Civil & Environmental Engineering

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Academic Programs

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The Civil and Environmental Engineering Department at Cal Poly, San Luis Obispo offers a rigorous and engaging educational experience that fully embraces Cal Poly's "Learn by Doing" approach.

Undergraduate Programs

BS Civil Engineering

Graduates of a civil engineering program must have the engineering skills needed to plan, design, construct, and maintain infrastructure and industrial facilities. In addition, graduates must have the broad education necessary to communicate effectively with other engineers, architects, planners, administrators, government officials, and the general public. The faculty and staff of the Civil Engineering program at Cal Poly understand these needs and take pride in preparing their students for the challenges associated with engineering practice.

The Civil Engineering program at Cal Poly has quickly grown into one of the largest and most respected programs in California and the nation. The program consistently attracts top student candidates because of its modern, well-equipped laboratories, the close interaction that occurs between undergraduates and full-time faculty, and a strong reputation among employers in the civil engineering and construction industries. Scientific depth is included within the curriculum for those students who are interested in graduate study.

The Civil Engineering program recognizes the importance of student organizations and strongly supports the American Society of Civil Engineers (ASCE) Student Chapter as well as Chi Epsilon, the national civil engineering honor society. These student groups sponsor opportunities for professional development, community service, and social activities which help to complement the formal academic program. The ASCE Student Chapter, an active member of the campus community, has been recognized as the nation’s most outstanding civil engineering student organization twice during the past decade.

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The program’s mission is to prepare students for successful careers in civil engineering by providing a high quality, practice-oriented education that emphasizes design project experiences, “hands-on” laboratory activities, and teamwork. The program’s faculty, in consultation with civil engineering practitioners and alumni, have developed a number of educational objectives to support this mission. These objectives are:

1. Successfully perform engineering functions in Civil Engineering practice;
2. Communicate effectively with industry professionals, decision makers and community members;
3. Work in an ethical and professional manner to positively impact society and the environment in a regional, national and global context;
4. Pursue life-long learning and service to the profession through continuing education opportunities, professional organizations, leadership, graduate degrees and/or other certification; and
5. Progress toward professional licensure.

The undergraduate curriculum in civil engineering is designed to support the educational objectives. Therefore, the curriculum includes broad coverage of mathematics, engineering and basic sciences, liberal arts, humanities, and social sciences. The program also includes a number of required engineering courses designed to ensure students become proficient in a breadth of civil engineering sub-disciplines: geotechnical, construction, structural, transportation, environmental, and water resources.

All CE majors must complete a quarter course in professional practice and a two quarter senior design capstone sequence that focuses on current civil engineering design procedures, standards and multiple realistic constraints. The professional practice course includes topics on interpersonal communication, teamwork, leadership, and ethics. Together, the three quarters promote an understanding of the issues and skills to become a successful design professional.

Flexibility within the curriculum allows students to select from a wide range of upper division civil engineering technical electives. Students use these technical electives to focus in one of the four areas of civil engineering noted above or to design a “general” curriculum that allows for a broad range of civil engineering interests. Students should consult with a faculty advisor prior to selecting and enrolling in upper division civil engineering technical electives.

BS Environmental Engineering

The BS program in Environmental Engineering is concerned with the interrelation of people, materials, and processes in a complex and changing environment. The broad field of environmental engineering includes control of air and water pollution, environmental health and safety, solid waste, hazardous waste management, and pollution prevention.

The program offers a sound background in the fundamentals of thermodynamics, fluid mechanics, mass transfer, water resources, and geotechnical engineering. The problem-oriented approach to instruction, in modern well-equipped laboratories, provides an excellent opportunity to gain understanding and experience of the discipline. The program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

The main focus of the program is to prepare graduates for practice in professional engineering. Thus, Cal Poly’s “learn by doing” philosophy is emphasized by integrating design throughout the curriculum, especially in the numerous design-centered laboratories. In the required senior design project, which is completed in a two-quarter set of capstone courses, students demonstrate their understanding...
of engineering knowledge and their ability to apply that knowledge creatively to practical problems.

The Environmental Engineering program educational objectives are that its graduates will:

• Apply environmental engineering principles to analyze and solve real-world engineering challenges.
• Think independently, engage in lifelong learning, and continue their development as professionals.
• Be prepared to pursue graduate study and licensure.
• Communicate effectively, both orally and in writing, and collaborate successfully in teams.
• Address the ethical, societal, and global issues encountered in environmental engineering.

