79 for complete GE course listing.
- Minimum of 12 units required at the 300-400 level.

**Area A Communication (8 units)**

- A1 Expository Writing ........................................... 4
- A2 Oral Communication ........................................... 4
- A3 Reasoning, Argumentation, and Writing * 4 in Support ........................................... 0

**Area B Science and Mathematics (no additional units are required)**

- B1 Mathematics/Statistics * 8 units in Support ....... 0
- B2 Life Science * 4 units in Support .................... 0
- B3 Physical Science * 4 units in Support................ 0
- B4 One lab taken with either a B2 or B3 course
- B5 (requirement for Liberal Arts students only)
- B6 Upper-division Area B * 4 units in Support ....... 0
- Additional Area B units* 8 units in Support .......... 0

**Area C Arts and Humanities (16 units)**

- C1 Literature ..................................................... 4
- C2 Philosophy ..................................................... 4
- C3 Fine/Performing Arts ........................................ 4
- C4 Upper-division elective .................................... 4

**Area D/E Society and the Individual (12 units)**

- D1 The American Experience (40404) ..................... 4
- D2 Political Economy * 4 units in Support ............. 0
- D3 Comparative Social Institutions ..................... 4
- D4 Self Development (CSU Area E) ......................... 4

**ELECTIVES** .......................................................... 0

**Total Units** .......................................................... 193
# BS BioResource and Agricultural Engineering

## - by Year

### Freshman

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>Engineering Design Graphics</td>
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<td>CAD for Agricultural Engineering</td>
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<td>Engineering Surveying I</td>
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### Sophomore

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<td>Intro Principles Bioresource Engr</td>
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<td>BRAE 232</td>
<td>Agricultural Structures Planning</td>
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<td>BRAE 234</td>
<td>Intro to Mechanical Systems in Agriculture</td>
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<td>Principles of Irrigation</td>
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<td>ME 212</td>
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<td>Gen Chem/Engineering (Add’l Area B)</td>
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<td>BRAE 328</td>
<td>Measurements/Computer Interfacing</td>
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<td>BRAE 331</td>
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<td>CE 201</td>
<td>Strength of Materials or CE 204, 205 Strength of Materials I, II</td>
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<tr>
<td>CE 206</td>
<td>Strength of Materials Lab</td>
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<tr>
<td>ME 302</td>
<td>Thermodynamics</td>
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<tr>
<td>PHYS 206</td>
<td>Instrumentation-Experimental Physics</td>
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<tr>
<td>PHYS 256</td>
<td>Electrical Measurements Lab</td>
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<tr>
<td>ECON 201</td>
<td>Economics (D2)</td>
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<tr>
<td>STAT 312</td>
<td>Statistical Methods for Engineers (B6)</td>
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<tr>
<td>American experience elective (D1)</td>
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<tr>
<td>Comparative social institutions elective (D3)</td>
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<tr>
<td>Fine and performing arts elective (C3)</td>
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<tr>
<td>Self-development elective (D4)</td>
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</table>

### Senior

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BRAE 414</td>
<td>Irrigation Engineering</td>
<td>4</td>
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<tr>
<td>BRAE 415</td>
<td>Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>BRAE 421</td>
<td>Equipment Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BRAE 422</td>
<td>Equipment Engineering</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 433</td>
<td>Agricultural Structures Design</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 460</td>
<td>Senior Project Organization</td>
<td>1</td>
</tr>
<tr>
<td>BRAE 461, 462</td>
<td>Senior Project</td>
<td></td>
</tr>
<tr>
<td>Philosophy elective (C2)</td>
<td></td>
<td>4</td>
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<tr>
<td>Literature elective (C1)</td>
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</tr>
<tr>
<td>Arts and humanities elective (300-400) (C4)</td>
<td></td>
<td>4</td>
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<tr>
<td>Adviser approved electives</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

Total: 193

---

2001-2003 Cal Poly Catalog
Crop Science

Department Head, H. Paul Fountain
Edgar H. Beyer  W. Keith Patterson
J. Wyatt Brown  John C. Phillips
Louis W. Harper  Edwin C. Seim
David H. Headrick  Scott J. Steinmaus
Robert J. McNeil  David L. Warfield
Gene P. Offermann

ACADEMIC PROGRAMS

Crop Science - BS, Minor
Fruit Science - BS, Minor
Plant Protection Science - BS, Minor

Three major curricula leading to the Bachelor of Science degree are offered by the Crop Science Department and are designed to prepare students for many career opportunities. In consultation with faculty advisers, students majoring in Crop Science or Fruit Science select electives according to their career goals. These electives are designed to provide students with curriculum flexibility and choice. Students may select coursework in one of the following areas: crop production management, orchard and vineyard management, postharvest technology-marketing, crop/vegetable science, pomology, enology, crop ecology, and applied biotechnology.

The department has 70 acres of productive citrus, avocados, grapes, deciduous orchard, and berries. Additional nonbearing acreage for instructional use exists and new plantings are under way. About 400 acres are devoted to student production enterprises in field and vegetable crops. Students are encouraged to gain experience and earn income by participation in the enterprise project program or by working for the campus farm.

The technological phases of instruction are enhanced by equipment for fruit packing, grading, seed processing and pesticide application. Also available are the pesticide rinsate recycling system and specialized laboratory equipment for the study of various crops and postharvest technology. Field trips supplement instruction for crops not common to the San Luis Obispo area.

Cal Poly’s Swanton-Pacific Ranch near Davenport, California offers internship experiences in managing not only crops but also livestock, rangeland and forests. Students are able to intern on this working ranch while concurrently taking university courses offered from the San Luis Obispo campus through distance-learning technology. The department supports extra- and co-curricular activities for its students, including two student clubs.

BS Crop Science
Prepares graduates for careers in crop production, management, sales and service. Positions are available with commercial pest control firms, government regulatory agencies, and agriculturally related organizations. Graduates also pursue careers as agronomists and horticulturists with government or industry. Instruction includes agronomic crops, vegetable crops, and tropical crops.

BS Fruit Science
Prepares graduates for management positions with orchards/vineyards, canneries, pest control firms, government regulatory agencies, fruit tree nurseries, research stations, and produce-marketing companies. Instruction includes deciduous fruits, nut crops, citrus, avocados, grapes, berries, tropical and subtropical fruits, and minor fruit species.

BS Plant Protection Science
A multi-faceted discipline requiring knowledge of pest and beneficial organism biology as well as an understanding of crop production principles, ecology, biotechnology, pesticide toxicology, and environmental science. Plant protection specialists work with crop producers, the ornamental and turf industry, forestry, and livestock producers to reduce pest problems. As environmental regulations increase, employment opportunities grow for people holding professional licenses. The major prepares students to pass all categories of the California Pest Control Advisors License exam.

Interdisciplinary Minors
The department participates in offering interdisciplinary minors in Geographic Information Systems for Agriculture, and Wine and Viticulture. Please see College of Agriculture section for more information.

Graduate Program
Cal Poly offers a Master of Science degree in Agriculture with a specialization in Crop Science. Please refer to the MS Agriculture section of the College of Agriculture.
BS CROP SCIENCE

- 60 units upper division
- 2.0 GPA
- GWR
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRSC 101 Orientation to Crop Science</td>
<td>1</td>
</tr>
<tr>
<td>CRSC 131 Introduction to Crop Science</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 132 Cereal Grain Production</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 133 Row Crop Production</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 202/VGSC 202 Enterprise Project</td>
<td>3</td>
</tr>
<tr>
<td>PPSC 221 Weed Science</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 304 Plant Improvement</td>
<td>4</td>
</tr>
<tr>
<td>PPSC 311 Insect Pest Management</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 411 Experimental Techniques and Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 461, 462 Senior Project</td>
<td>3,3</td>
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<tr>
<td>CRSC 463 Undergraduate Seminar</td>
<td>2</td>
</tr>
<tr>
<td>VGSC 232 California Vegetable Production</td>
<td>4</td>
</tr>
<tr>
<td>CRSC/FRSC/VGSC 300-400 level electives</td>
<td>16</td>
</tr>
</tbody>
</table>

60 units required; 16 units are in Support.

SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
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<tbody>
<tr>
<td>BIO 302/BIO 303 Genetics</td>
<td>4/3</td>
</tr>
<tr>
<td>BOT 121 General Botany (B2 &amp; B4)*</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111 Survey of Chemistry (B3&amp;B4)*</td>
<td>5</td>
</tr>
<tr>
<td>FRSC 230 California Fruit Growing</td>
<td>4</td>
</tr>
<tr>
<td>MATH 118 Pre-Calculus Algebra (B1)*</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 463 Undergraduate Seminar</td>
<td>2</td>
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<tr>
<td>SS 121 Introductory Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>Adviser-approved electives</td>
<td>33/34</td>
</tr>
</tbody>
</table>

Minimum 8 units of BIO/BOT/CHM. 12-15 units must be 300-400 level. Areas may include applied biotechnology, crop ecology, production mgmt., post-harvest tech/marketing, crop/ veg. science. May not include Enterprise Project/Mgt.

62 units required; see page 79 for complete GE course listing.

GENERAL EDUCATION (GE)

- 72 units required; 16 units are in Support.
- See page 79 for complete GE course listing.
- Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)

A1 Expository Writing 4
A2 Oral Communication 4
A3 Reasoning, Argumentation, and Writing 4

Area B Science and Mathematics (no additional units are required)

B1 Mathematics/Statistics 8 units in Support 0
B2 Life Science 4 units in Support 0
B3 Physical Science 4 units in Support 0
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)

C1 Literature 4
C2 Philosophy 4
C3 Fine/Performing Arts 4
C4 Upper-division elective 4
Area C elective (Choose one course from C1-C4) 4

Area D/E Society and the Individual (20 units)

D1 The American Experience (40404) 4
D2 Political Economy 4
D3 Comparative Social Institutions 4
D4 Self Development (CSU Area E) 4
D5 Upper-division elective 4

Area F Technology Elective (upper division)

4 units 4

56 units required; 16 units are in Support.

8 units of BIO/BOT/CHM. 8 units 300-400 level. Areas may include applied biotechnology, crop ecology, enology, orchard/ vineyard mgmt., pomology, postharvest tech/mktg. May not include Enterprise Project/MGT.

BS FRUIT SCIENCE

- 60 units upper division
- 2.0 GPA
- GWR
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>CRSC 101 Orientation to Crop Science</td>
<td>1</td>
</tr>
<tr>
<td>PPSC 221 Weed Science</td>
<td>4</td>
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<tr>
<td>PPSC 311 Insect Pest Management</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 411 Experimental Techniques/Analysis</td>
<td>4</td>
</tr>
<tr>
<td>FRSC 422 Tropical/Subtropical Crop &amp; Fruit Prod.</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 461, 462 Senior Project</td>
<td>3,3</td>
</tr>
<tr>
<td>CRSC 463 Undergraduate Seminar</td>
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<tr>
<td>FRSC 131, 132, 133 Pomology</td>
<td>4,4,4</td>
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<tr>
<td>FRSC 202/402 Enterprise Project Management</td>
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</tr>
<tr>
<td>FRSC 231 Viticulture</td>
<td>4</td>
</tr>
<tr>
<td>FRSC 331 Advanced Viticulture</td>
<td>4</td>
</tr>
<tr>
<td>FRSC 332 Fruit Plant Propagation</td>
<td>4</td>
</tr>
<tr>
<td>FRSC 342 Citrus and Avocado Fruit Production</td>
<td>4</td>
</tr>
<tr>
<td>FRSC 421 Postharvest Tech. Horticultural Crops</td>
<td>3</td>
</tr>
<tr>
<td>FRSC 425 Postharvest Tech. Hort. Crops Lab</td>
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</tr>
<tr>
<td>CRSC/FRSC/VGSC 300-400 level elective</td>
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</table>

67 units required; see page 79 for complete GE course listing.

SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>BIO 302 or BIO 303 Genetics</td>
<td>4/3</td>
</tr>
<tr>
<td>BOT 121 General Botany (B2 &amp; B4)*</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111 Survey of Chemistry (B3&amp;B4)*</td>
<td>5</td>
</tr>
<tr>
<td>CRSC 230 or VGSC 230</td>
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<tr>
<td>MATH 118 Pre-Calculus Algebra (B1)*</td>
<td>4</td>
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<tr>
<td>CRSC 463 Undergraduate Seminar</td>
<td>2</td>
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<tr>
<td>SS 121 Introductory Soil Science</td>
<td>4</td>
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<tr>
<td>Adviser-approved electives</td>
<td>28/29</td>
</tr>
</tbody>
</table>

8 units of BIO/BOT/CHM. 8 units 300-400 level. Areas may include applied biotechnology, crop ecology, enology, orchard/ vineyard mgmt., pomology, postharvest tech/mktg. May not include Enterprise Project/MGT.
GENERAL EDUCATION (GE)
72 units required; 16 units are in Support.
→ See page 79 for complete GE course listing.
→ Minimum of 12 units required at the 300-400 level.

