Graduate Programs

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http://cafes.calpoly.edu/departmentsandmajors/graduatePrograms

Programs of Study/Specializations Available
Agribusiness – MS, see page 89
Forestry Sciences – MS, see page 124
Agricultural Education – Master of New Fall 2010
Agriculture – MS with Specializations in:
Agricultural Engineering Technology
Animal Science
Crop Science
Dairy Products Technology
Environmental Horticultural Science
Food Science and Nutrition
Irrigation
Plant Protection Science
Recreation, Parks, and Tourism Management
Soil Science

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

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

Admission/Acceptance Requirements – MS only

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

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

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

Each specialization below may list additional prerequisites/requirements for the specific program.

Programs of Study
There are four graduate degree programs in the college: MS Agribusiness, MS Forestry Sciences, Master of Agricultural Education (non-thesis), and MS Agriculture with the following specializations: Agricultural Engineering Technology, Animal Science, Crop Science, Dairy Products Technology, Environmental Horticultural Science, Food Science and Nutrition, Irrigation, Plant Protection Science, Recreation, Parks, and Tourism Management, and Soil Science.

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

Formal Study Plan. Graduate students must file the formal study plan for the degree with the CAFES Graduate Coordinator no later than the end of the quarter in which the 12th unit of approved courses is completed. The formal program of study must include at least 45 units of committee-approved graduate coursework; at least half of the units required by the committee as reflected on the formal study plan must be at the 500 level. Students should refer to the course descriptions in this catalog for credit limitations of individual courses; for example, total credit for AG 500, Individual Study, is limited to six units. All candidates must meet the current Graduation Writing Requirement; see page 71. All students are required to pass an oral comprehensive examination which is normally given during the final quarter of the program of study. A written comprehensive exam may also be required by the master's degree committee, but this is optional. For students in a thesis program the final oral comprehensive examination includes, but is not necessarily limited to, a defense of the thesis.
Master of Science in Agriculture

MS Agriculture, Specialization in AGRICULTURAL ENGINEERING TECHNOLOGY
Students have the opportunity to focus their program on the application of engineering technologies and management to solve agriculturally related problems.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>BRAE 599 Thesis</td>
<td>6</td>
</tr>
<tr>
<td>AG 581/BRAE 581 Graduate Seminar</td>
<td>1</td>
</tr>
<tr>
<td>SS 501 Research Planning</td>
<td>4</td>
</tr>
<tr>
<td>STAT 512 Statistical Methods</td>
<td>4</td>
</tr>
<tr>
<td>STAT 513 Applied Experimental Design and Regression Models</td>
<td>4</td>
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<tr>
<td>BRAE 521 Systems Analysis of Ag Systems</td>
<td>4</td>
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</tbody>
</table>

Restricted electives

Any 400 and 500 level courses approved by the student’s graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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MS Agriculture, Specialization in ANIMAL SCIENCE

Additional prerequisites: Prospective students are required to: (1) submit a cover letter identifying interests, goals and experience relevant to the MS program, and (2) submit a résumé.

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

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>ASCI 581 Graduate Seminar</td>
<td>3</td>
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<tr>
<td>AG 581 Graduate Seminar</td>
<td>1</td>
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<tr>
<td>STAT 512 Statistical Methods</td>
<td>4</td>
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<tr>
<td>STAT 513 Applied Experimental Design and Regression Models</td>
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<tr>
<td>AG 599 Thesis</td>
<td>6</td>
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</table>

Select 16 units from the following

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>AG 500 Individual Study in Agriculture</td>
<td>6</td>
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<tr>
<td>ASCI 403 Applied Biotech in Animal Science</td>
<td>5</td>
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<tr>
<td>ASCI 405 Domestic Livestock Endocrinology</td>
<td>4</td>
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<td>ASCI 406 Applied Animal Embryology</td>
<td>5</td>
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<td>ASCI 415 HACCP for Meat and Poultry Ops</td>
<td>3</td>
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<tr>
<td>ASCI 420 Animal Metabolism and Nutrition</td>
<td>3</td>
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<tr>
<td>ASCI 450 Computer Apps in Animal Science:</td>
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<tr>
<td>Spreadsheet Analysis</td>
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<tr>
<td>ASCI 500 Individual Study in Animal Science</td>
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<tr>
<td>ASCI 503 Adv Molecular Tech in Animal Sci</td>
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<tr>
<td>ASCI 593 Stem Cell Research Internship</td>
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<td>ASCI 594 Applications in Stem Cell Research</td>
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<tr>
<td>VS/ASCI 438 Systemic Animal Physiology</td>
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<tr>
<td>VS/ASCI 440 Immunology and Diseases of Animals</td>
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<td>AGED 438 Instructional Processes in Agric Ed</td>
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<tr>
<td>BIO 501 Molecular and Cellular Biology</td>
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<td>BIO 524 Developmental Biology</td>
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<td>CHEM 528 Nutritional Biochemistry</td>
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<td>NR 532 Apps in Biometrics and Econometrics</td>
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</tbody>
</table>

Restricted electives

Any 400 and 500 level courses approved by the student’s graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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MS Agriculture, Specialization in CROP SCIENCE

