BioResource & Agricultural Engineering

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Academic Programs

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The 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 resources center 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 and Biological Engineers offers professional and co-curricular activities.

Undergraduate Programs

BS Agricultural Systems Management

The mission of the Agricultural Systems Management program is to provide a "learn by doing" undergraduate educational experience that prepares 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, in 3-5 years after graduation, are successful as one of the following:

- Individuals that are successful in technical, business, or management positions within agriculture or related industries
- Applying unique engineering problem-solving skills and principles so that they are "industry ready" to undertake technological, business, or management projects and make significant contributions from day one on the job
- Actively pursuing professional development such as a degree in an advanced degree program, professional license, or technical certification

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 and Biological 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 prepares 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, in 3-5 years after graduation, are successful as one of the following:

- Engineers in positions of professional responsibility and leadership in a modern multi-disciplinary, system-oriented environment that emphasizes problem solving
- Actively pursuing professional development such as a degree in an advanced degree program, professional license, or technical certification

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• Applying unique engineering problem-solving skills and principles within a career outside traditional engineering environments, such as management, teaching, research, or other professional fields

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.

Consistent with program accreditation requirements regarding a graduate’s ability to function on multidisciplinary teams, the BioResource and Agricultural Engineering program has adopted an explicit graduation requirement in this area. This provides students an opportunity to practice team skills. Such experience is important for practicing engineers given the ever-increasing diversity of engineering science and applications. Methods to fulfill this requirement include items such as:

• Team design project
• CO-OP or internship employment
• Certain club activities
• Working with faculty on a sponsored project
• Project embedded in curriculum
• Taking certain technical electives
• Service learning project

Career opportunities exist in the design, evaluation and management of systems -- water resources, irrigation, drainage, groundwater, pumps, soil conservation; agricultural power and machinery; food processing; energy; and agricultural environments. The program is accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org).

Minors

The department participates in offering interdisciplinary minors in Water Science and Geographic Information Systems.

Please see College of Agriculture, Food and Environmental Sciences (http://catalog.calpoly.edu/collegesandprograms/collegeofagriculturefoodenvironmentalsciences) section for more information.

Graduate Program

Cal Poly offers the MS in Agriculture with specializations in BioResource and Agricultural Systems and in Irrigation, and the MS in Engineering with a specialization in Water Engineering.

Please see College of Agriculture, Food and Environmental Sciences (http://catalog.calpoly.edu/collegesandprograms/collegeofagriculturefoodenvironmentalsciences) and College of Engineering (http://catalog.calpoly.edu/collegesandprograms/collegeofengineering/smengineering/specializationinwaterengineering) sections for more information.

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