

**Organic Production Systems
Certificate of Special Study
at
California State University, Fresno**

The Department of Plant Science

The Department of Plant Science at California State University, Fresno is located in the nation's most productive agricultural valley. Our graduates acquire a sound academic background that is deeply rooted in field-based experience in the broad array of disciplines within Plant Science. These currently include pomology, olericulture, agronomy, environmental horticulture, soils, irrigation, economic entomology, plant pathology, weed science, and mechanized agriculture.

**Proposed New Faculty Position in Soil Microbiology/Agroecology
to Establish Certificate of Special Study in Organic Production Systems**
(*\$1.5 to \$3 million*)

Over the past several years there has been considerable interest in expanding our faculty expertise, course offerings, research and outreach to include a dedicated focus on providing the knowledge and skills necessary for a growing workforce in organic production systems; with an emphasis on field-based experiential learning within each of the above disciplines. Although our current faculty hold advanced degrees in each of the above disciplines, we clearly lack faculty expertise in soil microbiology or agroecology. Given the importance of biotic processes in soil properties, or the ecological processes applied to agricultural production, the elimination of this knowledge gap is essential for the establishment of a proposed 22-unit certificate of special study in “*Organic Production Systems*”. Thus the success of such hinges directly upon the creation of a new faculty position, with specific teaching, research, and outreach expertise in either soil microbiology or agroecology.

This new position would be responsible for teaching the following newly developed courses:

- ***Soil Microbiology (3 units)*** - This new course will be designed to introduce practical and theoretical concepts related to agricultural soils as vital living ecosystems. Topics will include microbial occurrence, distribution, and activity in the soil environment with an emphasis on sustaining microbial function responsible for organic and inorganic transformation within the agricultural soils. Application of these principles will be an integral component of the required two-semester/summer “*Introduction/Advanced Organic Production Systems Field Experience*” for this certificate (see below).
- ***Agroecology (3 units)*** - This new course will be designed to introduce various topics of agroecology including plant and animal production, energy, pest management, specialized

and controlled environment agriculture and sustainable practices. This will include an examination of successfully implemented sustainable-resilient food and fiber production systems. Application of these principles will be an integral component of the required four-unit, two-semester *Introduction/Advanced Organic Production Systems Field Experience* for this certificate (see below).

In addition to teaching the above newly developed courses this new faculty position in soil microbiology/agroecology will be the sole instructor of record responsible for establishment, facilitation, and assessment of the following two (Introduction/Advanced) newly developed required field-based experiential learning courses with organic crops on the university agricultural laboratory (farm) and industry partners. The former includes the following: **1) Certified Organic** - 2.4 acres of vegetable crops and 0.8 acre for organic crops research, and **2) Transitional** - 1.0 acre of additional vegetable crops (certified organic in summer, 2020), 20 acres of olives (certified organic in fall, 2020) and a potential 25 acres of stone fruit (to be certified organic in spring 2022).

- ***Introduction Organic Production Systems Field Experience/Advanced Organic Production Systems Field Experience (4 units)*** - Two-semesters or summers required (480 hours total) - This new field-based experiential learning series will involve direct application of theory and concepts in organic field production on the university's agricultural laboratory (farm) and/or organic production industry partners through hands-on farm work, lectures and discussions, community engagement, and field trips to regional/statewide organic farms and markets. Students will also be required to participate in hands-on sustainable agriculture research and outreach focused on the latest innovations in organic production, including mechanization, irrigation, soil fertility, propagation, and pest management.

Lastly, in addition to the above four newly developed courses, this new faculty position will assume responsibility for teaching, assessment, and coordination of multiple sections of the following required university-wide upper-division general education course:

- ***Food, Society, and Environment (3 units)*** - This course provides university-wide exposure to the fundamentals of food production systems, human social behavior, and environmental quality, including basic principles of environmental and agricultural sciences as applied to interrelationships among social value systems, agricultural activities and environmental resources.

In order to implement and sustain a vibrant teaching, research and outreach program necessary to support this certificate this newly hired soil microbiology/agroecology faculty will also be required to establish and maintain a multidisciplinary collaboration in “***Organic Production Systems***” with faculty experts across departments within the university (Earth and Environmental Science, Animal Science, etc.) as well as university and community college, and statewide organic/sustainable/resilient community and industry partners.