Area A  Communication (12 units)
A1 Expository Writing ............................................ 4
A2 Oral Communication ............................................ 4
A3 Reasoning, Argumentation, and Writing ................. 4

Area B  Science and Mathematics (no additional units are required)
B1 Mathematics/Statistics * 8 units in Support .......... 0
B2 Life Science * 4 units in Support ......................... 0
B3 Physical Science * 4 units in Support ................. 0
B4 One lab taken with either a B2 or B3 course

Area C  Arts and Humanities (20 units)
C1 Literature .......................................................... 4
C2 Philosophy ......................................................... 4
C3 Fine/Performing Arts .......................................... 4
C4 Upper-division elective ......................................... 4
Area C elective (Choose one course from C1-C4).... 4

Area D/E  Society and the Individual (20 units)
D1 The American Experience (40404) ...................... 4
D2 Political Economy ............................................... 4
D3 Comparative Social Institutions ......................... 4
D4 Self Development (CSU Area E) ......................... 4
D5 Upper-division elective ......................................... 4

Area F  Technology Elective (upper division)
(4 units) ................................................................. 4

ELECTIVES .................................................................. 6

BS PLANT PROTECTION SCIENCE
60 units upper division
GWR
2.0 GPA
USCP
* = Satisfies General Education requirement

MAJOR COURSES
CRSC 101 Orientation to Crop Science.................... 1
CRSC/FRSC/VGSC 202 Enterprise Project ............ 3
PPSC 221 Weed Science ........................................... 4
CRSC 304 Plant Improv or CRSC 410 Crop Phys. .. 4
PPSC 311 Insect Pest Management ....................... 4
PPSC 327 Vertebrate Pest Management ................. 4
PPSC 405 Advanced Weed Science ..................... 4
CRSC 411 Experimental Techniques/Analysis ....... 4
PPSC 431 Advanced Insect Pest Management ......... 4
PPSC 441 Biological Control of Insects ................. 4
CRSC 461 Senior Project ......................................... 3
CRSC 462 Senior Project ......................................... 3
CRSC 463 Undergraduate Seminar ...................... 2

Select adviser approved production courses in
CRSC/FRSC/VGSC.................................................. 16

SUPPORT COURSES
BIO 115 Animal/Human Structure/Function .......... 4
BIO 302 or BIO 303 Genetics .............................. 4/3
BIO 325 General Ecology ....................................... 4
BOT 121 General Botany (B2 & B4)* .................... 4
BOT 323 Plant Pathology ......................................... 4
CHEM 111 Survey of Chemistry (B3&B4)* .......... 5
CHEM 312 Survey of Organic Chemistry (transfer equivalent CHEM 212)........ 5
CHEM 313 Survey of Biochemistry ....................... 5
MATH 118 Pre-Calculus Algebra (B1)* ................. 4
(MATH 116 & 117 will substitute)
SS 121 Introductory Soil Science ......................... 4
STAT 218 Applied Statistics/Life Sciences (B1)* .. 4
ZOO 335 General Entomology ............................... 4
Adviser approved electives ................................. 8/9

GENERAL EDUCATION (GE)
72 units required; 16 units are in Support.
→ See page 79 for complete GE course listing.
→ Minimum of 12 units required at the 300-400 level.

Area A  Communication (12 units)
A1 Expository Writing ............................................ 4
A2 Oral Communication ............................................ 4
A3 Reasoning, Argumentation, and Writing ................. 4

Area B  Science and Mathematics (no additional units are required)
B1 Mathematics/Statistics * 8 units in Support .......... 0
B2 Life Science * 4 units in Support ......................... 0
B3 Physical Science * 4 units in Support ................. 0
B4 One lab taken with either a B2 or B3 course

1 Adviser approval required.
Area C  Arts and Humanities (20 units)
  C1 Literature .......................................................... 4
  C2 Philosophy ........................................................ 4
  C3 Fine/Performing Arts ......................................... 4
  C4 Upper-division elective ..................................... 4
  Area C elective (Choose one course from C1-C4)........... 4
Area D/E  Society and the Individual (20 units)
  D1 The American Experience (40404) ....................... 4
  D2 Political Economy ............................................ 4
  D3 Comparative Social Institutions ........................... 4
  D4 Self Development (CSU Area E) ........................... 4
  D5 Upper-division elective ..................................... 4
Area F Technology Elective (upper division)  
(4 units)................................................................. 4

56

ELECTIVES .................................................................... 11
186

CROP SCIENCE MINOR
Designed for students majoring in related academic disciplines who desire careers in crop production or the associated industry. The minor offers a broad-based knowledge of the science and technology of agronomy and vegetable production, especially as practiced in California.

Required courses
- CRSC 131 Introduction to Crop Science .......... 4
- CRSC 132 Cereal Grain Production or CRSC 133 Row Crop Production .......... 4
- CRSC 201 Agric. Chemical/Equipment Safety .... 1
- CRSC 202 or VGSC 202 Enterprise Project ...... 1
- PPSC 221 Weed Science or VGSC 232 California Vegetable Production .... 4

Restricted elective courses .................................... 16
Select any four courses from the following:
- BRAE 340; any CRSC/PPSC/VGSC 300-400 level courses 30

FRUIT SCIENCE MINOR
The minor is designed for students majoring in related academic disciplines who desire to seek careers in fruit production or the associated industry. The minor offers a broad-based knowledge of the science and technology of pomology, viticulture, and citrus and avocado production.

Required courses
- FRSC 131, 132 Pomology ........................................ 4
- FRSC 133 Pomology or FRSC 231 Viticulture .......... 4
- FRSC 342 Citrus and Avocado Fruit Production .... 4
- CRSC 201 Agric. Chemical/Equipment Safety .... 1
- FRSC 202 Enterprise Project ................................. 2
- FRSC 402 Enterprise Project Management .......... 3

Restricted elective courses .................................... 8
Select from the following:
- BRAE 340; BOT 323; CRSC 445;
  FRSC 331, 332, 421, 422, 436; PPSC 311

30

PLANT PROTECTION MINOR
This program emphasizes both plant protection and plant production. Within the plant protection field of study, the student will be exposed to a broad range of pest management subjects including entomology, plant pathology, and weed control. Within the production area the student may emphasize fruit production, crop production, ornamental horticulture, or natural resource management.

Required courses
- Advanced versions of the following courses may be substituted by production majors.
- BOT 323 Plant Pathology or
  BOT 324 Ornamental and Forest Pathology .......... 4
- PPSC 221 Weed Science ......................................... 4
- PPSC 311 Insect Pest Management ...................... 4

Courses in area of emphasis ................................. 16
Students elect Emphasis I or Emphasis II based on their major.

I. Emphasis for Plant Production Majors (16 units)
  Plant production majors: Crop Science, Fruit Science, Forestry and Natural Resources (Forestry Concentration) and Environmental Horticultural Science.
  Select 16 units from: BIO 435; BOT 325, 431; CRSC 410; FNR 303; FRSC 414; PPSC 327, 405, 431, 441; ZOO 335

II. Emphasis for Non-Plant Production Majors (16 units)
  Select 12 units of agriculture production courses
  Select one course from Emphasis I (4 units)

1 Approval of minor adviser required.
Dairy Science

Department Head, Leslie S. Ferreira
Leanne M. Berning
Nana Y. Farkye
William T. Gillis
Stanley L. Henderson
Rafael Jimenez-Flores
Edwin H. Jaster
Gary D. Reif
Phillip S. Tong

ACADEMIC PROGRAMS
Dairy Science - BS, Minor

The Bachelor of Science degree in Dairy Science is designed to prepare students for employment in the various phases of the dairy industry, as well as related fields. All students within the major take a common core of courses and, with adviser approval, select additional courses in an area of interest, which may include: dairy farm or plant management, processing technology, agriculture communication, management, preparation for graduate or veterinary school, and agriculture teaching.

Excellent facilities are provided for students. The dairy herd includes purebred Jerseys and Holsteins, located on a well-planned unit, where feeding, milking, calf raising, artificial insemination, and management are carried out. The campus creamery is well-equipped with modern processing equipment. Students are employed on a part-time basis to work in both the production and processing areas.

The Dairy Products Technology Center (DPTC) focuses on multidisciplinary dairy foods research and training activities designed to support the dairy industry and consumers of dairy products. Current research areas are: cheese chemistry and technology, bioseparation processes, and new product and process development. The Center has state-of-the-art research and development facilities. Students may conduct dairy foods related research projects under the guidance of Dairy Science faculty. Opportunities also exist to work on joint projects with other institutions.

Graduate Program
Cal Poly offers a Master of Science degree in Agriculture with a specialization in Dairy Products Technology. Please refer to the MS Agriculture section of the College of Agriculture.

BS DAIRY SCIENCE

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>DSCI 100</td>
<td>Enterprise Project or Internship in Dairy Science</td>
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</tr>
<tr>
<td>DSCI 101</td>
<td>Dairy Feeds and Feeding</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 121</td>
<td>Elements of Dairying</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 134</td>
<td>Intro. to Dairy Products Technology</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 202</td>
<td>Dairy Promotion and Marketing</td>
<td>4</td>
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<tr>
<td>DSCI 223</td>
<td>Frozen Dairy Foods or Dairy Cattle Selection, Breeds, Fitting and Showing</td>
<td>4</td>
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<tr>
<td>DSCI 233</td>
<td>Milk Processing and Inspection</td>
<td>4</td>
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<tr>
<td>DSCI 234</td>
<td>Dairy Foods Evaluation</td>
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<tr>
<td>DSCI 301</td>
<td>Dairy Cattle Nutrition or Dairy 401 Physical and Chemical Properties of Dairy Products</td>
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<tr>
<td>DSCI 321</td>
<td>Lactation Physiology</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 444</td>
<td>Dairy Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 330</td>
<td>Artificial Insemination and Embryo Biotechnology or Dairy 434 Cheese and Fermented Dairy Foods</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 333</td>
<td>Dairy Cattle Management, Safety and Animal Well-Being or Dairy 402 Quality Assurance and Control of Dairy Products</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 422</td>
<td>Breeding and Genetics of Dairy Cattle or Dairy 435 Concentration/Fractionation and Butter Technology</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 432</td>
<td>Advanced Dairy Herd Management or Dairy 433 Dairy Plant Mgt. &amp; Equipment</td>
<td>4</td>
</tr>
<tr>
<td>DSCI 461</td>
<td>Senior Project</td>
<td>2</td>
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<tr>
<td>DSCI 462</td>
<td>Senior Project</td>
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</tr>
<tr>
<td>DSCI 463</td>
<td>Undergraduate Seminar</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
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<td>58</td>
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</table>

SUPPORT COURSES

* = Courses satisfy General Education requirement

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCRO 221</td>
<td>Microbiology (B2 &amp; B4)*</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Survey of Chemistry or CHEM 127 General Chemistry (B3&amp;B4)*</td>
<td>5/4</td>
</tr>
<tr>
<td>CHEM 312</td>
<td>Survey Organic Chemistry or BIO 151 Introduction to Biology (transfer equivalent CHEM 212)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 118</td>
<td>Pre-Calculus Algebra (B1)*</td>
<td>4</td>
</tr>
</tbody>
</table>

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Adviser approved electives ........................................ 41
At least 18 units must be 300-400 level. May be selected from one of the following areas: dairy management, dairy industry, agriculture communications, pre-grad, pre-vet, agriculture education, dairy products technology, dairy processing pre-graduate.

GENERAL EDUCATION (GE)
72 units required; 12 units are in Support.
→See page 79 for complete GE course listing.
→Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)
A1 Expository Writing ........................................... 4
A2 Oral Communication ........................................ 4
A3 Reasoning, Argumentation, and Writing............... 4

Area B Science and Mathematics (4 units)
B1 Mathematics/Statistics * 4 units in Support ....... 4
B2 Life Science * 4 units in Support ...................... 0
B3 Physical Science * 4 units in Support............... 0
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)
C1 Literature ...................................................... 4
C2 Philosophy .................................................... 4
C3 Fine/Performing Arts ....................................... 4
C4 Upper-division elective .................................... 4
Area C elective (Choose one course from C1-C4) ... 4

Area D/E Society and the Individual (20 units)
D1 The American Experience (40404) ................. 4
D2 Political Economy .......................................... 4
D3 Comparative Social Institutions....................... 4
D4 Self Development (CSU Area E) ...................... 4
D5 Upper-division elective .................................... 4

Area F Technology Elective (upper division)
(4 units) .......................................................... 4

60

ELECTIVES ................................................................. 9/10
186

DAIRY SCIENCE MINOR
The purpose of this minor is to help students from other disciplines gain a basic understanding of the terminology and practices used within the field of dairy science. Students may choose to emphasize dairy husbandry or dairy products technology, but the curriculum is flexible enough to accommodate students' individual goals. After completion, dairy husbandry students will have a basic understanding of cattle, dairy nutrition, milk production practices and commercial dairy herd management. Dairy products technology students will have an understanding of dairy food processing and marketing, quality and regulatory control and processing plant management. Specific programs will be designed to reflect the individual students' interest and needs.

