The objective of the civil engineering program is to prepare graduates to enter and be successful in the civil engineering profession. Graduates are expected to become licensed professional engineers, and to reach responsible positions in a wide range of professional settings, including consulting firms, industry, or government. This program will prepare students to begin and successfully complete graduate studies in engineering and/or post-baccalaureate education in a professional degree program. The civil engineering program provides breadth in core sub-disciplines and depth in at least one area of specialization. This degree program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Civil engineering is the original of the engineering disciplines. With the increase in population, the growing complexity of industries, and changing urban centers, the civil engineer’s task—applying science to the control and utilization of the environment for the total benefit of mankind—represents a challenge unsurpassed in all of engineering.

The civil engineer often is confronted with conditions so variable and complex that they cannot be precisely defined by science and mathematics. Therefore, a knowledge of the arts and social sciences, as well as the physical sciences, is essential. In addition, because civil engineering requires overall planning of very large projects whose components involve many other disciplines, it is also necessary to have knowledge of management techniques. The goal of the civil engineering program is to provide an education that enables graduates to make far-reaching decisions that draw not only from technical knowledge but also from integrity and judgment.

In the professional courses, classroom lectures are supplemented by laboratory practice, including the study of materials, structural engineering, hydraulics, environmental engineering, geotechnical engineering, and surveying. The principal functional areas that are considered sub-divisions of civil engineering are structural engineering, transportation engineering, geotechnical engineering, environmental engineering, water resources engineering, and construction management.

Students may choose a professional specialization as described on the following pages, or one of the following minors: Air Force Aerospace Studies, Military Science, Naval Science, and other approved minors.

Architecture students who plan to pursue a Master of Engineering in Structural Engineering degree should take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE 303</td>
<td>Structural Design I</td>
<td>3</td>
</tr>
<tr>
<td>CAE 304</td>
<td>Structural Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CAE 307</td>
<td>Structural Design II</td>
<td>3</td>
</tr>
<tr>
<td>CAE 431</td>
<td>Steel Design</td>
<td>3</td>
</tr>
<tr>
<td>CAE 432</td>
<td>Concrete and Foundation Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Students should consult the Master of Engineering in Structural Engineering curriculum for additional details.
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAE Additional Science Requirement</strong></td>
<td>CAE 221</td>
<td>Engineering Geology</td>
<td>3</td>
</tr>
<tr>
<td><strong>Mathematics Requirements</strong></td>
<td>CAE 312</td>
<td>Engineering Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Calculus I</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Calculus II</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>MATH 251</td>
<td>Multivariate and Vector Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MATH 252</td>
<td>Introduction to Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td><strong>Physics Requirements</strong></td>
<td>PHYS 123</td>
<td>General Physics I: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 221</td>
<td>General Physics II: Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td><strong>Capstone Design Requirement</strong></td>
<td>CAE 495</td>
<td>Capstone Senior Design</td>
<td>3</td>
</tr>
<tr>
<td><strong>Chemistry Requirement</strong></td>
<td>CHEM 124</td>
<td>Principles of Chemistry I with Laboratory</td>
<td>4</td>
</tr>
<tr>
<td><strong>Computer Science Requirement</strong></td>
<td>CS 104</td>
<td>Introduction to Computer Programming for Engineers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>or CS 105</td>
<td>Introduction to Computer Programming</td>
<td>2</td>
</tr>
<tr>
<td><strong>Engineering Course Requirements</strong></td>
<td>CAE 286</td>
<td>Theory and Concept of Structural Mechanics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CAE 287</td>
<td>Mechanics of Structural Materials</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MMAE 305</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td><strong>Interprofessional Projects (IPRO)</strong></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>See Illinois Tech Core Curriculum, section E</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Humanities and Social Science Requirements</strong></td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>See Illinois Tech Core Curriculum, sections B and C</td>
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<td>21</td>
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<tr>
<td><strong>Total Credit Hours</strong></td>
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<td></td>
<td>131</td>
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</table>

1. All technical electives must be CAE or EG courses at the 400-level or above.

All civil engineering students are required to take the Fundamentals of Engineering (FE) examination during their senior year. The examination is offered by the State of Illinois multiple times during the year. Students should contact the Department of Civil, Architectural, and Environmental Engineering for information concerning this examination.
### Bachelor of Science in Civil Engineering Curriculum