The proposed curriculum for this certificate of special study in “*Organic Production Systems*” was developed in consult with, and review of the following resources, related academic programs (former/current) and industry partners:

- California Certified Organic Farmers
- Sustainable Agricultural Education Association
- US Department of Agriculture, National Institute of Food and Agriculture-Agriculture and Food Research Initiative - Sustainable Agricultural Systems
- US Department of Agriculture - Sustainable Agriculture Research and Education Program
- US Department of Agriculture - Agricultural Marketing Service - National Organic Program
- The National Center for Appropriate Technology
- University of California, Santa Cruz - Center for Agroecology & Sustainable Food Systems
- California Polytechnic State University-San Luis Obispo - Sustainable Agriculture (minor)
- Washington State University -| Organic Agriculture Systems (B.S.), Sustainable Agriculture (Graduate Certificate), and Certificate in Sustainable Agriculture
- Oregon State University - Sustainable Agriculture (minor)
- Cornell University - Organic Agriculture (Organics) Concentration
- Colorado State University - Interdisciplinary Program in Organic Agriculture
- Michigan State University - Sustainable Agriculture and Food Systems (B.S. & B.A. specialization), Organic Farmer Training Program (Certificate), and Ecological Food and Farming Systems (M.Sc.specialization)
- University of California, Davis | Sustainable Agriculture and Food Systems (B.S.)

Proposed Curriculum Organic Production Systems Certificate of Special Study

➤ **Core Courses: (12 units)**

- Soil Microbiology (3 units) **
- Agroecology (3 units) **
- Organic Crop Production (3 units)
- Food, Society, and Environment (3 units)

➤ **Field Experience (4 units - 480 hours)**

- Introduction to Organic Production Systems Field Experience (2 units/240 hours) **
- Advanced Organic Production Systems Field Experience (2 units/240 hours) **

** *Newly developed courses taught by new microbiology/agroecology faculty.*

➤ **Electives (6 units)**

- Introduction to Crop Science (3 units)
- Row Crops (3 units)
- Cereal and Forage Crops (3 units)
- Range Ecology and Management (3 units)
- Vegetable Production (3 units)
- Introduction to Fruit Science (3 units)
- Fruit Species of California (3 units)
- Principles of Pomology II (3 units)
- Citrus and Subtropical Fruits (3 units)
- Agricultural Tractors (3 units)
- Agricultural Machinery and Equipment (3 units)
- Advanced Farm Machinery (3 units)
- Greenhouse & Nursery Crop Production (3 units)
- Introduction to Plant Science (3 units)
- Bee Biology & Apiculture (3 units)
- Mycology (3 units)
- Organic Farming Entrepreneurship (3 units)
- Introduction to Plant Health (3 units)
- Pesticides (3 units)
- Plant Nematology (3 units)

- Biological Control (*3 units*)
- Diagnosis and Control of Plant Diseases (*3 units*)
- Soil and Water Management (*3 units*)
- Irrigation Systems (*3 units*)
- General Viticulture I (*3 units*)
- General Viticulture II (*3 units*)
- Raisin Production and Processing (*2 units*)
- Production and Marketing of Table Grapes (*2 units*)
- Winegrape Production (*2 units*)
- Introduction to Animal Science (*3 units*)
- Beef Cattle Production (*3 units*)
- Swine Production (*3 units*)
- Sheep Production (*3 units*)
- Dairy Cattle Production (*3 units*)
- Introduction to Animal Health (*3 units*)
- Animals and Society (*3 units*)
- Meat Science (*3 units*)
- Poultry Production (*3 units*)
- Environmental Management of Farm Animals (*3 units*)
- Dairy Cattle Nutrition (*3 units*)
- Introduction to Food Science and Technology (*3 units*)
- Introduction to Food and Dairy Processing (*3 units*)
- Food and Dairy Chemistry (*3 units*)
- Food Analysis (*3 units*)
- Quality Assurance in the Food and Dairy Industries (*3 units*)
- Food and Dairy Microbiology (*3 units*)
- Fruit and Vegetable Processing
- Dairy Processing (*3 units*)
- Food Engineering (*3 units*)
- Food Laws, Regulations, Inspection, and Grading (*3 units*)
- Food and Culture (*3 units*)
- Agricultural Sector Analysis (*3 units*)
- Farm Management (*3 units*)
- Agribusiness Management (*3 units*)
- Agricultural Cooperative Management (*3 units*)
- Food and Fiber Industry Management (*3 units*)
- Agricultural and Food Policy (*3 units*)
- Environmental and Natural Resource Policy (*3 units*)

➤ **Required Plant Science Major Courses:**

- Plant Biology, or Intro Bio) and Intro to Plant Science (3-6 units)
- Intro Gen Chem (4 units)
- Elementary Statistics (3 units)
- Organic Chemistry or Intro Organic/Biochemistry (3 units)
- General Biochemistry (3 units)
- Introduction to Biometrics (3 units)
- Aspects of Crop Productivity (3 units)
- Plant Propagation (3 units)
- Crop Improvement (3 units)
- Economic Entomology (3 units)
- Weed Science (3 units)
- Plant Pathology (3 units)
- Integrated Pest Management (3 units)
- Agricultural Water (3 units)
- Soils (3 units)
- Soils Lab (1 unit)
- Crop Nutrition (3 units)

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