

College of *Engineering*

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ACADEMIC PROGRAMS

Aerospace Engineering	<u>BS*</u> , <u>MS</u>
Biomedical Engineering	<u>BS</u> , <u>MS</u>
BioResource & Agricultural Engineering ..	<u>BS*</u>
(College of Agriculture, Food and Environmental Sciences)	
Civil and Environmental Engineering	<u>MS</u>
Civil Engineering	<u>BS*</u>
Computer Engineering.....	<u>BS*</u>
Computer Science.....	<u>BS*</u> , <u>MS</u> , <u>Minor</u>
Electrical Engineering	<u>BS*</u> , <u>MS</u>
Engineering.....	<u>MS</u>
Engineering Management.....	<u>MBA/MS</u>
Environmental Engineering	<u>BS*</u>
Fire Protection Engineering <i>Fall 2010</i>	<u>MS</u>
General Engineering	<u>BS</u>
Industrial Engineering	<u>BS*</u> , <u>MS</u>
Manufacturing Engineering	<u>BS*</u>
Materials Engineering.....	<u>BS*</u>
Mechanical Engineering	<u>BS*</u> , <u>MS</u>
Multidisciplinary Design	<u>Minor</u>
Software Engineering	<u>BS</u>
Transportation Planning	<u>MCRP/MS</u>

* Engineering programs accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone: (410) 347-7700.

** BS Computer Science program accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone: (410) 347-7700.

Engineering and computer science programs at Cal Poly are strongly oriented toward preparing graduates for immediate entry into professional practice. Students declare their majors when they enter as freshmen, and they generally take at least one course in that major each quarter. This early introduction better motivates and prepares students to master the foundational mathematics, basic science, and engineering science or computer science central to success in all the engineering disciplines.

The undergraduate engineering disciplines listed above provide the education needed for entry to the engineering profession and for continued academic work toward advanced degrees. Many of our graduates enter graduate programs at Cal Poly or other institutions. Cal Poly engineering and computer science graduates are highly desired by industry and find a variety of professional opportunities awaiting them, such as engineering design, computer hardware and software engineering, test and evaluation, systems analysis, modeling and simulation, manufacturing, applied research, development, sales and field engineering. Graduates pursue careers in a broad cross-section of industry, government agencies, public utilities, marketing groups, and educational institutions.

The College of Engineering is an internationally-recognized, premier undergraduate engineering college. Its mission is to educate students for careers of service, leadership and distinction in engineering or other fields by using a participatory, learn by doing, "hands-on" approach.

State-of-the-art facilities and laboratories form the core of Engineering's project-centered curriculum. Ranging from the Aircraft Design Lab to the Rotor Dynamics Laboratory, these facilities offer advanced technological systems that allow students to link theory with practice. New college buildings also promote interdisciplinary project activities, including the Advanced Technology Laboratories, Bonderson Projects Center, and Engineering IV. With 19,000 square feet of space for individual and team-based projects, the Bonderson Center offers enriched opportunities for multidisciplinary projects and collaboration with industry. The newest facility, Engineering IV, concentrates many of the engineering programs in one area. The \$28 million, 104,000-square-foot building includes modern classrooms and laboratories for aerospace, mechanical, civil, environmental, industrial and manufacturing engineering programs.

The Accreditation Board for Engineering and Technology (ABET) defines engineering as "the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize economically the materials and forces of nature for the benefit of mankind."

Engineering and computer science programs at Cal Poly prepare graduates for practice in professional engineering and computer science. Attributes of engineering graduates include:

- (a) an ability to apply knowledge of mathematics, science, and engineering;
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data;

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;

(d) an ability to function on multidisciplinary teams;

(e) an ability to identify, formulate, and solve engineering problems;

(f) an understanding of professional and ethical responsibility;

(g) an ability to communicate effectively;

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;

(i) a recognition of the need for, and an ability to engage in life-long learning;

(j) a knowledge of contemporary issues; and

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. In addition, an engineering program must demonstrate that its students attain any additional outcomes articulated by the program to foster achievement of its education objectives.

Multidisciplinary Requirement

Consistent with ABET's requirement (d) on multidisciplinary teams, most engineering programs have adopted an explicit graduation requirement in this area. This provides students an opportunity to practice team skills. Such experience is important for practicing engineers, with the ever increasing diversity of engineering science and applications. Required activities for students are defined by each individual program, and may include items such as:

- Team senior 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

Contact department for specific requirements, or the College of Engineering Advising Center.

Our curricula reflects a "learn by doing" philosophy via incorporation of numerous design-centered laboratories, integration of design, and inclusion of the senior design project capstone design experience.

The excellence of Cal Poly's undergraduate engineering and computer science programs provides the foundation for master's degree programs. Industry often considers the master's degree as an important requirement for the design, development, applied research and analysis

occupations in engineering and computer science. The master's degree allows entry into these occupations at higher levels of technical skills and responsibilities.

ENGINEERING STUDENT AFFAIRS

Stacey Breitenbach, Assistant Dean
Engineering South (40), Room 117
(805) 756-1320

www.esa.calpoly.edu

The College of Engineering Student Affairs encompasses the Advising Center, International Exchange Program, Multicultural Engineering Program/MESA Schools Program, Outreach Services, and the Women's Engineering Program.

Advising Center

Engineering South (40), Room 115
(805) 756-1461

www.eadvise.calpoly.edu

The College of Engineering Advising Center serves undergraduate students with academic advising issues in conjunction with each student's faculty advisor.

The academic advising staff tracks the academic and administrative progress of each student based on the academic expectations outlined below.