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Semester 1</th>
<th>Credit Hours</th>
<th>Semester 2</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAE 100</td>
<td>2</td>
<td>CAE 101</td>
<td>2</td>
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<tr>
<td></td>
<td>CAE 110</td>
<td>1</td>
<td>CAE 111</td>
<td>1</td>
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<tr>
<td></td>
<td>CAE 105</td>
<td>3</td>
<td>MATH 152</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>5</td>
<td>CS 104 or 105</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>CHEM 124</td>
<td>4</td>
<td>PHYS 123</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Humanities 200-level Course</td>
<td>3</td>
<td>Social Sciences Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td></td>
<td>17</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Semester 1</th>
<th>Credit Hours</th>
<th>Semester 2</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>MATH 251</td>
<td>4</td>
<td>MATH 252</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CAE 286</td>
<td>3</td>
<td>MMAE 305</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CAE 221</td>
<td>3</td>
<td>CAE 287</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS 221</td>
<td>4</td>
<td>CAE 312</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Humanities or Social Sciences Elective</td>
<td>3</td>
<td>Humanities Elective (300+)</td>
<td>3</td>
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<tr>
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<table>
<thead>
<tr>
<th>Year 3</th>
<th>Semester 1</th>
<th>Credit Hours</th>
<th>Semester 2</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAE 302</td>
<td>3</td>
<td>CAE 307</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CAE 303</td>
<td>3</td>
<td>CAE 323</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CAE 304</td>
<td>3</td>
<td>CAE Technical Elective(^1)</td>
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<tr>
<td></td>
<td>CAE 315</td>
<td>3</td>
<td>IPRO Elective II</td>
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<tr>
<td></td>
<td>IPRO Elective I</td>
<td>3</td>
<td>Social Sciences Elective (300+)</td>
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<table>
<thead>
<tr>
<th>Year 4</th>
<th>Semester 1</th>
<th>Credit Hours</th>
<th>Semester 2</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAE 419</td>
<td>3</td>
<td>CAE 432</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CAE 431</td>
<td>3</td>
<td>CAE 495</td>
<td>3</td>
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<tr>
<td></td>
<td>CAE 457</td>
<td>3</td>
<td>CAE Technical Elective(^1)</td>
<td>3</td>
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<tr>
<td></td>
<td>CAE 470</td>
<td>3</td>
<td>CAE Technical Elective(^1)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CAE Technical Elective(^1)</td>
<td>3</td>
<td>Social Sciences Elective (300+)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Humanities Elective (300+)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
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<td>15</td>
</tr>
</tbody>
</table>

Total Credit Hours: 131

\(^1\) All technical electives must be CAE or EG courses at the 400-level or above.

This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

All civil engineering students are required to take the Fundamentals of Engineering (FE) examination during their senior year. The examination is offered by the State of Illinois multiple times during the year. Students should contact the Department of Civil, Architectural, and Environmental Engineering for information concerning this examination.
Professional Specializations in Civil Engineering

Students who select an area of specialization must take a minimum of nine credit hours from the following technical electives listed under the respective area of specialization.

Three additional credit hours may be any 400-level CAE course taken with prior approval of the student’s adviser and chair.

### Civil-Environmental Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 426</td>
<td>Statistical Tools for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ENVE 310</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENVE 404</td>
<td>Water and Wastewater Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENVE 463</td>
<td>Introduction to Air Pollution Control</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: 9

### Construction Engineering and Management

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE 471</td>
<td>Construction Planning and Scheduling</td>
<td>3</td>
</tr>
<tr>
<td>CAE 472</td>
<td>Construction Site Operation</td>
<td>3</td>
</tr>
<tr>
<td>CAE 473</td>
<td>Construction Contract Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: 9

### Geotechnical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE 401</td>
<td>Hydraulics, Hydrology, and Their Applications</td>
<td>3</td>
</tr>
<tr>
<td>CAE 415</td>
<td>Pavement Design, Construction and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>CAE 486</td>
<td>Soil and Site Improvement</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: 10

### Structural Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE 411</td>
<td>Structural Analysis II</td>
<td>3</td>
</tr>
</tbody>
</table>

Select a minimum of two courses from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE 408</td>
<td>Bridge and Structural Design</td>
<td>3</td>
</tr>
<tr>
<td>CAE 410</td>
<td>Introduction to Wind and Earthquake Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CAE 435</td>
<td>Experimental Analysis of Structures</td>
<td>3</td>
</tr>
<tr>
<td>CAE 436</td>
<td>Design of Masonry and Timber Structures</td>
<td>3</td>
</tr>
<tr>
<td>CAE 437</td>
<td>Homeland Security Concerns in Engineering Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Other 400- or 500-level courses may be used towards the specialization with the prior approval of the student’s adviser.

Total Credit Hours: 9

### Transportation Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAE 412</td>
<td>Traffic Engineering Studies and Design</td>
<td>3</td>
</tr>
<tr>
<td>CAE 415</td>
<td>Pavement Design, Construction and Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>CAE 416</td>
<td>Facility Design of Transportation Systems</td>
<td>3</td>
</tr>
<tr>
<td>CAE 417</td>
<td>Railroad Engineering and Design</td>
<td>3</td>
</tr>
<tr>
<td>CAE 430</td>
<td>Probability Concepts in Civil Engineering Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: 9