CIVIL ENGINEERING MAJOR

Program Director: Natasha Andrade, Ph.D.

The Bachelor of Science in Civil Engineering requires a total of 122 credit hours with an emphasis on basic science (mathematics, chemistry, and physics), engineering science (mechanics of materials, statics, and dynamics), and basic civil and environmental engineering core courses (computations, materials, fluid mechanics, probability & statistics, and Geographic Information Systems). By the Junior year, each student chooses one of three tracks: Geotechnical/Structural, Environmental/Water Resources, or Transportation/Project Management. Each track specifies junior- and senior-level requirements. All three tracks include technical electives that may be selected from a combination of the six Civil Engineering specialties and other approved courses (the six specialty areas are: Environmental, Geotechnical, Project Management, Structural, Transportation, and Water Resources). The curriculum provides a sensible blend of required courses and electives, permitting students to pursue their interests without the risk of overspecialization.

The Bachelor of Science in Civil Engineering degree program at the University of Maryland is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and the Civil Engineering Program Criteria.

Admission to the Major
See the entrance requirements for the A. James Clark School of Engineering (https://academiccatalog.umd.edu/undergraduate/colleges-schools/engineering/) in the Colleges and Schools section of this catalog.

Mission
The mission of the Department of Civil and Environmental Engineering is threefold:

1. Provide a high quality, challenging education that encompasses breadth and depth; and prepare graduates to be proficient in both analysis and synthesis facets of civil engineering design;
2. Maintain a strong research program that is recognized for excellence in major areas of civil and environmental engineering;
3. Provide service to the university, the civil engineering profession, and the community at large.

The department provides an educational program of basic and specialized engineering knowledge necessary for its graduates to be proficient in recognized specialties of civil engineering. This preparation provides graduates with the tools needed for successful practice in the period following graduation. In addition to general and technical education, the educational program stresses professional and ethical responsibilities, an awareness of societal issues, and the need for lifelong learning.

The department contributes to the advancement of knowledge through research on important engineering problems. The research results are communicated through recognized channels of knowledge dissemination.

The department serves the needs of the community by emphasizing global and societal issues. The department addresses these issues through university and professional channels and contributes to their solutions.

Program Educational Objectives
The Department of Civil and Environmental Engineering has established the following program educational objectives:

- To understand, apply and develop fundamental knowledge in science, technology, engineering and mathematics.
- To attain advanced qualification in both specialization and breadth.
- To understand and apply business sensitive criteria in meeting professional responsibilities.
- To incorporate societal sensitive criteria into professional decisions.
- To develop forward-thinking attitudes that enhance communication and exemplary practice.

Student Learning Outcomes
In addition to ensuring technical competency of all graduates in the broad discipline areas of civil engineering, the department must encourage the development of skills and abilities that will enhance the marketability of its graduates and provide them with the best possible opportunity for success in the workplace. As a result, the faculty has agreed to develop the following abilities and skills within each graduate and has approved the following Student Outcomes:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Additional outcomes as per ASCE criteria are:

- Breadth in civil engineering areas
- Technical specialization
- Project management
- Public policy
- Business and public administration
- Leadership
- Attitudes
REQUIREMENTS

The Department offers a program of study leading to an ABET-accredited Bachelor of Science in Civil Engineering (BSCE) degree. Each student specializes in one of three tracks: Geotechnical/Structural, Environmental/Water Resources, or Transportation/Project Management. A total of 122 credit hours are required for a BSCE degree with an emphasis in basic science (mathematics, chemistry, and physics), engineering science (mechanics of materials, statics, and dynamics), basic civil and environmental engineering courses; required courses in the selected track; technical electives; and a senior capstone design course. The curriculum provides a sensible blend of required courses and electives, permitting students to pursue their interests without the risk of overspecialization.

Freshman Year

<table>
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<th>First Semester</th>
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| Total Credits 14 | 16 |

Sophomore Year

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| Total Credits 17 | 15 |

Junior Year

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Geotechnical and Structural Engineering

| | |
|----------------|---------|---------|
| | |

Environmental and Project Management

| | |
|----------------|---------|---------|
| | |

Total Credits 60

Senior Year

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| Total Credits 15 | 15 |

Transportation/Project Management Track

Junior Year

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<td>ENCE472</td>
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| Total Credits 15 | 15 |

Senior Year

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| Total Credits 16 | 14 |

Total Credits 60
## Environmental/Water Resources Track

### Junior Year

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### Senior Year

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<td>ENCE432</td>
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<td>Tech Electives</td>
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</table>

### Total Credits 60

Minimum Degree Requirements: 122 credits and the fulfillment of all departmental, school, and university requirements with a cumulative grade point average of at least 2.0. Additional semester credits will be involved to the extent that courses carrying more than three credits are selected.

### ENCE Electives

- 3XX, 4XX or 6XX. At least two must be ENCE courses
- No more than one ENCE489
- No more than 3 total ENCE with the same first two numbers

### TECH Electives

Students can choose from a variety of courses that are approved as technical electives. Moreover, if a student chooses a course that is not pre-approved, the student can request an evaluation by the Committee of Undergraduate Education for approval.

### Breadth Electives

#### Geotechnical & Structural Track

Include two electives from List A or List B:

<table>
<thead>
<tr>
<th>List A Course</th>
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<td>ENCE402</td>
<td>Simulation and Design of Experiments for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ENCE422</td>
<td>Project Cost Accounting and Economics</td>
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</tr>
<tr>
<td>ENCE423</td>
<td>Project Planning, Estimating &amp; Scheduling</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>List B Course</th>
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<tr>
<td>ENCE310</td>
<td>Introduction to Environmental Engineering</td>
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</tr>
<tr>
<td>ENCE353</td>
<td>Introduction to Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENCE441</td>
<td>Foundation Design</td>
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</tr>
<tr>
<td>ENCE444</td>
<td>Experimental Methods in Geotechnical Structural Engineering</td>
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<tr>
<td>ENCE454</td>
<td>Design of Concrete Structures</td>
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#### List A

<table>
<thead>
<tr>
<th>List B Course</th>
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<tr>
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<td>Introduction to Project Management</td>
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<td>ENCE370</td>
<td>Introduction to Transportation Engineering and Planning</td>
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<tr>
<td>ENCE402</td>
<td>Simulation and Design of Experiments for Engineers</td>
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</tr>
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<td>ENCE423</td>
<td>Project Planning, Estimating &amp; Scheduling</td>
<td>3</td>
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<td>ENCE470</td>
<td>High Way Engineering</td>
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<td>ENCE472</td>
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FOUR-YEAR PLAN

Click here (https://eng.umd.edu/advising/four-year-plans/) for roadmaps for four-year plans in the A. James Clark School of Engineering.

Additional information on developing a four-year academic plan can be found on the following pages:

- http://4yearplans.umd.edu
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success) section of this catalog