CIVIL ENGINEERING UNDERGRADUATE MAJOR

See the "Department of Civil and Environmental Engineering (http://exploredegrees.stanford.edu/schoolofengineering/civilandenvironmentalengineering)" section of this bulletin for additional information on the department, and its programs and faculty.

The department offers a B.S. as well as a minor in Civil Engineering (see following), as well as a B.S. in Environmental Systems Engineering (http://exploredegrees.stanford.edu/soe-ug-majors/ese) and a minor in Environmental Systems Engineering (http://exploredegrees.stanford.edu/schoolofengineering/civilandenvironmentalengineering/#minortext).

Civil Engineering (CE)

Completion of the undergraduate program in Civil Engineering leads to the conferral of the Bachelor of Science in Civil Engineering.

Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodologies necessary for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems and to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate studies in engineering.

Requirements

Mathematics and Science

45 units minimum; see Basic Requirements 1 and 2

Technology in Society

One course required

CEE 102A Legal and Ethical Principles in Design, Construction, and Project Delivery

Engineering Fundamentals

Two courses required

ENGR 14 Intro to Solid Mechanics

ENGR 90/CEE 70 Environmental Science and Technology

Engineering Depth

Minimum of 68 Engineering Fundamentals plus Engineering Depth; see Basic Requirement 5

CEE 100 Managing Sustainable Building Projects

CEE 101A Mechanics of Materials

CEE 101B Mechanics of Fluids

CEE 101C Geotechnical Engineering

CEE 146S Engineering Economics and Sustainability

Specialty courses in either:

- Environmental and Water Studies (see below)
- Structures and Construction (see below)

Total Units 116

Environmental and Water Studies Focus

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 101D</td>
<td>Computation in Civil and Environmental Engineering (or CEE 101S)</td>
<td>3</td>
</tr>
<tr>
<td>CEE 162E</td>
<td>Rivers, Streams, and Canals</td>
<td>3</td>
</tr>
<tr>
<td>CEE 166A</td>
<td>Watersheds and Wetlands</td>
<td>4</td>
</tr>
<tr>
<td>CEE 166B</td>
<td>Floods and Droughts, Dams and Aqueducts</td>
<td>4</td>
</tr>
<tr>
<td>CEE 172</td>
<td>Air Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>CEE 177</td>
<td>Aquatic Chemistry and Biology</td>
<td>4</td>
</tr>
<tr>
<td>CEE 179A</td>
<td>Water Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CEE 179C</td>
<td>Environmental Engineering Design</td>
<td>5</td>
</tr>
</tbody>
</table>

Remaining specialty units from:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 179B</td>
<td>Environmental and Water Studies</td>
<td>3</td>
</tr>
<tr>
<td>CEE 179D</td>
<td>Environmental and Water Studies</td>
<td>3</td>
</tr>
<tr>
<td>CEE 179E</td>
<td>Environmental and Water Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

CEE 100 meets the Writing in the Major (WIM) requirement

A course may only be counted towards one requirement; it may not be double-counted. All courses taken for the major must be taken for a letter grade if that option is offered by the instructor. Minimum Combined GPA for all courses in Engineering Fundamentals and Depth is 2.0.
## Civil Engineering Undergraduate Major

### Honors Program

This program leads to a B.S. with honors for undergraduates majoring in Civil Engineering or in Environmental Systems Engineering. It is designed to encourage qualified students to undertake a more intensive study of civil and environmental engineering than is required for the normal majors through a substantial, independent research project.

The program involves an in-depth research study in an area proposed to and agreed to by a Department of Civil and Environmental Engineering faculty adviser and completion of a thesis of high quality. A written proposal for the research to be undertaken must be submitted and approved by the faculty adviser in the fourth quarter prior to graduation. At the time of application, the student must have an overall grade point average (GPA) of at least 3.3 for course work at Stanford; this GPA must be maintained to graduation. The thesis is supervised by a CEE faculty adviser and must involve input from the School of Engineering undergraduate Honors Program (UGHB) ([http://ughb.stanford.edu](http://ughb.stanford.edu)).

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### Civil Engineering (CE) Minor

The civil engineering minor is intended to give students a focused introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Architectural Design, Construction Engineering and Management, and Structural and Geotechnical Engineering. Students interested in Environmental and Water Studies should refer to the Environmental Systems Engineering major program requirements.

The minimum prerequisite for a civil engineering minor is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra, Multivariable Calculus, and Modern Applications as prerequisites. The minimum prerequisite for a Civil Engineering minor focusing on architectural design is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus). Students should recognize that a minor in civil engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, and the field itself is so broad, 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. Additional information, including example minor programs, are provided on the CEE web site ([http://cee.stanford.edu/prospective/undergrad/minor_overview.html](http://cee.stanford.edu/prospective/undergrad/minor_overview.html)) and in Chapter 6 of the Handbook for Undergraduate Engineering Programs ([http://ughb.stanford.edu](http://ughb.stanford.edu)).

### General guidelines are:

1. A civil engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes
of at least 3 units each of letter-graded work, except where letter grades are not offered.

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. Example programs are given on the CEE webpage.

Professor Anne Kiremidjian (kiremidjian@stanford.edu) is the CEE undergraduate minor adviser in Structural Engineering and Construction Engineering and Management. John Barton (jhbarton@stanford.edu (http://www.stanford.edu/dept/registrar/bulletin/jhbarton@stanford.edu)), Program Director for Architectural Design, is the undergraduate minor adviser in Architectural Design. Students must consult the appropriate adviser when developing their minor program, and obtain approval of the finalized study list from them.