The Dairy Science Minor will require two introductory courses. Students must obtain prior program approval from the Dairy Science Minor Coordinator in selecting an additional five courses according to their interests and goals. A minimum of 26 hours is required for the minor, at least half of which must be at the 300 and 400 level.

Required courses
DSCI 121 Elements of Dairying .......................... 4
or DSCI 230 General Dairy Husbandry ............. 4
DSCI 134 Intro to Dairy Products Technology  .... 4
or DSCI 231 General Dairy Manufacturing ......... 4

Courses in area of emphasis ............................... 18
Select five courses from the following, with adviser approval:

Dairy Husbandry
DSCI 101 Dairy Feeds and Feeding (4)
DSCI 241 Dairy Cattle Selection, Breeds, Fitting and Showing (4)
DSCI 301 Dairy Cattle Nutrition (4)
DSCI 321 Lactation Physiology (4)
DSCI 330 Artificial Insemination and Embryo Biotechnology (4)
DSCI 333 Dairy Cattle Mgt, Safety and Animal Well-Being (4)
DSCI 422 Breeding/Genetics of Dairy Cattle (4)
DSCI 432 Advanced Dairy Herd Management (4)

Dairy Products Technology
DSCI 202 Dairy Promotion and Marketing (4)
DSCI 223 Frozen Dairy Foods (4)
DSCI 233 Milk Processing and Inspection (4)
DSCI 234 Dairy Foods Evaluation (2)
DSCI 401 Phys/Chem Properties of Dairy Products (4)
DSCI 402 Quality Assurance and Control of Dairy Products (4)
DSCI 433 Dairy Plant Management and Equipment (4)
DSCI 434 Cheese and Fermented Dairy Foods (4)
DSCI 435 Concentration/Fractionation and Butter Technology (4)
DSCI 444 Dairy Microbiology (4)
Environmental Horticultural Science

Department Head, Barry A. Eisenberg
Stephen F. Angley  Robert P. Rice, Jr.
Thomas E. Eltzroth  Virginia R. Walter
David E. Green II  David J. Wehner
David W. Hannings  Michael D. Zohns
Daniel E. Lassanske

ACADEMIC PROGRAMS
BS Environmental Horticultural Science
Ornamental Plant Production Minor

The Bachelor of Science degree in Environmental Horticultural Science offers the student a comprehensive preparation for attractive positions in the nursery, turf, greenhouse, landscape, and floriculture industries. This includes both the production and sales-service areas of these major fields. The curriculum stresses production and marketing of nursery plants, fresh flowers, flowering plants, and foliage plants; landscape contracting, design, installation and management; turf management; integrated pest management; and marketing.

Graduates of the Environmental Horticultural Science Department are in demand for management and sales positions within the dynamic nursery and floriculture industries, as well as the large and diverse areas within the landscape industries.

Cal Poly graduates are employed nationally and internationally as business owners, growers, managers, researchers, educators, salespersons, landscape contractors, designers, landscape management professionals, extension agents, agricultural commissioners, consultants, pest control advisers, and park and golf course superintendents.

The facilities of the department include a student-operated commercial greenhouse range and nursery in which students carry on a project program involving wholesale and retail sales and a student-operated plant shop. Also included are 35,000 square feet of greenhouses; 7,500 square feet of shadehouses; a 10,000-square foot US Golf Association specification experimental green; and an extensive field container growing area. The department also has several modern, well-equipped laboratories including: Tissue Culture, Landscape Industries with CAD, pest management, and Plant Materials. In addition to 200 acres of landscaped campus, an arboretum is also utilized as an outdoor laboratory. The campus is planted with many interesting and unusual trees and shrubs from all over the world, as well as native plant materials.

Also available are the latest models of equipment necessary in nurseries, greenhouses, parks and grounds, landscaping, and florist shops. An extensive list of periodicals covering the field of environmental horticulture is available to students. Through the staff, affiliation in several national and state horticultural organizations is maintained.

The curriculum is well grounded in the sciences and, through the flexibility of 30 units of adviser-approved electives, students can tailor coursework to meet their individual needs. Areas of interest include: landscape management, landscape technologies and implementation, floriculture production and management, nursery production and management, retail horticulture, turf production and management, horticultural communications, horticultural biotechnology, post-harvest physiology and technology, integrated pest management; and teaching agriculture. Students may also choose to complete a minor in Agribusiness, Agricultural Communication, Crop Science, Fruit Science, Plant Protection or Water Science.

Recommended Sequence: Major and Support Courses
The following is a guide for scheduling Major and Support Courses. By following this sequence, students should meet prerequisites for Major coursework. Courses are not always offered during the quarter indicated. Please consult with your academic adviser and the current Class Schedule.

<table>
<thead>
<tr>
<th>1st Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Winter</strong></td>
<td><strong>Spring</strong></td>
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<tr>
<td>EHS 110</td>
<td>EHS 122</td>
<td>EHS 124</td>
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<tr>
<td>EHS 121</td>
<td>EHS 123</td>
<td>EHS 126</td>
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<tr>
<td>BOT 121</td>
<td>AG 250</td>
<td>EHS 231</td>
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<tr>
<td>CHEM 111</td>
<td>CHEM 212/312</td>
<td>SS 121</td>
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<tr>
<td><strong>Fall</strong></td>
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<td>EHS 232</td>
<td>SS 221</td>
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<td>SPAN 111</td>
<td>ECON 201</td>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>PPSC 311</td>
<td>EHS 327</td>
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<td>BOT 324</td>
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<th>4th Year</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<td>EHS 461</td>
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<td>EHS 462</td>
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<tr>
<td>EHS 427</td>
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Graduate Program
Cal Poly offers a Master of Science degree in Agriculture with a specialization in Environmental Horticultural Science. Please refer to the MS Agriculture section of the College of Agriculture for more information.

ORNAMENTAL PLANT PRODUCTION MINOR
The Ornamental Plant Production minor gives a student an understanding of the important ornamental crops grown in California, how they are propagated and grown, how we manipulate the environment to control the crop, and how they are harvested and handled after harvest. Ornamental plants are a multibillion dollar part of the agriculture industry in California, and students majoring in Agricultural Business, Crop Science, Fruit Science, and Plant Protection Science may well deal with ornamental plants as crops during their careers.

Required courses
EHS 121 Fundamentals of Environmental Horticulture I ........................................... 4
EHS 124 Plant Propagation......................................................... 4
EHS 210/310/401 Enterprise Project/Field Studies .............................................................. 1
EHS 121 Fundamentals of Environmental Horticulture II ........................................... 4
EHS 210/310/401 Enterprise Project/Field Studies .............................................................. 1
EHS 121 Fundamentals of Environmental Horticulture III ........................................... 4
EHS 210/310/401 Enterprise Project/Field Studies .............................................................. 1
Electives .......................................................... 19
Chosen from:
EHS 231/232, 324, 327, 340, 341, 342, 424, 425

BS ENVIRONMENTAL HORTICULTURAL SCIENCE

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tr>
<td>EHS 110 Orientation Environmental Horticult. Sci.</td>
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<tr>
<td>EHS 121 Fundamentals Environmental Hort. I</td>
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<tr>
<td>EHS 122 Fundamentals Environmental Hort. II</td>
<td>4</td>
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<tr>
<td>EHS 123 Landscape Installation and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>EHS 124 Plant Propagation</td>
<td>4</td>
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<tr>
<td>EHS 126 Environmental Horticulture Construction</td>
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<tr>
<td>EHS 200/210/339/401</td>
<td>1/2</td>
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<tr>
<td>EHS 221 Water Issues and Delivery Systems</td>
<td>3</td>
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<tr>
<td>EHS 231, EHS 232 Plant Materials</td>
<td>4,4</td>
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<tr>
<td>EHS 327 Abiotic Plant Problems</td>
<td>3</td>
</tr>
<tr>
<td>EHS 427 Diseases &amp; Pest Control Sys. Orn. Plants</td>
<td>4</td>
</tr>
<tr>
<td>EHS 461 Senior Project</td>
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<tr>
<td>EHS 462 Senior Project</td>
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<tr>
<td>EHS 463 Senior Seminar</td>
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Adviser approved electives. 300-400 level .................................. 30

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Support Courses

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BIO 302/BOT 313/PHYS 104/PSC 101</td>
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<tr>
<td>BIO 435 Plant Physiology</td>
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</tbody>
</table>

BOT 121 General Botany (B2 & B4)* ........................................... 4
BOT 323 Plant Pathology or BOT 324 Orn. & Forest Pathology ........... 4
BUS 201/207 Business Law Survey ................................................... 3/4
BUS 212 Financial Accounting for Nonbusiness Majors .................... 4
CHEM 111 Survey of Chemistry (B3&B4)* ........................................... 5
CHEM 312 Survey of Organic Chemistry transfer equivalent CHEM 212). ................................................... 5
CSC 110 Computers & Computer Applications or AG 250 Computer Appl. to Agriculture ........... 3
ECON 201 Survey of Economics (D2)* ........................................... 4
MATH 118 Pre-Calculus Algebra (B1)* ........................................... 4
(MATH 116 & MATH 117 will substitute)
PPSC 311 Insect Pest Management ................................................... 4
SPAN 111 Elementary Hispanic Language and Culture (USCP) .................. 4
SS 121 Introductory Soil Science ................................................... 4
SS 221 Fertilizers ................................................................. 4
STAT 218 Applied Statistics/Life Sciences (B1)* ................................ 4

64/65

GENERAL EDUCATION (GE)
72 units required; 20 units are in Support.

Area A Communication (12 units)
A1 Expository Writing ................................................................. 4
A2 Oral Communication ................................................................. 4
A3 Reasoning, Argumentation, and Writing ..................................... 4

Area B Science and Mathematics (no additional units are required)
B1 Mathematics/Statistics * 8 units in Support ............................... 0
B2 Life Science * 4 units in Support ............................................ 0
B3 Physical Science * 4 units in Support ....................................... 0
B4 One lab taken with either a B2 or B3 course ................................

Area C Arts and Humanities (20 units)
C1 Literature ................................................................. 4
C2 Philosophy ................................................................. 4
C3 Fine/Performing Arts ............................................................... 4
C4 Upper-division elective ............................................................... 4
Area C elective (Choose one course from C1-C4) .............................. 4

Area D/E Society and the Individual (16 units)
D1 The American Experience (40404) ............................................. 4
D2 Political Economy * 4 units in Support ....................................... 0
D3 Comparative Social Institutions ................................................... 4
D4 Self Development (CSU Area E) ................................................... 4
D5 Upper-division elective ............................................................... 4

Area F Technology Elective (upper division)
(4 units) ........................................................................ 4

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ELECTIVES........................................................................ 0-2

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2001-2003 Cal Poly Catalog
Food Science and Nutrition

Department Chair, Phillip M. Doub
Louise A. Berner  Joseph Montecalvo, Jr.
Madoka Dawson  Krishnakumar (Kris) S. Morey
Brian C. Hampson  Tom Neuhaus
Hany M. Khalil  O. Robert Noyes
Kathleen A. McBurney  Mary E. Pedersen

ACADEMIC PROGRAMS

Food Science - BS, Minor
Nutrition - BS, Minor

The department offers two degree programs designed to prepare graduates for employment in the general areas of human nutrition and commercial food processing. Graduates in Nutrition find rewarding careers in public health, business, food industry, clinical nutrition, food systems management and education. Food Science graduates take responsible positions in commercial food processing and development, sales, quality assurance and government regulation. Opportunities for private consulting and business are available to graduates in both majors, depending on personal interests and initiative. The department also offers minors in Food Science and Nutrition.

The department is equipped with a food processing operations pilot plant and a food preparation laboratory. The laboratories are designed for teaching courses in nutrition, food service management, sensory evaluation, functional components of foods, and quality control as well as other food processing systems. Classroom and laboratory instruction is personalized, and faculty adhere to the university's learn-by-doing philosophy. Multimedia and computer applications are emphasized.