Academic Expectations

Students are expected to:

- maintain current, cumulative, higher education, *and* major grade point averages of a 2.0 or higher.
- complete a *minimum* of ~~36~~ 45 degree applicable units each academic year (an academic year runs from summer quarter through spring quarter). Students pursuing their degree on a part-time basis with acceptable reasons for doing so are expected to submit an academic plan to the Assistant Dean for review (all units on the plan should be degree applicable). *Change effective Summer 2009.*
- enroll and complete a *minimum* of six units of degree applicable major/support coursework each quarter with no more than four units that are not degree applicable.
- enroll and complete courses in one attempt.
- complete their lower-division math and science courses as early as possible.
- be enrolled in a math course each quarter until their sequence is completed.

All academically oriented student paperwork is processed through the Advising Center (for example, course substitution petitions, excess unit forms, late enrollment forms, withdrawal forms, change of major forms, technical elective forms, etc).

The majority of the general education questions and interpretation of transfer credit is handled in the

Advising Center once the Evaluations Office has provided the initial evaluation.

The Advising Center maintains working folders on each student. These folders are used for general advising purposes. The Advising Center has past and present flowcharts for all engineering majors and major specific technical elective forms.

While the Advising Center is responsible for providing procedural advice, faculty advisors are responsible for providing academic content and technical advice. Student course scheduling, course content questions, and career planning are usually done by the faculty advisors. Although the Assistant Dean has signature authority for the advisor, Department Chair, and Dean, it is not uncommon for some forms to be routed for appropriate review. In order to process paperwork in a timely manner, it is important for students to submit paperwork to the Advising Center for initial review.

International Exchange Program

Maria Sklar, IEP Advisor
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www.eadvise.calpoly.edu

The College of Engineering has agreements with several overseas universities. These exchange programs differ from the University wide exchange programs in that they offer students the opportunity to attend overseas universities with an engineering focus, while paying Cal Poly tuition. The partner universities have been specifically selected by the College for their innovative technology and engineering coursework. Participation gives students the opportunity to gain a global engineering perspective while taking coursework that may be degree applicable. Students typically return with improved communication skills, a better understanding of other cultures, and a more marketable resume for industry. The current list of partner universities is located at www.eadvise.calpoly.edu/iep/.

Multicultural Engineering Program (MEP)/MESA Schools Program

David Cantu, Director
Engineering South (40), Room 117
(805) 756-1433
www.calpoly.edu/~mep

The MESA Engineering Program (MEP) is an academic support program designed to recruit, retain, and graduate educationally disadvantaged students in engineering and computer science disciplines. MEP builds an academic support community among students and provides the necessary bridges for students' academic and professional success.

MEP offers an orientation class in effective learning techniques. A study center is available for students so

that they can overcome feelings of isolation, develop supportive academic peer groups, and share information about classes and scholarship opportunities. Tutoring is available for undergraduate technical courses. Group study workshops teach students complex technical concepts through group study and support. MEP fosters professional development by helping coordinate summer jobs, internship, and scholarship opportunities with companies who recognize the MEP as a valuable source for skilled future employees.

Outreach Services

Teana Fredeen, Outreach Coordinator
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(805) 756-1324
outreach@calpoly.edu

Outreach is an important part of the mission of Cal Poly's College of Engineering. The K-14 outreach programs stimulate student interest in engineering. Cal Poly attracts non-traditional and underrepresented students to engineering through the outreach activities of the Multicultural Engineering Program and the Women's Engineering Program. By partnering with K-12 schools and community colleges in the community, Cal Poly offers engineering projects and presentations in the classroom. For middle and high school students, schools are invited to visit Cal Poly labs to inspire students with the exciting hands-on opportunities in engineering. The schools are encouraged to implement an engineering curriculum and partner with Cal Poly for support, tutoring and curriculum development.

The Engineering Days summer camp provides a hands-on learning opportunity for high school students to explore engineering disciplines. The Exploring Engineering bi-lingual program brings parents and students from MESA schools programs and Parent Institute for Quality Education programs to campus during Open House to encourage students to pursue a college education.

Cal Poly students are encouraged to volunteer for outreach activities to increase their speaking abilities and share their experiences with aspiring young minds.

Women's Engineering Program (WEP)

Karen Bangs, Director
Engineering South (40), Room 119
(805) 756-2350
<http://ceng-web.calpoly.edu/wep.php>

The mission of the Women's Engineering Program (WEP) is to recruit and retain women engineering and computer science students by focusing on outreach, on-campus support and professional preparation objectives. To meet these objectives, WEP works closely with the Society of Women Engineers (SWE) Cal Poly student section, one of the top student sections in the nation, in

supporting a variety of programs directed at pre-college, undergraduate and graduate students.

Outreach activities are directed at students from kindergarten through community college. These programs are designed to encourage pre-university women and girls to consider engineering as a career choice. Outreach recruitment activities include: Engineering Summer Camp, Building an Engineer workshops, Shadow an Engineering Student day, Engineering Road Show, Girl Scout Engineering Badge day, elementary school workshops, and career fairs.

The Women's Engineering Program provides on-campus support to Cal Poly women engineering students through a variety of academic, leadership and social activities. These activities help students connect to their peers while concurrently assisting them in achieving their educational goals. On-campus support activities include: scholarships, academic counseling and referrals, pre-registration counseling, big sibling program, test files, teacher evaluations, SWE meetings, and community service activities.

Professional preparation activities are designed to prepare students for a productive career by facilitating networking with professionals and corporations. Professional preparation activities include: Shadow an Engineer, Evening With Industry banquet, Team Tech, Industry Tours, Resume Book, and MentorNet.

ENVIRONMENTAL STUDIES MINOR

Please see the College of Science and Mathematics for more information on this interdisciplinary minor.

BA LIBERAL ARTS AND ENGINEERING STUDIES

Please see University-Wide Programs, page 73, for more information on this interdisciplinary major.