For students with undergraduate preparation in plant agriculture. 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CRSC 445 Cropping Systems</td>
<td>4</td>
</tr>
<tr>
<td>CRSC 581 Graduate Seminar</td>
<td>3</td>
</tr>
<tr>
<td>CRSC 599 Thesis</td>
<td>6</td>
</tr>
<tr>
<td>HCS 511 Ecological Biometrics</td>
<td>4</td>
</tr>
<tr>
<td>SS 501 Research Planning</td>
<td>4</td>
</tr>
</tbody>
</table>

Restricted electives

Any 400 and 500 level courses, approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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MS Agriculture, Specialization in DAIRY PRODUCTS TECHNOLOGY

Additional prerequisites: Prospective students are required to: (1) submit a cover letter identifying interests, goals and experience relevant to the MS program, and (2) submit a résumé.

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

Units

Required Courses ......................................................... 27
DSCI 401 Physical and Chemical Properties of Dairy Products (4)
DSCI 444 Dairy Microbiology (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 523 Design and Analysis of Experiments (4)

Restricted electives...................................................... 18
Any 400 and 500 level courses, approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

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

Units

Required Courses ........................................................ 15-17
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)

Restricted electives ................................................... 28-30
Any 400 and 500 level courses, approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.

MS Agriculture, Specialization in IRRIGATION
Additional prerequisites: B.S. or B.A. with proficiency in basic chemistry and math. Students must have successfully completed at least one undergraduate class in general irrigation, soil science, crop science, calculus, and hydraulics, plus be familiar with spreadsheets. Students may complete prerequisite courses at Cal Poly if necessary.

Units

Required Courses ......................................................... 37
BRAE 405 Chemigation (1)
BRAE 414 Irrigation Engineering (4)
BRAE 435 Drainage (4)
BRAE 440 Agricultural Irrigation Systems (4)
BRAE 438 Drip/Micro Irrigation or BRAE 439 Vineyard Water Management (4)
BRAE 500 Individual Study (3)
BRAE 532 Water Wells and Pumps (4)
BRAE 533 Irrigation Project Design (4)
BRAE 599 Thesis (6)
400-500 level research methods or statistics course (3)

Restricted electives ...................................................... 8
Any 400 and 500 level courses approved by the student's graduate committee. At least half of all units required by the committee as reflected on the formal study plan must be at the 500 level.
MS Agriculture, Specialization in PLANT PROTECTION SCIENCE
Provides research experience at the graduate level; provides the opportunity to conduct field and/or laboratory research programs with corporate stakeholders for career enhancement; allows students to develop more diverse or specialized skill sets for post-graduation employment; provides opportunity to obtain required coursework for state licensing.

Required Courses ...................................................... 22-24
- AG 581 Graduate Seminar (1-3)
- CRSC/EHS 581 Graduate Seminar (3)
- HCS 511 Ecological Biometrics (4)
- PPSC 521 Plant-Pest Interactions (4)
- PPSC 599 Thesis (6)
- SS 501 Research Planning (4)

Select 8 units from the following ............................. 8
- PPSC 405 Advanced Weed Management (4)
- PPSC 414 Grape Pest Management (4)
- PPSC 427 Disease and Pest Control Systems for Ornamental Plants (4)
- PPSC 431 Insect Pest Management (4)
- PPSC 441 Biological Control of Insects (4)

Restricted electives .................................................. 13-15
Any 400 and 500 level courses approved by the graduate committee. At least half of all units required by the committee must be at the 500 level.

MS Agriculture, Specialization in RECREATION, PARKS, AND TOURISM MANAGEMENT
Prerequisite: In order to develop an academic background in this discipline, students who have not completed a BS/BA degree in Recreation, Parks and Tourism Administration may be required to take the following undergraduate courses: RPTA 101, RPTA 210, RPTA 360, and STAT 217/218.

Required Courses ....................................................... 23
- RPTA 450 Resource and Grant Development (4)
- RPTA 527 Leisure Behavior and Theory (4)
- RPTA 581 Graduate Seminar (2)
- RPTA 599 Thesis (9)
- STAT 513 Applied Experimental Design and Regression Models (4)

Restricted electives .................................................... 22
Any 400 and 500 level courses approved by the graduate committee. At least half of all units required by the committee must be at the 500 level.

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

Units

Required Courses ....................................................... 40
- 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 501 Research Planning (4)
- SS 508 Environmental Assessment for Erosion Control (3)
- SS 522 Advanced Soil Fertility (3)
- SS 581 Graduate Seminar in Soil Science (3)
- SS 582 GIS in Advanced Land Management (3)
- SS 599 Thesis (6)

Restricted electives .................................................... 5
Any 400 and 500 level courses approved by the graduate committee. At least half of all units required by the committee must be at the 500 level.

Students with a BS degree in Soil Science may apply only 9 units of SS 422, SS 423, SS 431, SS 432 to fulfill the MS requirements.

MBA, Specialization in AGRIBUSINESS
The Orfalea 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 158, the Orfalea College of Business). Information and application materials may be obtained by writing to the MBA Coordinator, Orfalea 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.