Through the student enterprise program, students can manufacture and market various food products. Enterprise projects are designed to simulate industry and business practices. Students are further encouraged to gain industry experience by working during the summer months or by participating in one of the university co-op or internship programs.

There are two departmental clubs—Nutrition Club and Food Science Club. Club activities involve a wide range of social, professional and service projects. Clubs provide opportunity for leadership training and participation in professional societies and organizations.

Graduate Program
Cal Poly offers an MS in Agriculture with a specialization in Food Science and Nutrition. Please refer to the MS Agriculture section in the College of Agriculture.

Interdisciplinary Minors
The department participates in offering interdisciplinary minors in Packaging (see College of Business section), and Wine and Viticulture (see College of Agriculture section).

BS Food Science
The program is designed to prepare students for employment in the food industry. Principal areas of instruction are in food processing and engineering, food safety and sanitation, quality assurance, food chemistry and analysis, product development, and sensory evaluation. Instruction prepares graduates for careers in line production management, quality control, food research/development, marketing, and management. The curriculum is approved by and is in compliance with minimum standards established by the Institute of Food Technologists, an international scientific society. IFT scholarship eligibility may require completion of selected courses in food engineering, technical calculus, and chemistry.

BS Nutrition
The program offers a broad preparation in the science of nutrition. Coursework includes foods and nutrition, general chemistry, organic chemistry, biochemistry, microbiology, general biology, and a variety of general education courses. Students select an area of concentration based upon their interests and career goals. The concentrations are described below.

Concentrations
Applied Nutrition. Prepares students for careers in various areas of nutrition, including dietetics, food systems management, nutrition communications, and community nutrition. This concentration is a Didactic Program in Dietetics (DPD), which is currently granted approval status by the Commission on Accreditation for Dietetics Education, of the American Dietetic Association, 216 W. Jackson Blvd., Chicago, IL 60606-6995, (312) 899-4876. Students in this concentration are eligible to apply for admission to an accredited dietetic internship, upon completion of which the graduate must pass a national examination administered by the Commission on Dietetic Registration to qualify as a registered dietitian (RD).
Graduates also are prepared to pursue advanced degrees in foods and nutrition, public health, and food systems management.

**Culinary Science and Management in Nutrition.** Designed for students wanting to apply a strong science background in one of two areas: foodservice management or food product development. This concentration serves the growing need for nutritionists who are positioned to make decisions that require a blend of management training, culinary expertise, and a fundamental science background.

**Nutrition and Food Industries.** Designed for students who want to apply knowledge of nutrition to careers in the food industry and related organizations (such as commodity and other non-profit organizations, pharmaceutical companies, or government). Students will be prepared for positions in food product research and development, quality and regulatory operations, food and health communications, public relations, extension, and technical sales. In addition, students will be prepared for graduate study in food science, nutrition, or related fields.

**Nutrition Science.** Emphasizes a strong background in basic sciences and human nutrition for students planning further study in graduate school or a health-related profession such as medicine, dentistry, nursing, or physical therapy. Students need to check with their advisers for specific requirements for various health-related professions.

**BS FOOD SCIENCE**

- 60 units upper division
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

**MAJOR COURSES**

- FSN 125 Introduction to Food Science .................. 5
- FSN 154 Basic Calculations in Food Processing .......... 4
- FSN 204 Food Processing Operations ..................... 4
- FSN 210 Nutrition ........................................... 4
- FSN 275 Principles of Food Safety and Hazard Analysis .................................................. 4
- FSN 278 Food Plant Sanitation .................................. 4
- FSN 334 Food Packaging .................................... 3
- FSN 335 Food Quality Assurance .......................... 4
- FSN 364 Food Chemistry ..................................... 4
- FSN 374 Food Laws and Regulations ...................... 4
- FSN 408 Food Comp Science and Product Dev. .......... 4
- FSN 411 Sensory Evaluation of Food ...................... 3
- FSN 434 Food Analysis ...................................... 4
- FSN 444 Engineering Concepts in Food Processing or FSN 494 Food Engineering ...................... 4
- FSN 461 Senior Project ..................................... 3
- FSN 462 Senior Project ..................................... 3
- FSN 463 Undergraduate Seminar .......................... 1
- FSN 474 Advanced Food Processing .......................... 4

**SUPPORT COURSES**

- BIO 115 Animal/Human Structure and Function (B2 & B4) ................................................. 4
- CHEM 111 Survey of Chemistry or CHEM 127, 128 General Chemistry (B3&B4) .......................... 5/8
- CHEM 312 Survey of Organic Chemistry (transfer equivalent CHEM 212) ........................... 5
- CHEM 313 Survey of Biochemistry and Biotechnology ....................................................... 5
- MATH 118 Pre-Calculus Algebra or MATH 161, 162 Calculus for Life Sciences I, II (B1) ........... 4/8
- MCRO 221 Microbiology .................................... 4
- MCRO 421 Food Microbiology ............................... 4
- PHYS 104 Introductory Physics ................................ 4
- STAT 218 Applied Statistics/Life Sciences (B1) .... 4
- Adviser approved electives .................................. 16

(At least 7 units must be at 300-400 level)

55-62

**GENERAL EDUCATION (GE)**

- 72 units required; 16 units are in Support.
- See page 79 for complete GE course listing.
- Minimum of 12 units required at the 300-400 level.

**Area A Communication (12 units)**

- A1 Expository Writing ...................................... 4
- A2 Oral Communication .................................... 4
- A3 Reasoning, Argumentation, and Writing .............. 4

**Area B Science and Mathematics (no additional units are required)**

- B1 Mathematics/Statistics * 8 units in Support .......... 0
- B2 Life Science * 4 units in Support ........................ 0
- B3 Physical Science * 4 units credited in Support ... 0
- B4 One lab taken with either a B2 or B3 course

**Area C Arts and Humanities (20 units)**

- C1 Literature ............................................... 4
- C2 Philosophy ............................................... 4
- C3 Fine/Performing Arts .................................... 4
- C4 Upper-division elective .................................. 4
- Area C elective (Choose one course from C1-C4) .... 4

**Area D/E Society and the Individual (20 units)**

- D1 The American Experience (40404) ................. 4
- D2 Political Economy ....................................... 4
- D3 Comparative Social Institutions ....................... 4
- D4 Self Development (CSU Area E) ...................... 4
- D5 Upper-division elective ................................. 4

**Area F Technology Elective (upper division)**

- (4 units) .................................................. 4

56

**ELECTIVES** ...................................................... 2-9

186

1 MATH 116 and 117 will substitute for MATH 118 and are taught at a slower pace. Upon completion of both MATH 116 and MATH 117, a student will receive 4 units of GE credit for Area B1.
BS NUTRITION

- 60 units upper division
- 2.0 GPA
- = Satisfies General Education requirement

MAJOR COURSES
FSN 101 Orientation to Nutrition ........................ 1
FSN 121 Fundamentals of Food ............................ 4
FSN 210 Nutrition ............................................... 4
FSN 230 Elements of Food Processing .................... 4
FSN 250 Food and Nutrition: Customs and Culture
(4)* (USCP) .................................................. 4
FSN 310 Maternal and Child Nutrition .................... 4
FSN 315 Nutrition in Aging .................................... 4
FSN 328, 329 Advanced Nutrition I, II .................... 4,4
FSN 415 Nutrition Education and Communications ..... 4
FSN 461, 462 Senior Project .................................. 2,2
FSN 463 Undergraduate Seminar .......................... 1
MCRO 221 Microbiology (B2 & B4)* ..................... 4
1 CHEM 111 Survey of Chemistry or
CHM 127 General Chemistry (B3&B4)* ............... 5/4
CHEM 312 Survey of Organic Chemistry or
CHM 316 Organic Chemistry I (transfer
equivalents CHEM 212, 216) ............................ 5
CHEM 313 Surv Biochemistry & Biotechnology
or CHEM 371 Biochemical Principles .............. 5
ECON 201 Survey of Economics (D2)* ............... 4
ENGL 148 Reasoning, Argumentation, and
Technical Writing (A3)* .............................. 4
1, 2 MATH 118 Pre-Calculus Algebra or
MATH 120 Pre-Calculus Algebra & Trig (B1)* ....... 4/5
SOC 110 Comparative Societies (D3)* ................. 4
STAT 218 Applied Statistics Life Sciences (B1)* ... 4
1 BIO 115 Animal/Human Structure/Function or
BIO 151 Introduction to Biology .......................... 4/5
Concentration courses (see below) ...................... 55-61

139-148

GENERAL EDUCATION (GE)
72 units required; 32 units are in Major.
→See page 79 for complete GE course listing.
→Minimum of 12 units required at the 300-400 level.

Area A Communication (8 units)
A1 Expository Writing ......................................... 4
A2 Oral Communication ....................................... 4
A3 Reasoning, Argumentation, and Writing * 4
units in Major .............................................. 0

Area B Science and Mathematics (no additional units
are required)
B1 Mathematics/Statistics * 8 units in Major ......... 0
B2 Life Science * 4 units in Major ......................... 0
B3 Physical Science * 4 units in Major ................. 0
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)
C1 Literature .................................................... 4
C2 Philosophy ................................................ 4
C3 Fine/Performing Arts .................................. 4
C4 Upper-division elective ................................. 4
Area C elective (Choose one course from C1-C4) .... 4

Area D/E Society and the Individual (8 units)
D1 The American Experience (40404) ............... 4
D2 Political Economy * 4 units in Major .............. 0
D3 Comp. Social Institutions * 4 units in Major ... 0
D4 Self Dev. (CSU Area E) * 4 units in Major ....... 0
D5 Upper-division elective ............................... 4

Area F Technology Elective (upper division)
(4 units) ..................................................... 4

40

ELECTIVES .................................................. 0-6
186

CONCENTRATIONS (select one)
Applied Nutrition Concentration
FSN 263 Professional Practice in Applied Nutrition 2
FSN 321 Culinary Mgt. Principles and Practice ...... 4
FSN 343, 344 Institutional Foodservice I, II ........... 3,3
FSN 416 Community Nutrition ............................ 4
FSN 417 Nutrition Counseling ............................ 4
FSN 426 Food Systems Management .................. 3
FSN 429, 430 Clinical Nutrition I, II .................. 4,4
BIO 302 Human Genetics or BIO 303 Survey of
Genetics ...................................................... 3
BUS 212 Financial Actg for Nonbusiness Majors ... 4
BUS 384 Human Resources Management .......... 4
MCRO 421 Food Microbiology ............................ 4
PSY 201/202 General Psychology ........................ 4
ZOO 331, 332 Human Anatomy/Physiology I, II .... 5,5

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Culinary Science and Management in Nutrition
Concentration
FSN 304 Adv. Culinary Principles and Practice .... 4
FSN 321 Culinary Mgt. Principles and Practice .... 4
FSN 341 Wines and Fermented Foods ................. 3
FSN 343 Institutional Foodservice I ..................... 3
FSN 344 Institutional Foodservice II .................... 3
FSN 364 Food Chemistry .................................... 4
FSN 408 Food Comp. Science/Product Dev. ....... 4
FSN 411 Sensory Evaluation of Food .................. 3
FSN 426 Food Systems Management ................. 3
AGB 301 Food and Fiber Marketing .................... 4
BUS 212 Accounting ....................................... 4
IT 428 Industrial Strategies ................................ 4
Adviser approved electives ............................. 16

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1 Advanced level course may be required for Nutrition Science
Concentration.
2 MATH 116 and 117 will substitute for MATH 118 and are taught at a
slower pace. Upon completion of both MATH 116 and MATH 117, a
student will receive 4 units of GE credit for Area B1.
Nutrition and Food Industries Concentration

FSN 154 Basic Calculations in Food Processing ..... 4
FSN 275 Principles of Food Safety and Hazard Analysis ............................................. 4
FSN 335 Food Quality Assurance........................ 4
FSN 364 Food Chemistry......................................... 4
FSN 374 Food Laws and Regulations.............. 4
FSN 408 Food Comp. Science and Product Dev. .... 4
FSN 410 Nutr Implications of Food Ind Practices... 4
FSN 411 Sensory Evaluation of Food.................. 3
FSN 420 Critical Evaluation of Nutrition Research. 2
FSN 434 Food Analysis ........................................... 4
AGB 301 Agricultural Marketing or BUS 245 Elements of Marketing ................................. 4
JOUR 218/312/331................................................... 4
MCRO 421 Food Microbiology........................................ 4

Processing – Select two from:
ASCI 209, FSN 204, 244, 334, 341; DSCI 231 ... 6-8
Production – Select one from: ASCI 231,
CRSC 230, DSCI 230, FRSC 230, VGSC 230 3-4

Nutrition Science Concentration

FSN 416 Community Nutrition................................ 4
FSN 429 Clinical Nutrition I...................................... 4
FSN 430 Clinical Nutrition II.................................... 4
BIO 303 Survey of Genetics or BIO 302 Human Genetics .............................................. 3
PHYS 121 College Physics........................................ 4
ZOO 331, 332 Human Anatomy/Physiology I, II .... 5,5
Adviser approved electives (must be selected with adviser's approval).............................. 26

FOOD SCIENCE MINOR

The minor is principally designed for students majoring in related academic disciplines who desire employment in the food industry. Upon completion of this minor, students will have acquired the fundamental technical skills necessary to understand basic issues and concepts in food science such as food processing, food safety, quality assurance, and product development.

