Environmental Engineering

In the College of Engineering

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The undergraduate degree in Environmental Engineering is accredited by the Engineering Accreditation Commission (EAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: 410-347-7700.

Faculty
Emeritus: Guroi, Stratton
Interim Chair: Walsh
The Blasker Chair in Environmental Engineering: Buyuksonmez
The William E. Leonhard, Jr. Chair in Civil, Construction, and Environmental Engineering:
Associate Professor: Buyuksonmez
Assistant Professor: Garoma Ararsso

Offered by the Department of Civil, Construction, and Environmental Engineering
Doctor of Philosophy degree in engineering sciences:
(bioengineering), (electrical and computer engineering), (mechanical and aerospace engineering), (structural engineering).
Master of Engineering.
Master of Science degree in civil engineering.
Concentration in environmental engineering.
Major in civil engineering with the B.S. degree.
Major in construction engineering with the B.S. degree.
Major in environmental engineering with the B.S. degree.

Mission of the Department
The mission of the Department of Civil, Construction, and Environmental Engineering is to provide a high quality undergraduate and graduate education in the civil, construction, and environmental engineering areas as well as the advising and other support needed to ensure the students’ academic success and preparation for a productive engineering career. In addition, through research and continuing professional development, the faculty produce, enhance and promote new developments within their areas of expertise for the benefit of society and the furtherance of their profession.

The objective of the program is to give the student a basic knowledge of civil, construction, and environmental engineering, as well as the interdisciplinary background and skills to meaningfully participate in and contribute technical advances toward this profession. The program integrates technical aspects with studies in the social sciences and humanities to ensure appropriate sensitivity to socially related problems.

Instruction is given both at the undergraduate level, leading to the bachelor’s degree, and at the graduate level, leading to the master’s or doctoral degrees. The undergraduate program builds upon concepts of mathematics, physics, chemistry and basic engineering with specialized study in civil, construction, and environmental engineering. Engineering design is emphasized, particularly in conjunction with computer utilization and practical engineering problems. Aspects of safety and engineering ethics are woven throughout the program.

The civil, construction, and environmental programs of the department choose to continue their formal studies on a full- or part-time basis at San Diego State University or at another institution. (See the Graduate Bulletin for additional information.)

The civil, construction, and environmental programs are enhanced through cooperation with the American Society of Civil Engineers, the American Public Works Association, the Associated General Contractors, the Chi Epsilon Civil Engineering Honor Society, and other national organizations who sponsor student chapters to further aid the student’s professional development. The chapters at San Diego State University have won many awards in regional and national competition with other schools throughout the country.

Educational Objectives
The objectives of the environmental engineering program are: 1) to provide graduates with the technical knowledge and skills required to practice environmental engineering; 2) to provide graduates with an understanding of the ethical, social, legal, and professional issues faced in environmental engineering; and 3) to provide graduates with a solid foundation for graduate studies, continuing education, and lifelong professional development.

The Blasker Chair in Environmental Engineering
The Blasker Chair in Environmental Engineering was established by an endowment from the Blasker-Rose-Miah Endowment Fund of the San Diego Foundation. The fund was created in honor of Mr. Samuel Blasker who left $8.0 million to the San Diego Foundation. Mr. Blasker was a successful aeronautical engineer and a business man with a vision to nurture and develop unique and innovative discoveries and experiences which may be of benefit to humanity.

The current appointee to the Chair, Dr. Fatih Buyuksonmez, is an accomplished scholar in the area of solid and hazardous waste management.

The William E. Leonhard, Jr. Chair in Civil, Construction and Environmental Engineering
The William E. Leonhard, Jr. Chair in Civil, Construction, and Environmental Engineering is funded with an endowment created by generous gifts from William G. Leonhard, Jr. and his parents, William E. and Wyliss M. Leonhard. After Bill Leonhard graduated from San Diego State in 1964, he entered a career in the Air Force, rising to the rank of colonel. In January 1990, he retired from the Air Force, spent the next several years in private industry, and retired again in 1998. The Leonhard Chair is intended to promote excellence in undergraduate education in civil, construction, and environmental engineering.

Transfer Credit
No credit will be given for upper division engineering coursework taken at an institution having an engineering program which has not been accredited by the Engineering Accreditation Commission (EAC) of ABET, unless the student successfully completes the first 12 units of engineering work attempted at this university. At that time, and upon recommendation of the department, unaccredited work will be evaluated for full or partial credit.