An engineering approach to the subject enables graduates of the program to pursue careers in industry, consulting firms, and public agencies concerned with air and water pollution control, groundwater, potable water treatment, solid waste management, and hazardous waste management.

Various program constituencies, such as graduates and employers, are consulted periodically for input on the appropriateness as well as the attainment of the educational objectives. Other indicators such as student/alumni placement and success rates in the statewide fundamentals in engineering examination are also used to evaluate attainment.

The Society of Environmental Engineers offers technical programs and other activities, including field trips to study typical installations of systems. Student memberships also are available in the Air and Waste Management Association, the California Water Pollution Control Association, and the Water Environment Federation.

Graduate Program

MS Civil and Environmental Engineering

General Characteristics

The Master of Science program in Civil and Environmental Engineering has the following objectives:

• Job-entry education for the more complex areas of engineering, such as research and development, innovative design, systems analysis and design, and managerial engineering;
• Updating opportunities for practicing engineers;
• Graduate preparation for further study in engineering, leading to the Doctor of Engineering or Ph.D. degree.

Prerequisites

For admission as a classified graduate student, an applicant must hold a bachelor’s degree in engineering or a closely related physical science with a minimum GPA of 3.0 in the last 90 quarter units (60 semester) attempted. Applicants are required to submit satisfactory scores for the General (Aptitude) Test of the Graduate Record Examination. An applicant who meets these standards but lacks prerequisite coursework may be admitted as a conditionally classified graduate standing (classified or conditionally classified) may be obtained from the Graduate Program Coordinator of the MS in Civil and Environmental Engineering program.

Program of Study

Graduate students must file a formal study plan with their advisor, department, college and university graduate studies office by 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). With the graduate advisor’s approval, students select their elective units in one of the following areas of study: geotechnical engineering, structural engineering, transportation and planning, or water resources and environmental engineering.

The broad curriculum requirements for the MS in Civil and Environmental Engineering are:

• a minimum of 45 total units;
• 2 units of Graduate Seminar (CE 591 and CE 592)
• a minimum of 20 units of advisor approved electives within the major;
• a minimum of 8 units of advisor-approved electives outside the primary area of focus;
• at least 23 units of the 45 unit program at the 500 level;
• a comprehensive examination (non-thesis option) or a written thesis with oral defense (thesis option).

Two program options are available:

Thesis option
36 units of advisor-approved coursework and 9 units of research/design resulting in a written thesis and oral defense examination administered by a panel of at least three faculty.

Non-thesis option
45 units of advisor-approved coursework which includes 1-unit comprehensive examination consisting of written and oral components administered by a panel of three faculty (maximum of two opportunities to pass this examination). Not an option for the blended BS+MS program.

Blended BS + MS Civil and Environmental Engineering

The blended program provides motivated students with an accelerated route to an MS in Civil and Environmental Engineering, with simultaneous conferring of both bachelor’s and master’s degrees. Students in the blended program are provided with a seamless process whereby they can progress from undergraduate to graduate status.

Eligibility

Students majoring in BS Civil Engineering or BS Environmental Engineering may be eligible to pursue the blended program toward an MS in Civil and Environmental Engineering after completing all required support and CE/ENVE 300-level classes. Participation in the program is based on prior academic performance and other measures of professional promise, with a minimum GPA of 3.0. Please see Graduate Programs (http://catalog.calpoly.edu/graduateeducation/#generalpoliciesgoverninggraduatestudiestext) for additional eligibility criteria.
Program of Study

Students originating in the BS Civil and Environmental Engineering programs are required to take:

Select one of the following Series: 4-6

**Series A**
- CE 466  Senior Design Project I
- CE 467  Senior Design Project II

**Series B**
- CE 468  Community Engineering Senior Design Project I
- CE 469  Community Engineering Senior Design Project II

**Series C**
- ENVE 466  Senior Project Design Laboratory I
- ENVE 467  Senior Project Design Laboratory II
- CE 599  Design Project (Thesis) 9
  or ENVE 599  Design Project (Thesis)

The blended program allows students to earn graduate credit for several of their senior electives, effectively decreasing the summed unit requirements for both degrees. Students in the blended program are required to complete a thesis.