Required core
FSN 125 Introduction to Food Science ............... 5
FSN 204 Food Processing Operations .................... 4
FSN 278 Food Plant Sanitation............................ 4
FSN 335 Food Quality Assurance.......................... 4

Emphasis area courses: ........................................ 10
Select 9 units from the following courses:
ASCI 209/211, 384;
FSN 154, 244, 341, 354, 364, 374, 408, 410, 434,
444, 474;
DSCI 231; MCRO 421

NUTRITION MINOR

The minor is designed for students majoring in academic disciplines such as Chemistry, Biochemistry, Biological Sciences, and Kinesiology. By completing this minor, students will enhance their academic qualifications in terms of employment or for admission to medical or dental schools or to graduate programs in allied health.

Required core
FSN 210 Nutrition (B5)………………………… 4
FSN 310 Maternal and Child Nutrition or FSN 315 Nutrition in Aging…………………………………… 4
FSN 328 Advanced Nutrition I …………………… 4
FSN 329 Advanced Nutrition II …………………… 4

Emphasis area courses: 11-12

From one of the following emphasis areas, select courses as directed in addition to the courses required:

Clinical Nutrition
Required: FSN 429, 430
Select one course from the following:
CHEM 337/338, CHEM 377, CHEM 473, PSY 304, or PSY 405.

Food Service Management
Required: FSN 343, 344, 426
Select one course from the following:
FSN 250, FSN 278, FSN 374, FSN 410, BUS 383, SOC 315 or SCOM 301

Community Nutrition
Required: FSN 416
Select two courses from the following:
FSN 250, FSN 415, ANT 401, POLS 326, REC 450, SOC 323, SCOM 418.

Sports Nutrition
Required: KINE 303, 451
Select one course from the following:
CHEM 337/338, CHEM 377, FSN 415, PSY 304, or PSY 317

27-28
Military Science

Department Head,
Lieutenant Colonel Ronald Lamb

Major Mark Johnson
Major Keith Kranhold
Captain Philip Kwong
Master Sergeant Antonio Reyes
Sergeant First Class Willard McClure

PROGRAMS

ROTC Four-Year Program
Military Science Minor

Four-Year Program
The Military Science Department conducts a dynamic four-year program of instruction which develops the mental and physical qualifications of graduates in preparation for positions of leadership within the military and civilian communities. Students may enroll at any time for full academic elective credit without incurring any military service obligation. However, the last two years of the program are oriented toward preparing the student for a military career.

The innovative and well-taught courses complement all major areas of study by broadening the student's basic education. The complete curriculum includes both military leadership and management courses; courses which provide an awareness of the heritage of the U.S. military; the Armed Forces' role in national defense strategy; professional military subjects; and military ethics.

Students desiring to attain a highly sought-after commission as a Second Lieutenant in the U.S. Army must meet eligibility requirements and complete the entire Military Science/ROTC (Reserve Officers’ Training Corps) Advanced Course (25 units). To be eligible for participation in the Cal Poly ROTC Program, a student must be enrolled full time (12 units) at Cal Poly, have at least two years remaining as a university student to permit completion of the advanced course prior to reaching the 30th birthday, and be physically qualified.

Financial Assistance
Many opportunities for financial assistance are available to students. Three areas of opportunities are: ROTC cadets who sign a contract for Advanced Phase, students who earn an ROTC scholarship, and cadets who train with Reserve or National Guard units. All ROTC cadets sign a contract to participate in the Advanced Phase of ROTC and receive a $200 a month allowance. Criteria to participate in the Advanced Phase are stated later. Highly competitive two-, three-, and four-year ROTC scholarships are available. The scholarship provides payment of full tuition, books, supplies, and the $200 a month allowance for the duration of the scholarship. Students interested in ROTC scholarship should contact the Military Science Department. Reserve or National Guard training provides an additional two sources of financial assistance: approximately $165 a month for one weekend drill and approximately $190 a month tuition assistance from the National Guard/Army Reserve "New GI Bill" benefits.

Equipment and Uniforms
All necessary equipment, uniforms and textbooks for participation in the Military Science/ROTC program are furnished to the student by the United States Government free of charge. Title to this property, other than expendable items, remains with the government. Students entering into active commissioned service after graduation are granted a special $300 uniform allowance.

Phases of Four-Year Program
The four-year program elective military science curriculum is divided into two diverse phases. The basic phase is primarily for freshmen and sophomores, and the advanced phase is for junior and senior level students.

Basic Phase
The Basic Phase is a two-year challenging opportunity where students may, without obligation, investigate the ROTC Program and the military as a full- or part-time career. Students may enter and leave this phase during any quarter. The curriculum for the basic phase is listed below and offers many exciting opportunities for all students. To become an ROTC cadet during this phase requires the student be registered for a Military Science class, completion of an ROTC enrollment form (obtained at the Military Science Department, Dexter Building, Room 115), and an interview with the ROTC Enrollment Officer. Because this phase is for students to examine the ROTC Program without obligation, participation in ROTC activities is encouraged but not mandatory. Entry to the challenging Advanced Phase is accomplished either by successfully completing the Basic Phase classes, completing ROTC Summer Basic Camp or completing any military basic training program.
ROTC Summer Basic Camp

One method to qualify for the Advanced Phase is to successfully complete the six-week challenging ROTC Summer Basic Camp. Students normally attend Basic Camp between their second and third academic years. Transfer students may complete the camp during the summer immediately prior to their matriculation at Cal Poly. It is important that potential transfer students who plan to participate in the two-year ROTC program make their intentions known directly to the Military Science Department no later than June 1 of the year they plan to register at the university even though this date may precede the date of their final acceptance by the university.

The government will provide a transportation allowance to and from Basic Camp and pay at the rate of one-half of a Second Lieutenant's basic pay. All equipment, uniforms, room, board and medical care are furnished free while at camp. A maximum of 7 units elective credit may be earned for attending Basic Camp. No military obligation is incurred for attending this camp.

Basic Training

Outstanding students who have successfully served on active duty, regardless of the branch of service, are qualified to enter the Advanced Phase because they have completed basic training for their particular branch of service. Also, students who have been or are members of Reserve or National Guard units and have completed basic training are qualified for the Advanced Phase.

Advanced Phase

The Advanced Phase is a two-year period where ROTC cadets receive advanced leadership and management training. The cadets receive many hours of hands-on, practical leadership experiences to prepare them for a military career or a management position in the civilian sector. To become a cadet in the Advanced Phase a student must complete the Basic Phase, ROTC Summer Basic Camp or Basic Training. The student must also make a commitment to attend all required training activities and sign a contract to accept a prestigious commission in the United States Army. In return for the student's commitment, the Military Science Department will provide $200 a month, classroom instruction, real leadership opportunities, and continuous professional development of their leadership skills.

After their first year of the Advanced Phase, cadets usually attend a five-week camp where their leadership skills are further developed and assessed. All equipment, uniforms, room, board, and medical care are furnished free while at this camp. The cadets will also receive approximately $700 during the six weeks. Upon successful completion of the Advanced Phase and graduation from the university, the cadet will be commissioned as a Second Lieutenant in the United States Army.

Simultaneous Membership Program

Students can serve simultaneously in the National Guard or Army Reserve while they are cadets in ROTC and receive pay from both sources. Those who complete the ROTC Advanced Phase prior to graduation may continue serving in the Reserve or National Guard in the Simultaneous Membership Program. Since students can earn about $3,000 each year, this program provides both substantial financial and experience benefits.

BASIC PHASE

Freshman

MSC 111 Orienteering (2)
MSC 112 Survival Training: Wilderness (2)
MSC 116 Basic Military Skills (2)

Sophomore

MSC 211 Current Military Affairs (2)
MSC 212 Basic Camp (1–7)
MSC 213 Mountaineering (2)
MSC 215 Leadership Management Seminar (2)
MSC 225 Advanced Survival Techniques (2)
MSC 226 Advanced Orienteering (2)
MSC 229 Ranger Challenge (2)

ADVANCED PHASE

Junior

MSC 311 Leadership and Management (3)
MSC 312 Leader Communication Skills (3)
MSC 313 Tactical Military Operations (3)
MSC 314 ROTC Advanced Camp (6)

Senior

MSC 411 Military Professionalism and Ethics (3)
MSC 412 Military Justice (2)
MSC 413 Military Organization and Mgt (2)

1 Basic Camp is an optional 6-week summer training course (1-7 units) at Fort Knox, Kentucky.
2 Advanced Camp is a required 6-week summer training experience at Fort Lewis, Washington (6 credits).
Military Science Minor

The minor emphasizes the following personal and technical skills: time, personnel, and resource management under duress; knowledge of U.S. military heritage, customs, and courtesies; planning and briefing under time constraints; current national defense issues; equal opportunity, sexual harassment, and military ethics; military justice; physical fitness; map reading and orienteering; leadership, management, and counseling skills under duress; oral, visual, and written communication skills in accordance with Army norms; small unit tactics. It provides marketable skills to students interested in government service, personnel management, and law enforcement. A student does not have to join ROTC to earn a Military Science Minor.

Required core
MSC 217 Institutionalized Diversity: The U.S. Army ................................................................. 3
MSC 311 Leadership and Management ......................... 3
MSC 312 Leader Communication Skills .................. 3
MSC 313 Tactical Military Operations .................. 3
MSC 411 Military Professionalism and Ethics ........ 3
MSC 412 Military Justice ........................................ 2
MSC 413 Military Organization and Management .. 2
PE 131 Physical Conditioning .................................. 1

Adviser approved electives ........................................ 6
Select 6 units from the following:
MSC 111, 112, 116, 211, 212, 213, 215, 225,
226, 229, 314 (ROTC only), 411

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Natural Resources Management

Department Office
Agricultural Sciences Bldg. (11), Room 217
(805) 756-2702
www.nrm.calpoly.edu

Department Head, Norman H. Pillsbury
Brian C. Dietterick Timothy G. O'Keefe
Samantha J. Gill Douglas D. Piirto
John H. Harris Carolyn B. Shank
Francis T. Hendrick Richard P. Thompson
William W. Hendricks James R. Vilkitis
Walter R. Mark

ACADEMIC PROGRAMS
BS Forestry and Natural Resources
BS Recreation Administration
MS Forestry Sciences

BS Forestry And Natural Resources
The Bachelor of Science degree program in Forestry and Natural Resources prepares students for important careers in the protection, management, and development of our forest and natural resources. Students may elect to emphasize forest and land management disciplines, such as recreation management; urban forestry; environmental management; watershed, chaparral and fire management; hardwood management; wildlife biology.

Graduates qualify for such positions as forester, environmental interpreter, urban forester, environmental specialist, park administrator, resource manager, park ranger, resource planner, watershed manager, and fire manager.

Cal Poly graduates are employed throughout the world: establishing, managing and regenerating forests and urban wildland areas; providing opportunities for recreation use of forests; teaching; extension; research; harvesting forest crops; developing, processing and marketing wood products; and protecting and managing the environment.

Senior Fall Field Quarter. Starting Fall Quarter 2002, seniors must complete a full course load at Swanton Pacific Ranch, contingent on facilities. This experience will emphasize the integration of practical field skills and independent learning, with the acquisition of knowledge about natural resources and its management, including soils, water, trees, wildlife, forage. FNR 402, FNR 412, and FNR 416 will be taught each Fall at Swanton Pacific. It is important that students plan their class schedule in order to satisfy the prerequisites for these courses. For a fee, room and board will be available at Swanton. Prior to facility availability at Swanton, these course will be taught at Cal Poly with laboratories and field activities using Swanton Pacific and local resource areas.

Students are required to complete a period of natural resources related work experience equivalent to one quarter of full-time work. This can be accomplished by the completion of an internship, a seasonal job, volunteer work, or cooperative education course. Work experience for academic credit must be documented by work supervisor and approved by student's academic adviser.