General Education
Students will complete a minimum of 50 units in General Education, to include a minimum of nine upper division units taken after attaining junior class standing. No more than 12 units may be used for General Education credit from any one department or academic unit. No more than 7 units from one department can be used in Sections II and IV combined (Foundations of Learning, American Institutions, and Explorations of Human Experience). Students must complete 9 units in Sections II, III, and IV combined (Foundations of Learning, American Institutions, and Explorations of Human Experience).

I. Communication and Critical Thinking: 9 units
You may not use Credit/No Credit grades in this section.
1. Oral Communication (3 units)
2. Composition (3 units)
3. Intermediate Composition and Critical Thinking (3 units)
II. Foundations of Learning: 29 units
   A. Natural Sciences and Quantitative Reasoning (17 units):
      1. Physical Sciences (11 units)
         Engineering students will take Chemistry 200 (5 units).
         Physics 195 (3 units)
         Physics 196 (3 units)
      2. Life Sciences (3 units)
         Environmental engineering majors will take Biology 204.
      3. Laboratory (satisfied under A.1. above)
      4. Mathematics/Quantitative Reasoning
         Engineering students will take Mathematics 150, 3 units
         applicable to General Education. You may not use
         Credit/No Credit grades.
   B. Social and Behavioral Sciences (3 units)
   C. Humanities (9 units)
      Complete three courses in three different areas. One of these
      courses and the one under IV.A. below must be taken in the
      same department.

III. American Institutions: Three units of the six units of coursework
   which meet the American Institutions graduation requirement may
   be used in General Education, excluding courses numbered 500
   and above.

IV. Explorations of Human Experience: Courses in this area must
   not be taken sooner than the semester in which you achieve
   upper division standing (60 units passed). Upper division
   courses in the major department may not be used to satisfy
   General Education. Total: 9 units; must include one course of cul-
   tural diversity.
   A. Upper division Humanities (3 units)
      Three units must be taken from the same department as one of
      the Humanities courses selected in Foundations of Learning.
   B. Upper division Humanities (3 units from a department not
      selected in A above.)
   C. Upper division Social and Behavioral Sciences (3 units)

The Major

Environmental engineering involves the identification and design of
solutions for environmental problems. Society’s most crucial environ-
mental problems, such as providing safe drinking water, treatment and
proper disposal of wastes, water and air pollution control, remediation
of sites contaminated with spills or improper disposal of hazardous
substances, are handled by environmental engineers. Environmental
engineers are technical professionals who possess the scientific
knowledge to identify, design, build and operate systems that protect
the environment from the impact of human activities, and as such
make modern society possible.

The environmental engineering field and environmental engineer-
ing education are multidisciplinary. The B.S. degree provides a solid
foundation in the fundamentals of mathematics, physics, chemistry,
and engineering design that are needed to practice the profession or
to pursue a graduate degree. Environmental engineering education
also includes a range of other disciplines, such as biology, computer
science, ecology, economics, geological sciences, and public health.
To be able to address the spectrum of issues facing the environment,
environmental engineers are broadly educated, as well as technically
trained.

Environmental engineers are needed in both the private and public
sectors. They are employed by engineering consulting firms that work
in environmental pollution control, industries that need to comply with
pollution emission and discharge regulations, private and municipal
agencies that supply drinking water, treat and dispose wastes,
government agencies that monitor and regulate waste discharges and
air emissions, private and government laboratories, and universities
that conduct environmental research, international agencies that
transfer knowledge to the developing world, and public-interest
groups that advocate environmental protection.

Impacted Program

The environmental engineering major is an impacted program. To
be admitted to the environmental engineering major, students must
meet the following criteria:
   a. Complete with a grade of C or higher: Chemistry 200; Engineer-
ing Mechanics 200; Mathematics 150, 151; Physics 195, 196.
   These courses cannot be taken for credit/no credit (Cr/NC);
   b. Have an overall cumulative GPA of 2.1.

To complete the major, students must fulfill the degree requirements
for the major described in the catalog in effect at the time they are
accepted into the premajor at SDSU (assuming continuous enrollment).

Major Academic Plans (MAPs)

Visit http://www.sdsu.edu/mymap for the recommended courses
needed to fulfill your major requirements. The MAPs Web site was
created to help students navigate the course requirements for their
majors and to identify which General Education course will also fulfill
a major preparation course requirement.

Environmental Engineering Major

With the B.S. Degree

(Major Code: 09221) (SIMS Code: 442002)

All students in environmental engineering pursue a common
program of study in basic sciences, engineering, and environmental
engineering fundamentals and design. The program allows six units of
“professional electives” which can be selected from available courses
in environmental chemistry, environmental microbiology, water
resources, and other areas.

