

# CIVIL AND ENVIRONMENTAL ENGINEERING

— ABET ACCREDITATION CRITERIA APPLY —

The civil engineering profession is concerned with the built environment. Civil engineers plan, design, and construct major facilities including highways, transit systems, dams, tunnels, energy facilities, harbors, canals, buildings, and bridges. Civil engineers help manage our air, water, and energy resources and help protect society from natural catastrophes, such as earthquakes, as well as dealing with the hazards society itself generates in the form of toxic wastes.

Because these functions are often crucial to the day-to-day lives of most people and the facilities involved are physically substantial, civil engineers bear an important responsibility to the public. Their role is often more than just technical, requiring also a high degree of communicative skills and an ability to deal with people.

Civil engineering is a profession with a long and respected history. We marvel today at the works of our ingenious predecessors and the impact they had on their societies. The irrigation systems of Egypt and China, the Inca and Mayan temples and cities, the water supply tunnels of the Greeks, and the roads and aqueducts of Rome are examples. Through these many years, civil engineering has evolved into a broadly based discipline that deals with the technical as well as the social and economic aspects of our built environment.

## THE CURRICULUM

The undergraduate civil and environmental engineering curriculum includes a core, to be taken by all declared majors, that provides a broad introduction to the major areas of civil engineering. Two tracks then allow students to take additional specialized course work in either *Environmental and Water Studies* or *Structures and Construction*.

If you would like more information on civil and environmental engineering, contact the academic administrator, Jeri Jenkins, in Room M-42 of the Terman Engineering Center.

## CEE MINOR

The civil and environmental engineering minor is intended to give students an in-depth introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Environmental and Water Studies, Construction Engineering and Management, and Structural Engineering. The necessary prerequisites for a civil engineering minor are Physics 41 and Math 41, 42, and 51. Students should recognize that a minor in civil and environmental engineering is not an ABET-accredited degree program.

Since civil engineering is a very broad field and undergraduates having widely varying backgrounds may be interested in obtaining a civil and environmental engineering minor, no single set of course requirements will be appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below; this list must be officially approved by the civil and environmental engineering undergraduate minor advisor. Additional information on preparing a minor program, including "example" programs focusing on each of the areas of expertise listed above, is available in the Civil and Environmental Engineering Department Office (Terman M-42). While each example program focuses on a different area of expertise within the department, many other combinations of courses are also possible.

Guidelines on the civil and environmental engineering minor:

1. A civil and environmental engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes.
2. The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another.
3. Professor Robert L. Street (Terman M-17; x3-4969; email: street@ce) is the undergraduate minor advisor for the Civil and Environmental Engineering Department, and will provide guidance and advice on CEE minors. Students must consult with Professor Street in developing their minor program, and must obtain approval of the finalized study list from Professor Street.

# 1997-98 CIVIL AND ENVIRONMENTAL ENGINEERING MAJOR REQUIREMENTS

**MATHEMATICS AND SCIENCE:** (45 UNITS MINIMUM), INCLUDING THE FOLLOWING  
REQUIRED COURSES:

ME 100	Differential Equations in Engineering	3	A
Stat. 190	Statistics for Social Scientists	5	A,S
Phys. 41	Mechanics (or equivalent)	3	A
Chem. 31	Chemical Principles	4	A,W
G&ES 1	Fundamentals of Geology	5	A,W,S

One year of chemistry or physics.

For the *Environmental and Water Studies* track, Chem. 33 and either Chem. 35 or 135 is also required. For students who intend to pursue graduate work in this field, Bio. 31 is recommended as well.

**ENGINEERING FUNDAMENTALS:** (5 COURSES MINIMUM), INCLUDING

Engr. 14	Applied Mechanics: Statics and Deformables	5	A,W,S
Engr. 60	Engineering Economy	3	A,W, Sum

Students electing *Environmental and Water Studies* will also take:

Engr. 30	Engineering Thermodynamics	3	A,W
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Students electing *Structures and Construction* will also take:

Engr. 50	Introductory Science of Materials	4	W,S
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**TECHNOLOGY IN SOCIETY:**

1 course from the School of Engineering approved list

**EXPERIMENTATION:**

At least eight units of experimentation are required. With careful planning, no additional courses beyond those taken to meet the science, fundamentals, and depth requirements will be necessary.

**CIVIL AND ENVIRONMENTAL ENGINEERING DEPTH:** (FUNDAMENTALS + DEPTH = 68 UNITS MINIMUM)

**CORE:** (23 UNITS)

CEE100	Managing Civil Engineering Projects	4	A
CEE101A	Structural Systems	4	W
CEE101B	Mechanics of Fluids	4	S
CEE101C	Geotechnical Engineering	4	A
CEE110	Analysis and Numerical Modeling of CE Systems	4	A
CEE170	Environmental Science and Technology	3	A

**SPECIALTY COURSES**

Students will choose a specialty in *Structures and Construction* or *Environmental and Water Studies*, described on the following pages.

## CEE SPECIALTY IN ENVIRONMENTAL AND WATER STUDIES

The environmental and water studies option focuses on environmental engineering and science, water resources, and environmental planning. This option consists of a group of required classes that provide a broad introduction to the field, including substantial exposure to engineering design.

### REQUIRED COURSES:

CEE160	Mechanics of Fluids Laboratory	2	S
CEE161	Open Channel and Pipe Flows	4	A
CEE162	Hydrology and Water Resources	4	W
CEE163	Meteorology and the Atmospheric Environment	3	A
CEE169	Environmental and Water Studies: Design	5	S
CEE171	Environmental Planning Methods	3	W
CEE172	Air Quality Management	3	W
CEE176A	Energy Efficient Buildings	4	W

**Total units for engineering fundamentals plus core and required courses must be at least 68 units.** The Accreditation Board for Engineering and Technology (ABET) requires that these 68 units include 22-1/2 units of engineering design.

## CEE SPECIALTY IN STRUCTURES AND CONSTRUCTION

The structures and construction option provides students with courses in structural analysis and design, construction, building systems, and other courses related to structural engineering and construction management. A specific requirement of this specialty is participation in a major engineering design experience, which is fulfilled by taking CEE156, 181, and 182. These courses contain project components, which in combination form an integrated design experience.

### REQUIRED COURSES:

CEE102	Legal Context of Civil Engineering	3	W
CEE156	Building Systems Design	4	W
CEE180A	Introduction to Structural Analysis	3	S
CEE180B	Structural Analysis	4	A
CEE181	Design of Steel Structures	4	W
CEE182	Design of Reinforced Concrete Structures	4	S

### ELECTIVE COURSES:

E15	Dynamics	5	A,S
CEE122	Computer Integrated A/E/C	2+2	W,S
CEE140	Construction Surveying	3	S
CEE153	Construction Equipment and Methods	3	W
CEE160	Mechanics of Fluids Laboratory	2	S
CEE161	Open Channel and Pipe Flows	4	A
CEE162	Hydrology and Water Resources	4	W
CEE171	Environmental Planning Methods	3	W
CEE174	Ethical Issues in Civil Engineering	3-4	S
CEE176A	Energy Efficient Buildings	4	W
CEE176B	Electric Power: Generation and Conservation	4	S
CEE195	Structural Geology & Rock Mechanics	4	A
CEE196	Engineering Geology Practice	3	S
CEE199	Directed Reading or Special Studies in Civil Engineering	1-5	A,W,S
CEE203	Statistical Models in Structural Engineering	4	A

**Total units for engineering fundamentals plus core, required courses, and electives must be at least 68 units.** The Accreditation Board for Engineering and Technology (ABET) requires that these units include 22-1/2 units of engineering design.