Students are required to purchase 8 inch high field boots, hard-hats (OSHA approved), hand calculator capable of linear regression, 10X hand lens, and an engineers scale ruler prior to taking 200- or 300-level major courses. Students are strongly encouraged to purchase a laptop (preferably Macintosh) before beginning 300-level major courses.

Forest and natural resources facilities assist in the development of field skills. Special campus sites include Christmas tree plantations, weather station, greenhouses, woodlots, biomass energy plantations, logging competition arena, experimental watershed and reservoirs. The forest at Swanton-Pacific, an off-campus site near Santa Cruz, offers many educational opportunities for coursework and special studies on its 3800 acres of forests, wildlands and agricultural land areas. The site includes hardwood and redwood forest types, diverse ecosystems, streams and riparian habitat zones. In addition, the 70-acre Atlee School Forest and other nearby private resource areas, regional and State parks, and National Forests also provide opportunities for field experiences.

Opportunities for graduate studies are also available. Students may choose to develop thesis programs with an emphasis in selected fields of forest and natural resources, such as watershed and fire management, forest management, recreation, chaparral and hardwood ecosystem management, urban forestry, and environmental studies.

Cal Poly is an institution accredited by the Society of American Foresters. Also, employment as a forester with the Federal Government is recognized by the U.S. Office of Personnel Management.
Curricular Concentrations
Concentrations prepare students for entry into the profession of forestry and natural resources. The curriculum provides broad training in forest and natural resource management with emphasis in urban forestry, watershed, chaparral and fire management, hardwood management, natural resources recreation, environmental management, and wood energy systems. Extensive field training occurs concurrently with classroom instruction.

Environmental Management. Prepares students for employment as professionals in the fields of forestry and natural resources management planning, environmental impact assessment and evaluation, and environmental policy analysis. Individual student programs are developed.

Forest Resources Management. Specialized areas of study are available through an emphasis in Hardwood Management or individualized studies in such areas as agroforestry, environmental studies, fish and wildlife management, parks and outdoor recreation, computer science, journalism, business administration, Spanish, and marketing.

Hardwood Management: The protection, utilization, and regeneration of hardwood communities as well as the principles of hardwood management that are necessary to meet the rising demand for the multiple use of hardwood forests and oak woodlands are studied.

Natural Resources Recreation. Prepares students for employment in the planning, interpretation, development, and management of governmental and private resource-based parks and other recreational lands. Two areas of study are offered: recreation resource management and natural resources tourism.

Urban Forestry. Management problems resulting from the continued trend of urbanization into the urban-wildland interface are studied. Urban Forestry focuses on the urban ecosystem including lesser vegetation, wildlife, and open space, as well as the trees. The curriculum emphasizes the application of forestry skills for management of urban forest ecosystems.

Wildland Fire and Fuels Management. Focused study on the management of fire and fuels on landscapes ranging from the wildlands to the urban interface. Emphasis on the practices, issues and policies in controlling fire, using fire as an ecosystem management tool and social and economic impacts of fire.

Watershed Hydrology. Provides students a focused and encompassing program including a proficiency in watershed hydrology in forest ecosystems and Mediterranean ecosystems, rangeland hydrology, post-fire water-shed evaluation, and urban/wildland hydrologic implications.

Other Concentrations Available
The Wildlife Biology concentration offered by the Biological Sciences Department is available to Forestry and Natural Resources majors and prepares students for employment in the fish and wildlife areas of law enforcement, management, and production. FNR majors following this concentration will meet the Wildlife Society's certification education requirements or the certification requirements of the American Fisheries Society based on choice of restricted electives. Prerequisite courses in zoology are required of students entering this concentration. Students in the Wildlife Biology concentration may deviate up to 17 units of designated courses toward prerequisites with prior written approval of adviser. See Biological Sciences section for curricular requirements.

Geographic Information Systems For Agriculture Minor
This minor is an interdisciplinary program sponsored by three departments: BioResource and Agricultural Engineering, Natural Resources Management, and Crop Science. For more information, see the College of Agriculture section.

Recommended Sequence: Major and Support Courses
The following is a guide for scheduling Major and Support Courses. By following this sequence, students should meet prerequisites for Major coursework. Courses are not always offered during the quarter indicated. Please consult with your academic adviser and the current Class Schedule.

<table>
<thead>
<tr>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
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<td><strong>Fall</strong></td>
<td><strong>Winter</strong></td>
<td><strong>Spring</strong></td>
<td><strong>Fall</strong></td>
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<tr>
<td>FNR 140</td>
<td>BOT 121</td>
<td>CHEM 111</td>
<td>FNR 306</td>
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<td>FNR 201</td>
<td>MATH 120</td>
<td>SS 121</td>
<td>FNR 315</td>
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<tr>
<td>FNR 208</td>
<td>BRAE/FNR 247</td>
<td>FNR 260</td>
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<td>FNR 215</td>
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<td>STAT 218</td>
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<td>GE</td>
<td>SS 121</td>
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<td><strong>Fall</strong></td>
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<td>FNR 306</td>
<td>FNR 307</td>
<td>FNR 335</td>
<td>FNR 416</td>
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<td>FNR 315</td>
<td>FNR 326</td>
<td>FNR 365</td>
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<td>FNR 318</td>
<td>STAT 313/Calc.</td>
<td>BRAE 345</td>
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<td>GE</td>
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<td>(concentration)</td>
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2001-2003 Cal Poly Catalog
BS FORESTRY AND NATURAL RESOURCES

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Satisfies General Education requirement

MAJOR COURSES

FNR 140 Career Development and Planning NRM. 1
FNR 201 Introduction to Forest Ecosystem Mgmt. 3
FNR 208 Dendrology 4
FNR 215 Land and Resource Measurements 1
FNR 260 Harvesting and Forest Utilization 4
FNR 306 Natural Resource Ecology & Habitat Mgt 4
FNR 307 Fire Ecology 3
FNR 315 Forest Mensuration and Sampling 4
FNR/GEOG/LA 318 Applications in GIS 3
FNR 326 Natural Resources Econ. & Valuation 4
FNR 365 Silviculture and Vegetation Management 4
FNR 402 Forest Health 4
FNR 412 Forest and Natural Resources Senior Assessment Project 4
FNR 414 Timber Management 4
FNR 416 Environmental Impact Analysis & Mgmt. 4
FNR 419 Watershed Management 4
FNR 435 Natural Resources Policy Analysis 4
FNR 465 Ecosystem Management 4
Concentration courses 25

SUPPORT

AGB 212 Agricultural Economics 4
BIO 227 Wildlife Biology (B2)* 4
BOT 121 General Botany 4
BRAE/FNR 247 Forest Surveying 2
BRAE 345 Aerial Photograph & Remote Sensing 3
CHEM 111 Survey of Chemistry (B3&B4)* 5
MATH 120 Pre-Calculus Algebra and Trig. (B1)* 5
SS 121 Introductory Soil Science 4
STAT 218 Applied Stats in the Life Sciences (B1)* 4

STAT 313 or MATH 221 4
Adviser approved science course
BOT 223/313, CHEM 212/312, PHYS 121 4

GENERAL EDUCATION (GE)

72 units required; 16 units are in Support.
See page 79 for complete GE course listing.
Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)

A1 Expository Writing 4
A2 Oral Communication 4
A3 Reasoning, Argumentation, and Writing 4

Area B Science and Mathematics (no additional units are required)

B1 Mathematics/Statistics * 8 units in Support 0
B2 Life Science * 4 units in Support 0
B3 Physical Science * 4 units in Support 0
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)

C1 Literature 4
C2 Philosophy 4
C3 Fine/Performing Arts 4
C4 Upper-division elective 4
Area C elective (Choose one course from C1-C4) 4

Area D/E Society and the Individual (20 units)

D1 The American Experience (40404) 4
D2 Political Economy 4
D3 Comparative Social Institutions 4
D4 Self Development (CSU Area E) 4
D5 Upper-division elective 4

Area F Technology Elective (upper division)

(4 units) 4

CONCENTRATIONS (Select one)

Environmental Management Concentration

CRP 212 Introduction to Urban Planning 3
ENVE 330 Environmental Quality Control 4
FNR 339 Internship 6
FNR/CRP 404 Environmental Law or FNR 408
Water Resource Law and Policy 3
FNR 425 Applied Resource Analysis 4
Restricted electives, adviser's prior written approval 5

Forest Resources Management Concentration

FNR 204 Resource Fire Control 3
FNR 339 Internship 6
FNR 434 Wood Properties and Products 5
Restricted electives, adviser's prior written approval 11

1 MATH 118 and 119 will substitute for MATH 120 and are taught at a slower pace for those who need more review. Also, MATH 116 and 117 will substitute for MATH 118 for those people who need extra review.

ELECTIVES 1

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2001-2003 Cal Poly Catalog
Natural Resources Recreation Concentration
FNR 311 Environmental Interpretation .......................... 4
FNR 339 Internship .................................................... 6
FNR 410 Resource Recreation Management .......................... 4
FNR 417 Resource Recreation Planning .......................... 3
REC 101 Intro Recreation Parks and Tourism or
FNR 112 Parks and Outdoor Recreation .......................... 3
Restricted electives, adviser's prior written approval .......................... 5

25

Urban Forestry Concentration
FNR 311/EHS 421 ....................................................... 4
FNR 339 Internship .................................................... 6
FNR 350 Urban Forestry ............................................. 3
FNR 355 Hardwood and Woodlot Management ................. 4
FNR 450 Community Forestry ........................................... 3
Restricted electives, adviser's prior written approval .......................... 5

25

Wildland Fire and Fuels Management Concentration
FNR 204 Resource Fire Control ........................................... 3
FNR 339 Internship .................................................... 6
FNR 340 Resource Fire Management ........................................... 2
FNR 455 Urban-Wildland Interface Fire Protection .... 3
Restricted electives, adviser's prior written approval .......................... 11

25

Watershed Hydrology Concentration
MATH 143 Calculus III .............................................. 4
ENVE 434 Water Quality Measurements .......................... 2
FNR 420 Advanced Watershed Hydrology ......................... 4
GEOL 201 Physical Geology ..................................... 3
PHYS 122 College Physics ......................................... 4
SS 321 Soil Morphology ............................................. 4
SS 440 Forest and Range Soils ......................................... 4

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MS FORESTRY SCIENCES
The Master of Science degree program in Forestry Sciences has the following objectives:

To provide the forestry profession in California and the west with graduates educated in the forest science subdisciplines of

- Ecosystem management in the oak woodland, chaparral and Sierran forest types
- Economics and valuation in the urban interface forest
- Watershed hydrology in Mediterranean ecosystems
- Fire ecology, and
- Urban and community forestry

To develop characteristics and qualities that transcend job-specific skills and knowledge including:

- Critical thinking/problem solving competencies
- Communications and related social competencies
- Forest management competencies using an integrated ecosystem approach
- Quantitative systems/information management competencies
- Awareness of current issues and technical forestry competencies
- Independent thought and research methods

Graduate preparation for further study in forest service, leading to the Ph.D. degree.

Prerequisites: For admission as a classified graduate student, an applicant will have completed a bachelor's degree in forestry at an accredited forestry four-year college or completed the equivalent academic preparation as determined by appropriate campus authorities 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.

Program of Study: Graduate students must file a formal study plan with their major professor, graduate committee, department, college and university graduate studies office 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 a minimum of 45 units (at least 23 of which must be at the 500 level). The broad curriculum for the Master of Science degree in Forestry Sciences is:

a) a minimum of 29 units in the required core;
b) a minimum of 16 units of restricted electives approved by the student’s major professor and department head;
c) completion of a thesis and an oral and written examination. At the discretion of the graduate committee, the written examination may consist of submitting an article for publication to a referred journal.

Required courses ....................................................... 29
SS 501 Research Planning (3)
STAT 512 Statistical Methods (4)
FNR 530 Social Systems/Forest Resources Mgt (3)
FNR 532 Forestry Appl Biometrics/Econometrics (4)
FNR 534 Forest Ecosystem Mgt & Modeling (3)
FNR 581 Graduate Seminar in Forest Resources (3)
FNR 599 Thesis (9)

Restricted electives ....................................................... 16
Determined by the student’s graduate committee from forestry subdisciplines (400–500 level)

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For more information, contact Norman Pillsbury, Department Head.
BS Recreation Administration

Leisure is the second largest industry in the American economy with 400-500 billion dollars annually in direct spending. Recent labor and economic studies describe this industry as one of the top five growth industries for employment.