Preparation for the Major. Environmental Engineering 101;
Biology 204, 204L; Chemistry 130, 200; Civil Engineering 120, 121,
160, 220; Engineering 280; Engineering Mechanics 200, 220; Geolog-
ical Sciences 100; Mathematics 150, 151, 252; Physics 195, 196, 197.
(58 units)

Chemistry 200; Engineering Mechanics 200; Mathematics 150,
151; Physics 195, 196 must be completed with a grade of C or higher.
These courses cannot be taken for credit/no credit (Cr/NC).

General Education. Engineering students must follow the specific
General Education program outlined in this section of the catalog.
Other general education requirements and limitations, as well as
listings of specific General Education course electives are presented
in the General Education section of Graduation Requirements for the
Bachelor's Degree.

Graduation Writing Assessment Requirement. Passing the
Writing Placement Assessment with a score of 10 or above or complet-
ing one of the approved upper division writing courses (W) with a
grade of C (2.0) or better. See “Graduation Requirements” section for
a complete listing of requirements.

Major. A minimum of 43 upper division units to include Environ-
mental Engineering 355, 363, 441, 442, 554, 556, 558; Biology 315;
Civil Engineering 444, 495; Construction Engineering 430; Engineer-
ing Mechanics 340, 341; Mechanical Engineering 352, and three units
of professional electives.

Master Plan. A master plan of elective courses must be approved
by the undergraduate adviser and filed with the Office of Advising and
Evaluations as soon as the environmental engineering major is
declared. Students are required to see their undergraduate adviser
prior to registration each semester.
Environmental Engineering

Courses (ENV E)

Refer to Courses and Curricula and University Policies sections of this catalog for explanation of the course numbering system, unit or credit hour, prerequisites, and related information.

NOTE: Proof of completion of prerequisites (copy of transcript) is required for all courses which list prerequisites.

LOWER DIVISION COURSES

ENV E 101. Environmental Engineering Seminar (1)

Breadth and depth of environmental engineering field through presentations by invited faculty, graduate students, guests and seminar enrollees; including individual library research with written and oral presentations on selected environmental topics.

ENV E 296. Experimental Topics (1-4)

Selected topics. May be repeated with new content. See Class Schedule for specific content. Limit of nine units of any combination of 296, 496, 596 courses applicable to a bachelor’s degree.

UPPER DIVISION COURSES

(Intended for Undergraduates)

ENV E 320. Designing Solutions for Environmental Problems (3) [GE]

Prerequisites: Upper division standing and completion of the General Education requirement in Foundations of Learning, I.I.A. Natural Sciences and Quantitative Reasoning.

Human interaction with the land, water and air environment; environmental pollution; role of engineering in solving environmental problems. Not open to civil or environmental engineering majors.

ENV E 355. Environmental Engineering (3)

Prerequisite: Chemistry 200.

Causes and effects of environmental problems and engineering methods to control them.

ENV E 363. Environmental Engineering Laboratory (3)

Two lectures and three hours of laboratory.

Analysis of natural waters and wastewaters. Sampling and analysis of hazardous environmental pollutants. Techniques to analyze solid waste. (Formerly numbered Environmental Engineering 553.)

ENV E 441. Water Treatment Engineering (3)

Prerequisites: Environmental Engineering 355, credit or concurrent registration in Civil Engineering 444, Engineering Mechanics 340.

Basic water chemistry; water quality criteria and standards; residential, industrial and commercial water usage; principles of physical and chemical processes employed in water treatment; design of selected water treatment units; new and emerging water treatment technologies; and water distribution systems. (Environmental Engineering 441 and 442 formerly numbered Environmental Engineering 455.)

ENV E 442. Wastewater Treatment Engineering (3)

Prerequisite: Environmental Engineering 441.

Wastewater collection, influent wastewater characteristics; effluent discharge requirements; principles of physical, biological, and chemical processes employed in wastewater treatment; design of selected wastewater treatment units; new and emerging wastewater treatment technologies; advanced treatment process; recycled water. (Environmental Engineering 441 and 442 formerly numbered Environmental Engineering 455.)

ENV E 496. Advanced Environmental Engineering Topics (1-3)

Prerequisite: Consent of instructor.

Modern developments in environmental engineering. See Class Schedule for specific content. Maximum credit six units for any combination of Environmental Engineering 496, 499 and 596.

ENV E 499. Special Study (1-3) Cr/NC

Prerequisite: Consent of instructor.

Individual study in the area of environmental engineering. Maximum credit six units for any combination of Environmental Engineering 496, 499 and 596.

For additional courses which are electives in the environmental engineering program, refer to “Civil Engineering” in this section of the catalog.

GRADUATE COURSES

Refer to the Graduate Bulletin.