

## DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

### Undergraduate Study

The Department of Civil and Environmental Engineering offers an undergraduate program, Course 1-ENG, leading to the Bachelor of Science in General Engineering.

Undergraduates are encouraged to participate in the research activities of the department and in many cases obtain degree credit for such work. In general, students are encouraged to plan their programs for the third and fourth years so they dovetail with possible graduate study, including the department's Master of Engineering degree. This is readily accomplished by those students who embark on the departmental program in their second year. Under certain circumstances, students are permitted to work toward receiving simultaneous undergraduate and graduate degrees.

#### **Bachelor of Science in Engineering (Course 1-ENG)**

The degree is designed to prepare students to make an impact in solving the world's greatest challenges. The Bachelor of Science in Engineering program (<https://catalog.mit.edu/degree-charts/engineering-civil-environmental-engineering-course-1-eng>) offers the option to select a core and pursue tracks of study for in-depth exploration of particular areas, or to focus on cross-cutting, multidisciplinary studies within and outside the department in emerging areas of civil and environmental engineering, broadly defined. Refer to the website for further details on sample educational tracks and educational opportunities (<http://cee.mit.edu/undergraduate>).

The undergraduate program provides significant flexibility through a track structure that is consistent with the diverse nature of our disciplinary groups and responsive to students' interests in new educational offerings. The program is built around a solid foundation in mathematics, big data, sensing, and computing, and is complemented by laboratory subjects on data analysis. It includes a capstone subject that provides ample opportunities for students to solve complex problems. The program enables students to design individualized programs to meet particular educational objectives. For example, students interested in careers in fields such as sustainability, environmental science and engineering, microbiology, sustainable materials, geochemistry, energy resources, structural/architectural engineering, oceanography, or environmental law can design programs that provide both depth and breadth.

The main component of the program is a small set of General Department Requirements (GDRs) consisting of subjects that focus on mathematics, computation, probability and statistics, and data analysis, plus a capstone. Students select one of three core options, each consisting of subjects that build a solid background in one of three areas: environment, mechanics and materials, or

systems. Their selections of a core and a consistent set of four or five restricted elective subjects, in consultation with a CEE faculty advisor, define their track of undergraduate study. Restricted electives may be selected from subjects within or outside the Department of Civil and Environmental Engineering.

To satisfy the CI-M component of the Communication Requirement, students must take two of the department's CI-M subjects (1.013 and either 1.101/1.102 or 1.106/1.107) or take one Course 1 CI-M subject and petition the Subcommittee on the Communication Requirement to substitute one CI-M from another science or engineering field. Any outside CI-M must fit into the coherent program of electives approved by the student's academic advisor and must be approved by the undergraduate officer. The remaining part of the program consists of unrestricted electives, bringing the total number of required units beyond the General Institute Requirements to 180.

#### **Bachelor of Science in Climate System Science and Engineering**

The Department of Civil and Environmental Engineering (p. 3) and the Department of Earth, Atmospheric and Planetary Sciences (<https://catalog.mit.edu/schools/science/earth-atmospheric-planetary-sciences>) offer a joint undergraduate degree program leading to the Bachelor of Science in Climate System Science and Engineering (<https://catalog.mit.edu/degree-charts/climate-system-science-engineering-course-1-12>). A detailed description of the requirements can be found under the section on Interdisciplinary Programs.

#### **Minor in Civil and Environmental Systems**

The Minor in Civil and Environmental Systems consists of the following subjects:

|                    |   |           |
|--------------------|---|-----------|
| 1.020              | Modeling and Decision-Making for Sustainability               | 12        |
| 1.022              | Introduction to Network Models                                | 12        |
| 1.041[[]]          | Transportation: Foundations and Methods                       | 12        |
| 1.075              | Water Resource Systems  | 12        |
| 1.101              | Introduction to Civil and Environmental Engineering Design I  | 6         |
| 1.102              | Introduction to Civil and Environmental Engineering Design II | 6         |
| <b>Total Units</b> |   | <b>60</b> |

#### **Minor in Civil Engineering**

The Minor in Civil Engineering consists of the following subjects:

|       |  |    |
|-------|--|----|
| 1.035 | Mechanics of Materials                                       | 12 |
| 1.036 | Structural Mechanics and Design                              | 12 |
| 1.050 | Solid Mechanics  | 12 |
| 1.101 | Introduction to Civil and Environmental Engineering Design I | 6  |
| 1.060 | Fluid Mechanics  | 12 |

|                    |   |           |
|--------------------|---|-----------|
| 1.102              | Introduction to Civil and Environmental Engineering Design II | 6         |
| <b>Total Units</b> |   | <b>60</b> |

**Minor in Environmental Engineering Science**

The Minor in Environmental Engineering Science consists of the following subjects:

|                    |   |           |
|--------------------|---|-----------|
| 1.018[[]]          | Fundamentals of Ecology                                       | 12        |
| 1.060              | Fluid Mechanics   | 12        |
| 1.061A             | Transport Processes in the Environment I                      | 6         |
| 1.070A[[]]         | Introduction to Hydrology and Water Resources                 | 6         |
| 1.080              | Environmental Chemistry                                       | 12        |
| 1.091              | Traveling Research Environmental eXperience (TRES): Fieldwork | 3         |
| 1.106              | Environmental Fluid Mechanics Lab                             | 6         |
| 1.107              | Environmental Chemistry Laboratory                            | 6         |
| <b>Total Units</b> |   | <b>63</b> |

Substitution of equivalent subjects offered by other departments is allowed, with permission of the minor advisor. However, at least three full 12-unit subjects must be Course 1 subjects.

For a general description of the minor program (<https://catalog.mit.edu/mit/undergraduate-education/academic-programs/minors>), see Undergraduate Education.

**Other Undergraduate Opportunities Research Opportunities**

Students wishing to work closely with a member of the faculty on research may obtain permission to enroll in 1.UR Research in Civil and Environmental Engineering or 1.URG Research in Civil and Environmental Engineering. The Undergraduate Research Opportunities Program (UROP) (<https://catalog.mit.edu/mit/undergraduate-education/academic-research-options/undergraduate-research-opportunities-program>) offers numerous possibilities, and the department awards several UROP traineeships to undergraduates each term.