Organizations offering leisure services and products exist as a result of the demand for increased leisure opportunity. The Recreation, Parks and Tourism Management area offers a bachelor of science degree program in Recreation Administration which prepares students for professional employment in public, non-profit, private, and commercial leisure service organizations. Students may pursue a concentration in commercial recreation/tourism management, or natural resources recreation or select a course of study in special events, sport management and community recreation. In addition, leisure education courses provide university students with leisure lifestyle management skills. The major is accredited by the National Recreation and Park Association/American Association for Leisure and Recreation Council on Accreditation.

The major includes a 400 hour required internship (one quarter) in a leisure service organization. Graduates qualify for diverse positions as recreation supervisors, park and recreation administrators, travel and tourism specialists, environmental educators, park rangers, park naturalists, recreation related business owners, private recreation club managers, employee services and recreation specialists, chamber of commerce specialists, convention and visitor bureau program directors, meeting specialists and special event planners.

Recreation Administration graduates, employed in settings located in and out of the United States, are planning, organizing, implementing and evaluating leisure services to residents, tourists, and other participants. Sound administrative management skills learned in the program, and through practical and research applications, allow for career progress into executive management positions within the leisure service industry.

Students have access to the department's field laboratories and also develop competencies in a myriad of sites to include ropes course leadership laboratories, environmental education centers, leisure businesses and recreation departments. Students operate major special events and programs and conduct applied research in required and elective coursework.

In addition to major requirements, the curriculum provides a full range of general education and support courses designed to fully educate and prepare students for a global society where cultural diversity and international understanding are developed.

Curricular Concentrations

Commercial Recreation/Tourism Management.
Emphasizes preparation for employment in organizations that provide leisure products or services for profit or financial self-sufficiency. An emphasis on recreation business is targeted to the following areas: resorts and private camps, travel and tourism, product sales and marketing, public/private entrepreneurship, joint commercial-public ventures, and small business opportunities. Specific emphasis is placed commercial/tourism enterprises and special event management.

Natural Resources Recreation. Prepares students for employment in the planning, development, leadership, and management of outdoor recreation opportunities on public and private lands. Areas of study include park and recreation resource management, natural resources tourism, and interpretation and environmental education.

Graduate Program

Cal Poly offers a specialization in General Agriculture which provides the opportunity to focus in the area of Recreation, Parks and Tourism Management. Please refer to the MS Agriculture section of the College of Agriculture.

BS RECREATION ADMINISTRATION

- 60 units upper division
- 2.0 GPA
- Satisfies General Education requirement

MAJOR COURSES

- REC 101 Intro. to Recreation, Parks and Tourism 3
- REC 110 Career Develop and Planning in Recreation Administration 1
- REC 127 Leisure Behavior 4
- REC 210 Introduction to Program Design 4
- REC 252 Recreation and Special Populations 4
- REC 305 Recreation Areas and Facilities Mgt 4
- REC 324 Legal and Legislative Patterns in Recreation Administration 4
- REC 360 Assessment and Eval of Rec Parks and Tourism 4
- REC 405 Management and Leadership for Recreation Administration 4
- REC 424 Financing Recreation Services 4
- REC 460 Research in Recreation, Parks & Tourism 4
- REC 461 Senior Project 3
- REC 463 Pre-Internship Seminar 1
- REC 465 Internship 6
- BUS 384 Human Resources Management 4
- Concentration courses (see below) or adviser approved electives 28
SUPPORT COURSES

BUS 212 Financial Actg for Nonbusiness Majors ........ 4
BUS 346 Principles of Marketing .......................... 4
CSC 110/113/AG 250 ........................................... 3
ENGL 310 Corporate Communications ..................... 4
FNR 410/EHS 337/LA 363 ...................................... 3

(Natural Resources Recreation students are required to take FNR 410)
JOUR 312 Introduction to Public Relations .............. 4
MATH 118 Pre-Calculus Algebra (B1)* or
MATH 116 and 117 (B1)* ..................................... 4
STAT 217 Intro to Statistical Concepts and
Methods (B1)* .................................................. 4

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GENERAL EDUCATION (GE)
72 units required; 8 units in Support.
→See page 79 for complete GE course listing.
→Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)
A1 Expository Writing ........................................ 4
A2 Oral Communication ..................................... 4
A3 Reasoning, Argumentation, and Writing ............... 4

Area B Science and Mathematics (8 units)
B1 Mathematics/Statistics * 8 units in Support ...... 0
B2 Life Science .................................................. 4
B3 Physical Science .......................................... 4
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)
C1 Literature .................................................... 4
C2 Philosophy .................................................. 4
C3 Fine/Performing Arts .................................... 4
C4 Upper-division elective ................................ 4
Area C elective (Choose one course from C1-C4) ... 4

Area D/E Society and the Individual (20 units)
D1 The American Experience (40404) .................... 4
D2 Political Economy ....................................... 4
D3 Comparative Social Institutions ....................... 4
D4 Self Development (CSU Area E) ...................... 4
D5 Upper-division elective ................................ 4

Area F Technology Elective (upper division)
(4 units) ............................................................. 4

64

ELECTIVES .............................................................. 10

CONCENTRATION OR ADVISER APPROVED ELECTIVES

Select either a concentration or adviser approved electives.

Commercial Recreation/Tourism Management

Concentration

REC 313 Natural Resources and Agri-Tourism............ 4
REC 314 Travel and Tourism Planning .................... 4
REC 317 Convention and Meeting Management ....... 3
REC 414 Organization and Development of
Commercial Leisure Services ............................ 4
Restricted electives ........................................... 13

28

Natural Resources Recreation Concentration

REC 302 Environmental and Wilderness Education
or FNR 311 Environmental Interpretation ............. 4
REC 313 Natural Resources and Agri-Tourism .......... 4
REC 314 Travel and Tourism Planning or FNR
417 Resource Recreation Planning ...................... 4/3
Restricted electives ........................................... 16/17

28

Adviser Approved Electives .................................. 28

Recommended Sequence: Major and Support Courses

The following is a guide for scheduling Major and Support Courses. By following this sequence, students should meet prerequisites for Major coursework. Courses are not always offered during the quarter indicated. Please consult with your academic adviser and the current Class Schedule.

<table>
<thead>
<tr>
<th>1st Year</th>
<th>1st Year</th>
<th>1st Year</th>
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<tbody>
<tr>
<td>Fall</td>
<td>Winter</td>
<td>Spring</td>
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<tr>
<td>REC 101</td>
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<td>REC 127</td>
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<tr>
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<td>REC 210</td>
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<tr>
<td>BUS 212</td>
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<td>Fall</td>
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<td>Spring</td>
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<tr>
<td>REC 305</td>
<td>REC 324</td>
<td>REC 360</td>
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<tr>
<td>ENGL 310</td>
<td>BUS 384</td>
<td>FNR 410/EHS 337/ LA 363</td>
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<td>BUS 346</td>
<td>JOUR 312</td>
<td>REC Elective</td>
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<table>
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<tbody>
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<td>Fall</td>
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<tr>
<td>REC 405</td>
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<td>REC 465</td>
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<tr>
<td>REC 460</td>
<td>REC 424</td>
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</tr>
<tr>
<td>REC 463</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Units reduced effective Winter 2004 186 180

2001-2003 Cal Poly Catalog
Soil Science

Department Chair, Thomas J. Rice, Jr.
Gaston Amedee Thomas A Ruehr
Delmar D. Dingus Terry L. Smith
Brent G. Hallock Ronald D. Taskey
Lynn E. Moody

Affiliate Faculty:
Max Moritz Calvin H. Wilvert
William L. Preston

Academic Programs
Soil Science - BS, Minor
Earth Sciences - BS

BS Soil Science

Three-fourths of the world's food and nearly all of its fiber come from the fragile, thin skin of the land's surface—the soil. Moreover, soil absorbs and transmits rain and snow which replenish our groundwater; and it captures great quantities of environmental wastes. Soil scientists are the most knowledgeable and best trained people responsible for the management of soil, one of our most precious natural resources.

The Bachelor of Science degree in Soil Science provides fundamental knowledge and skills needed for field, laboratory, management, and teaching positions, as well as for graduate studies. Concentrations are offered in Land Resources, Environmental Management, and Environmental Science and Technology. These high quality programs help ensure that our graduates are well prepared for the diverse opportunities awaiting them. Also, graduates can 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.

Students are encouraged to reinforce their education, develop professional contacts, and strengthen their career potential by participating in any of the following activities: the Soils Club and the Soil and Water Conservation Society, each of which is nationally affiliated; the Soil Judging Team, which commonly qualifies for national competition; and internships and cooperative education programs with government and industry. Each of these opportunities, combined with a friendly, helping atmosphere, provide students a college experience that is highly personable as well as rewarding. Students also are encouraged to investigate opportunities for international education. Please see the Study Abroad program section of this catalog.

Facilities of the department include laboratories having up-to-date analyzers and a glasshouse. The department has access to several thousand acres of agricultural, forest and range land managed by the College of Agriculture. All of the facilities, equipment and land, which allow practical application of classroom knowledge, are for student use.

Our undergraduate soil science program ranks among the largest and strongest in the nation. Our graduates are employed from Alaska to Mexico, Maine to Hawaii, and on every continent. Their Cal Poly experience has provided them with the strong scientific foundation, practical skills and balanced general education needed to be flexible and competitive in today's diverse, and often unpredictable, job market.

Undergraduate and graduate students majoring in soil science earn a solid, useful education; likewise, students from other fields who select soil science courses as electives, or who select the soil science minor, can augment their skills and knowledge, making them more adaptable to changing professional opportunities. All students can discover soil's vital role in their lives, and the human dependence on the quality of soil for quality of life.

Cal Poly offers a Master of Science in Agriculture degree with a specialization in Soil Science. For information regarding this degree program, please refer to the MS Agriculture section.

Curricular Concentrations

Environmental Management. Offers a solid scientific background melded with environmental policy and administration, site analysis, and resource planning. The program helps prepare students for managerial positions dealing with today's complicated environmental problems and opportunities.

Environmental Science and Technology. Provides the strongest foundation for evaluating and solving complex environmental problems, including land and water degradation and contamination by hazardous wastes. Additionally, the concentration includes courses needed for admission to rigorous graduate programs.

Land Resources. Prepares students for professional opportunities in soil and water conservation, farm advisement, fertilizer and agricultural chemicals industries, forest and range soils, urban land enhancement, laboratory analysis, soil surveying, environmental issues, and international agriculture. The flexibility of this concentration allows students to select (with departmental
approval) from nearly any minor offered by the University. Students are encouraged to consider the minors in Land Rehabilitation, Water Science, and Geographic Information Systems, offered through the College of Agriculture. In addition, students may design their programs to prepare for graduate studies.

**BS Earth Sciences**

The BS in Earth Sciences provides a strong foundation for understanding and improving the utilization of land, water, and atmospheric resources. The program emphasizes a wide range of disciplines in natural resources and in the cultures that use and modify them. The core of the earth sciences curriculum is composed of soil science, geography, and geology, and is strengthened by a diverse array of related topical and technical specialties.

The Earth Sciences major provides detailed and thorough training in the natural and cultural processes that govern the relationship between humans and their habitats. The program also furnishes students the marketable expertise to assess, repair, and improve this fragile relationship while acquiring a well rounded education in both the natural and social sciences. In addition, majors can meet the educational requirements for professional certification in a number of areas and will find their training ideal for graduate school preparation in a number of related disciplines.

Due to the multidisciplinary nature of the Earth Sciences major, students have access to diverse faculty and laboratories in the various colleges. The degree program, itself, is administered by the Soil Science department, within the College of Agriculture. The department and its students have access to several thousand acres of agricultural, forest, and range land managed by this school. Additionally, California's Central Coast offers a diverse environmental and cultural setting for real-world training and experiences in the earth sciences.

Undergraduate students majoring in Earth Sciences will earn the credentials for useful careers in resource assessment and administration. They will graduate with a substantial and well rounded education in the natural and social sciences. Moreover, Earth Sciences graduates will possess the understanding, flexibility, and tools to appreciate and adapt to a changing world and its employment opportunities.

**Concentrations**

In addition to the required major courses, students select one of the following concentrations or individualized course of study based upon their interests and career goals.

**Geography.** Preparation for careers in environmental assessment, impact analysis, and administration. Study and analysis of environmental use and modification and the current legal and regulatory environment. This concentration also provides a strong foundation for graduate school or a career in education.

**Land and Water Resources.** Prepares students for professional opportunities in the mitigation and conservation of land and water resources. Emphasis is on the processes that endanger these ecosystems and the knowledge necessary to protect and maintain them. Additional training in soils and hydrological studies along with enhanced technological skills. This concentration also prepares students for graduate study in disciplines that specialize in land and water.

**Individualized Course of Study.** Students may pursue an academic minor or create a program, with faculty approval, based upon their interests and career goals. The coursework may be specifically tailored for a career in industry, education, government, or as preparation for graduate school.

