Civil Engineering

Department Information

- **Department Location:**
  Civil & Industrial Engineering
- **Department Phone:**
  701-231-7244
- **Department Web Site:**
  www.ndsu.edu/cee/ (http://www.ndsu.edu/cee/)
- **Credential Offered:**
  B.S.C.E.
- **Plan Of Study Sample:**
  bulletin.ndsu.edu/programs-study/undergraduate/civil-engineering/#planofstudytext (http://bulletin.ndsu.edu/programs-study/undergraduate/civil-engineering/#planofstudytext)

Major Requirements

Major: Civil Engineering

Degree Type: B.S.C.E.

Minimum Credits Required for Degree: 132

University Degree Requirements

1. Satisfactory completion of all requirements of the curriculum in which one is enrolled.
2. Earn a minimum total of 120 credits in approved coursework. Some academic programs exceed this minimum.
3. Satisfactory completion of the general education requirements as specified by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
6. Transfer Students: Must earn a minimum of 60 credits from a baccalaureate-degree granting or professional institution.
   a. Of these 60, at least 36 must be NDSU resident credits as defined in #7.
   b. Within the 36 resident credits, a minimum of 15 must be in courses numbered 300 or higher and 15 credits in the major field of study.
7. At least 36 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.

For complete information, please refer to the Degree and Graduation Requirements (http://bulletin.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation/) section of this Bulletin.

University General Education Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 120</td>
<td>College Composition II</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
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<tr>
<td>Upper Division Writing †</td>
<td></td>
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<tr>
<td>Quantitative Reasoning (R) †</td>
<td></td>
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<tr>
<td>Science and Technology (S) †</td>
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<td></td>
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<tr>
<td>Humanities and Fine Arts (A) †</td>
<td></td>
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<tr>
<td>Social and Behavioral Sciences (B) ‡</td>
<td></td>
<td></td>
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<tr>
<td>Wellness (W) ‡</td>
<td></td>
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<tr>
<td>Cultural Diversity (D) ‡</td>
<td></td>
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</tr>
<tr>
<td>Global Perspectives (G) ‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>39</strong></td>
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</tbody>
</table>
Civil Engineering

* May be satisfied by completing courses in another General Education category.

† General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review major requirements to determine if specific courses can also satisfy these general education categories.

A list of university approved general education courses and administrative policies are available here (http://bulletin.ndsu.edu/academic-policies/undergraduate-policies/general-education/#genedcoursestext).

### Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CE 111</td>
<td>Introduction to Civil Engineering</td>
<td>1</td>
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<tr>
<td>CE 112</td>
<td>Computer Applications in Civil Engineering</td>
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</tr>
<tr>
<td>CE 204</td>
<td>Surveying</td>
<td>3</td>
</tr>
<tr>
<td>CE 212</td>
<td>Civil Engineering Graphic Communications</td>
<td>3</td>
</tr>
<tr>
<td>CE 303</td>
<td>Civil Engineering Materials</td>
<td>2</td>
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<tr>
<td>CE 303L</td>
<td>Civil Engineering Materials Laboratory</td>
<td>1</td>
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<tr>
<td>CE 309</td>
<td>Fluid Mechanics</td>
<td>3</td>
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<tr>
<td>CE 310</td>
<td>Fluid Mechanics Laboratory</td>
<td>1</td>
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<tr>
<td>CE 316</td>
<td>Soil Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CE 343</td>
<td>Structural Engineering and Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CE 370</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 371</td>
<td>Environmental Engineering Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CE 404</td>
<td>Reinforced Concrete</td>
<td>3</td>
</tr>
<tr>
<td>CE 408</td>
<td>Water Resources and Supply</td>
<td>3</td>
</tr>
<tr>
<td>CE 418</td>
<td>Transportation Engineering</td>
<td>4</td>
</tr>
<tr>
<td>CE 444</td>
<td>Structural Steel Design</td>
<td>3</td>
</tr>
<tr>
<td>CE 483</td>
<td>Contracts and Specifications</td>
<td>3</td>
</tr>
<tr>
<td>CE 489</td>
<td>Senior Design</td>
<td>3</td>
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</tbody>
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**MATH Courses Required:**

- MATH 128 Introduction to Linear Algebra | 1
- MATH 165 Calculus I (May satisfy general education category R) | 4
- MATH 166 Calculus II | 4
- MATH 259 Multivariate Calculus | 3
- MATH 266 Introduction to Differential Equations | 3