**Graduate Program**

Cal Poly offers a Master of Science degree in Agriculture with a specialization in Soil Science. Please refer to the MS Agriculture section of the College of Agriculture.

**SOIL SCIENCE MINOR**

Students from major fields other than Soil Science may broaden their education, and enhance their career opportunities, by selecting the minor in Soil Science.

**Required courses**

- SS 121 Introductory Soil Science (B5) .................... 4
- SS 202 Soil and Water Conservation ....................... 3
- SS 221 Fertilizers and Plant Nutrition or SS 223 Rocks and Minerals .............................................. 4
- SS 321 Soil Morphology .......................................... 4

**Restricted Electives ............................................... 11/14**

- SS 310 Urban Soils (4)
- SS 322 Soil Fertility (4)
- SS 323 Geomorphology (4)
- SS 345 Soil Interpretations ands Management (4)
- SS 422 Soil Microbiology and Biochemistry (4)
- SS 423 Soil and Water Chemistry (5)
- SS 431 Soil Resource Inventory (4)
- SS 432 Soil Physics (5)
- SS 433 Land Use Planning (3)
- SS 440 Forest and Range Soils (4)
- SS 442 Soil Vadose Zone Remediation (4)
- SS 453 Tropical Soils (4)

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2001-2003 Cal Poly Catalog
BS SOIL SCIENCE

- 60 units upper division
- 2.0 GPA

* = Satisfies General Education requirement

### MAJOR COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>SS 110</td>
<td>Orientation in Soil Science</td>
<td>1</td>
</tr>
<tr>
<td>SS 121</td>
<td>Introductory Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>SS 202</td>
<td>Soil and Water Conservation</td>
<td>3</td>
</tr>
<tr>
<td>SS 221</td>
<td>Fertilizers and Plant Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>SS 223</td>
<td>Rocks and Minerals</td>
<td>4</td>
</tr>
<tr>
<td>SS 321</td>
<td>Soil Morphology</td>
<td>4</td>
</tr>
<tr>
<td>SS 322</td>
<td>Soil Fertility</td>
<td>4</td>
</tr>
<tr>
<td>SS 345</td>
<td>Soil Interpretations and Management</td>
<td>4</td>
</tr>
<tr>
<td>SS 422</td>
<td>Soil Microbiology and Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>SS 423</td>
<td>Soil and Water Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>SS 431</td>
<td>Soil Resource Inventory</td>
<td>4</td>
</tr>
<tr>
<td>SS 432</td>
<td>Soil Physics</td>
<td>5</td>
</tr>
<tr>
<td>SS 461</td>
<td>Soils Senior Project</td>
<td>1</td>
</tr>
<tr>
<td>SS 462</td>
<td>Soils Senior Project</td>
<td>3</td>
</tr>
<tr>
<td>SS 463</td>
<td>Undergraduate Soils Seminar</td>
<td>2</td>
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</table>

Concentration courses (see below).......................... 28/29

### SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 121</td>
<td>General Botany (B2 &amp; B4)*</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 415/BRAE 435/BRAE 440</td>
<td></td>
<td>3/4</td>
</tr>
<tr>
<td>AG 110/CSC 110/CSC 111</td>
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</tr>
<tr>
<td>MATH 141</td>
<td>Calculus I (B1)*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Calculus II (B1)*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 118</td>
<td>Pre-Calculus Algebra or MATH 141 Calculus I (B1)*</td>
<td>4</td>
</tr>
<tr>
<td>MATH 119</td>
<td>Pre-Calculus Trigonometry or MATH 142 Calculus II (B1)*</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 121/PHYS 131</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>STAT 218</td>
<td>Appl Statistics-Life Sciences</td>
<td>4</td>
</tr>
</tbody>
</table>

### GENERAL EDUCATION (GE)

- 72 units required; 16 units are in Support.
- Minimum of 12 units required at the 300-400 level.

<table>
<thead>
<tr>
<th>Area</th>
<th>Courses</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>A1</td>
<td>Expository Writing</td>
<td>4</td>
</tr>
<tr>
<td>A2</td>
<td>Oral Communication</td>
<td>4</td>
</tr>
<tr>
<td>A3</td>
<td>Reasoning, Argumentation, and Writing</td>
<td>4</td>
</tr>
<tr>
<td>B1</td>
<td>Mathematics/Statistics</td>
<td>8 units in Support</td>
</tr>
<tr>
<td>B2</td>
<td>Life Science</td>
<td>4 units in Support</td>
</tr>
<tr>
<td>B3</td>
<td>Physical Science</td>
<td>4 units in Support</td>
</tr>
<tr>
<td>B4</td>
<td>One lab taken with either a B2 or B3 course</td>
<td></td>
</tr>
</tbody>
</table>

### AREA A Communication (12 units)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Expository Writing</td>
<td>4</td>
</tr>
<tr>
<td>A2</td>
<td>Oral Communication</td>
<td>4</td>
</tr>
<tr>
<td>A3</td>
<td>Reasoning, Argumentation, and Writing</td>
<td>4</td>
</tr>
</tbody>
</table>

### AREA B Science and Mathematics (no add'l units req'd)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Mathematics/Statistics</td>
<td>8 units in Support</td>
</tr>
<tr>
<td>B2</td>
<td>Life Science</td>
<td>4 units in Support</td>
</tr>
<tr>
<td>B3</td>
<td>Physical Science</td>
<td>4 units in Support</td>
</tr>
<tr>
<td>B4</td>
<td>One lab taken with either a B2 or B3 course</td>
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### AREA C Arts and Humanities (20 units)

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>C1</td>
<td>Literature</td>
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</tr>
<tr>
<td>C2</td>
<td>Philosophy</td>
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<tr>
<td>C3</td>
<td>Fine/Performing Arts</td>
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</tr>
<tr>
<td>C4</td>
<td>Upper-division elective</td>
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### AREA D/E Society and the Individual (20 units)

<table>
<thead>
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<th>Course</th>
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<th>Units</th>
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<tbody>
<tr>
<td>D1</td>
<td>The American Experience (40404)</td>
<td>4</td>
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<tr>
<td>D2</td>
<td>Political Economy</td>
<td>4</td>
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<tr>
<td>D3</td>
<td>Comparative Social Institutions</td>
<td>4</td>
</tr>
<tr>
<td>D4</td>
<td>Self Development (CSU Area E)</td>
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<tr>
<td>D5</td>
<td>Upper-division elective</td>
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### AREA F Technology Elective (upper division)

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<th>Units</th>
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<tbody>
<tr>
<td></td>
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### ELECTIVES

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<table>
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### CONCENTRATIONS (select one):

#### Environmental Management Concentration

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<th>Title</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>CHEM 312</td>
<td>Survey of Organic Chemistry (transfer equivalent CHEM 212)</td>
<td>5</td>
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<tr>
<td>CRSC 411/STAT 313</td>
<td></td>
<td>4</td>
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<tr>
<td>SS 433 Land Use Planning</td>
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<td>3</td>
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<td>Select from:</td>
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<tr>
<td>FNR 202, 306, 311, 416, 425; PHIL 340, REC 302</td>
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<td>8</td>
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<tr>
<td>Select from:</td>
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<tr>
<td>CRP 404, 408, 420; FNR 408, 464; LA 451</td>
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<table>
<thead>
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#### Environmental Science and Technology Concentration

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<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CHEM 316 (transfer equivalent CHEM 216), 317 (transfer equivalent CHEM 217)</td>
<td>Organic Chemistry I, II</td>
<td>5,5</td>
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<td>CHEM 218/318, 231/331, 319, 341, 342, 385, 481</td>
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<td>ENVE 325, 330, 434, 439; SS 442</td>
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<tr>
<td>STAT 313 Applied Experimental Design and Regression Models</td>
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<table>
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<th>Units</th>
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#### Land Resources Concentration

<table>
<thead>
<tr>
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<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CHEM 312 Survey of Organic Chemistry (transfer equivalent CHEM 212)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>CRSC 411 Experimental Techniques and Analysis</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Additional courses selected from approved list. These units may be selected to apply toward an approved minor.</td>
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<table>
<thead>
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<th>Units</th>
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<tbody>
<tr>
<td></td>
<td>28</td>
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</tbody>
</table>

1 Students in the Environmental Science and Technology concentration take MATH 141 and MATH 142.

2 Students in the Environmental Science and Technology concentration take PHYS 131.
BS EARTH SCIENCES

- 60 units upper division
- 2.0 GPA
- = Satisfies General Education requirement

MAJOR COURSES
AG 450 Holistic Resource Management............. 4
ANT 310 Archaeological Field Methods............. 4
BOT 121 General Botany (B2 & B4)*............... 4
BOT 313 Taxonomy of Vascular Plants (transfer equivalent BOT 223)............. 4
BRAE 237 Engineering Surveying I............... 2
BRAE 345 Aerial Photogramm/Remote Sensing .... 3
CHEM 127, 128 General Chemistry (B3 & B4)* .... 4,4
FNR 306 Natural Resource Ecology/Habitat Mgt ... 4
FNR/GEOG/LA 318 Applic GIS in Natl Resources 3
GEOG 250 Physical Geography ...................... 4
GEOG 333 Human Impact on the Earth ............ 4
GEOG 414 Climatology ................................ 4
GEOL 201 Physical Geology .......................... 4
GEOL 204 Geologic History/California ............ 3
GEOL 241 Physical Geology Lab..................... 1
SS 110 Orientation to Soil Science ................. 1
SS 121 Introductory Soil Science ................... 4
SS 223 Rocks and Minerals ........................... 4
SS 321 Soil Morphology ................................ 4
SS 323 Geomorphology ................................ 4
SS 461, 462 Senior Project........................... 1,3
STAT 218 Applied Statistics/Life Sciences (B1)*.. 4
STAT 313 or CRSC 411 .................................. 4
Concentration courses (see below; 4 units B1)*..... 44

GENERAL EDUCATION (GE)
72 units required; 16 units are in Major.
→See page 79 for complete GE course listing.
→Minimum of 12 units required at the 300-400 level.

Area A Communication (12 units)
A1 Expository Writing .................................. 4
A2 Oral Communication .................................. 4
A3 Reasoning, Argumentation, and Writing........ 4

Area B Science and Mathematics (no add’l units req’d)
B1 Mathematics/Statistics * 8 units in Major & concentration ......................................... 0
B2 Life Science * 4 units in Major ................... 0
B3 Physical Science * 4 units in Major .............. 0
B4 One lab taken with either a B2 or B3 course

Area C Arts and Humanities (20 units)
C1 Literature ............................................. 4
C2 Philosophy ............................................. 4
C3 Fine/Performing Arts ............................... 4
C4 Upper-division elective ............................ 4
Area C elective (Choose one course from C1-C4)... 4

Area D/E Society and the Individual (20 units)
D1 The American Experience (40404) ............... 4
D2 Political Economy .................................... 4

D3 Comparative Social Institutions .................. 4
D4 Self Development (CSU Area E) ................. 4
D5 Upper-division elective ............................ 4

Area F Technology Elective (upper division)
(4 units) ................................................... 4

ELECTIVES ............................................... 4

CONCENTRATIONS (select one):

Geography Concentration
(Note: GEOG 150 meets GE D3, and GEOG 300 or 301 or 308 meets GE D5)
FNR 416 Environmental Impact Analysis/Mgt .... 4
GEOG 150 Intro Cultural Geography ............... 4
GEOG 301 Geography of Resource Utilization .... 4
GEOG 308 Global Geography ......................... 4
GEOG 325 Climate and Humanity ................... 4
GEOG 340 Geography of California or GEOG 300 Geography of the United States .... 4
MATH 118 Pre-Calculus Algebra ....................... 4
MATH 119 Pre-Calculus Trigonometry ............... 4
PHYS 121 College Physics ................................ 4
SS 433 Land Use Planning ............................. 3
Restricted electives ..................................... 5

Land and Water Resources Concentration
BRAE 415 Hydrology .................................... 4
CHEM 129 General Chemistry ......................... 4
FNR 419 Watershed Management ..................... 4
MATH 141 Calculus I .................................... 4
MATH 142 Calculus II ................................... 4
PHYS 131, 132 General Physics ...................... 4,4
SS 431 Soil Resource Inventory ....................... 4
SS 432 Soil Physics ..................................... 5
Restricted electives ................................. 7

Individualized Course of Study
MATH 118 Pre-Calculus Algebra ....................... 4
MATH 119 Pre-Calculus Trigonometry ............... 4
PHYS 121 College Physics ................................ 4
Restricted electives (minimum 18 units at 300-400 level)............... 32

129

189

44

44

32

44