**Other Required Courses:**

- CHEM 121 General Chemistry I | 4
  & 121L and General Chemistry I Laboratory (May satisfy general education category S)
- CHEM 122 General Chemistry II | 4
  & 122L and General Chemistry II Laboratory (May satisfy general education category S)
- ENGR 402 Engineering Ethics and Social Responsibility | 1
- ENGR 311 History of Technology in America (May satisfy general education category A) | 3
- ENGR 312 Impact of Technology on Society (May satisfy general education category B) | 3
- ENGL 321 Writing in the Technical Professions (May satisfy general education category C) | 3
- GEOL 105 Physical Geology (May satisfy general education category S and G) | 3
- IME 440 Engineering Economy | 2
- IME 460 Evaluation of Engineering Data | 3
- ME 221 Engineering Mechanics I | 3
- ME 222 Engineering Mechanics II | 3
- ME 223 Mechanics of Materials | 3
- ME 350 Thermodynamics and Heat Transfer | 3
- PHYS 252 University Physics II | 4

**Technical Electives Required:** Select 12 credits from the following:

**Structures:**
CE 411  Design of Pre-stressed Concrete (Design Credits 1.0)
CE 425  Bridge Evaluation and Rehabilitation (Design Credits 1.5)
CE 430  Timber and Form Design (Design Credits 1.5)
CE 441  Finite Element Analysis (Design Credits 1.0)
CE 445  Advanced Steel Design (Design Credits 1.0)
CE 446  Basic Dynamics of Structures (Design Credits 1.0)
CE 447  Stability of Structures (Design Credits 1.5)
CM&E 465  Bridge Engineering and Management (Design Credits 1.5)

Water Resources:
CE 421  Open Channel Flow (Design Credits 1.5)
CE 474  Groundwater Sustainability Design (Design Credits 1.5)
CE 476  Watershed Modeling (Design Credits 1.5)
CE 477  Applied Hydrology (Design Credits 1.5)

Environmental:
CE 410  Water and Wastewater Engineering (Design Credits 1.5)
CE 471  Environmental Nanotechnology (Design Credits 1.5)
CE 472  Solid Waste Management (Design Credits 1.0)
CE 473  Air Pollution (Design Credits 1.5)
CE 478  Water Quality Management (Design Credits 1.5)
CE 479  Advanced Water and Wastewater Treatment (Design Credits 1.5)
CE 499  Special Topics (Design Credits 1.5)

Transportation:
CE 419  Pavement Design (Design Credits 1.5)
CE 454  Geometric Highway Design (Design Credits 2.0)
CE 455  Airport Planning and Design (Design Credits 1.0)
CE 456  Railroad Planning and Design (Design Credits 1.5)
CE 457  Pavement Management Systems (Design Credits 1.0)
CE 458  Bituminous Materials and Mix (Design Credits 1.5)
CE 499  Special Topics (Design Credits 1.0)

Geotechnical:
CE 417  Slope Stability and Retaining Walls (Design Credits 1.5)
CE 461  Foundation Engineering (Design Credits 1.5)
CE 462  Designing with Geosynthetics (Design Credits 1.0)
CE 463  Geotechnical Earthquake Engineering (Design Credits 1.5)
CE 464  Advanced Soil Mechanics (Design Credits 1.0)

Advanced Materials:
CE 486  Nanotechnology and Nanomaterials (Design Credits 0.0)
CE 491  Seminar
CE 493  Undergraduate Research

Total Credits 114

1 No grades less than a "C" are accepted in any of the math courses, as well as ME 221 Engineering Mechanics I, ME 222 Engineering Mechanics II, and ME 223 Mechanics of Materials for this curriculum.
2 Use ME 351 as an alternate when ME 350 is not available for students due to scheduling.

Degree Requirements and Notes
• Students must complete courses in a minimum of three technical areas with a minimum of 6 credits in design for a minimum total of 12 technical electives.
• Transfer students are required to take ENGR 311 History of Technology in America or ENGR 312 Impact of Technology on Society regardless of General Education completion.

Note: Department permission required for graduate level courses. Credit may be earned only at the undergraduate level. Department permission is also required for some undergraduate courses. There are specific prerequisites and grade requirements to be allowed to take certain courses.