

# Civil Engineering

## Department Information

- **Department Location:**  
201 Civil & Industrial Engineering
- **Department Phone:**  
701-231-7244
- **Department Web Site:**  
[www.ndsu.edu/cee/](http://www.ndsu.edu/cee/) (<http://www.ndsu.edu/cee/>)
- **Credential Offered:**  
B.S.C.E.
- **Sample Program Guide:**  
[catalog.ndsu.edu/programs-study/undergraduate/civil-engineering/#planofstudytext](http://catalog.ndsu.edu/programs-study/undergraduate/civil-engineering/#planofstudytext) (<http://catalog.ndsu.edu/programs-study/undergraduate/civil-engineering/#planofstudytext>)

## Major Requirements

### Major: Civil Engineering

**Degree Type:** B.S.C.E.

**Minimum Credits Required for Degree:** 130

### 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 30 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.
6. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
7. Students presenting transfer credit must meet the NDSU residence credits and the minimum upper level credit. Of the 30 credits earned in residence, a minimum of 15 semester credits must be in courses numbered 300 or above, and 15 semester credits must be in the student's curricula for their declared major.

For complete information, please refer to the Degree and Graduation Requirements (<http://catalog.ndsu.edu/past-bulletin-archive/2024-25/academic-policies/undergraduate-policies/degree-and-graduation/>) section of this Bulletin.

### University General Education Requirements

A list of university approved general education courses and administrative policies are available here (<http://catalog.ndsu.edu/past-bulletin-archive/2024-25/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).

| Code                                                           | Title                           | Credits   |
|----------------------------------------------------------------|---------------------------------|-----------|
| <b>Category C: Communication</b>                               |                                 | <b>12</b> |
| ENGL 110                                                       | College Composition I           |           |
| ENGL 120                                                       | College Composition II          |           |
| COMM 110                                                       | Fundamentals of Public Speaking |           |
| Upper Division Writing <sup>†</sup>                            |                                 |           |
| <b>Category R: Quantitative Reasoning <sup>†</sup></b>         |                                 | <b>3</b>  |
| <b>Category S: Science and Technology <sup>†</sup></b>         |                                 | <b>10</b> |
| <b>Category A: Humanities and Fine Arts <sup>†</sup></b>       |                                 | <b>6</b>  |
| <b>Category B: Social and Behavioral Sciences <sup>†</sup></b> |                                 | <b>6</b>  |
| <b>Category W: Wellness <sup>†</sup></b>                       |                                 | <b>2</b>  |
| <b>Category D: Cultural Diversity <sup>*†</sup></b>            |                                 |           |
| <b>Category G: Global Perspectives <sup>*†</sup></b>           |                                 |           |
| <b>Total Credits</b>                                           |                                 | <b>39</b> |

\*

Courses for category D & G are satisfied by completing D & G designated 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.

## Major Requirements

| Code                                                                       | Title                                                       | Credits   |
|----------------------------------------------------------------------------|-------------------------------------------------------------|-----------|
| <b>Civil Engineering Core Requirements</b>                                 |                                                             |           |
| CE 111                                                                     | Introduction to Civil Engineering                           | 1         |
| CE 112                                                                     | Computer Applications in Civil Engineering                  | 1         |
| CE 204                                                                     | Surveying                                                   | 3         |
| CE 212                                                                     | Civil Engineering Graphic Communications                    | 3         |
| CE 303                                                                     | Civil Engineering Materials                                 | 2         |
| CE 303L                                                                    | Civil Engineering Materials Laboratory                      | 1         |
| CE 309                                                                     | Fluid Mechanics                                             | 3         |
| CE 310                                                                     | Fluid Mechanics Laboratory                                  | 1         |
| CE 316                                                                     | Soil Mechanics                                              | 3         |
| CE 343                                                                     | Structural Engineering and Analysis                         | 4         |
| CE 370                                                                     | Introduction to Environmental Engineering                   | 3         |
| CE 371                                                                     | Environmental Engineering Laboratory                        | 1         |
| CE 404                                                                     | Reinforced Concrete                                         | 3         |
| CE 408                                                                     | Water Resources and Supply                                  | 3         |
| CE 418                                                                     | Transportation Engineering                                  | 4         |
| CE 444                                                                     | Structural Steel Design                                     | 3         |
| CE 483                                                                     | Contracts and Specifications                                | 3         |
| CE 489                                                                     | Senior Design                                               | 3         |
| <b>MATH Courses Required: <sup>1</sup></b>                                 |                                                             |           |
| MATH 128                                                                   | Introduction to Linear Algebra                              | 1         |
| MATH 165                                                                   | Calculus I                                                  | 4         |
| MATH 166                                                                   | Calculus II                                                 | 4         |
| MATH 259                                                                   | Multivariate Calculus                                       | 3         |
| MATH 266                                                                   | Introduction to Differential Equations                      | 3         |
| <b>Other Required Courses :</b>                                            |                                                             |           |
| CHEM 121<br>& 121L                                                         | General Chemistry I<br>and General Chemistry I Laboratory   | 4         |
| CHEM 122<br>& 122L                                                         | General Chemistry II<br>and General Chemistry II Laboratory | 4         |
| ENGL 321                                                                   | Writing in the Technical Professions                        | 3         |
| ENGR 311                                                                   | History of Technology                                       | 3         |
| ENGR 327                                                                   | Ethics, Engineering, and Technology                         | 3         |
| GEOL 105                                                                   | Physical Geology                                            | 3         |
| IME 440                                                                    | Engineering Economy                                         | 3         |
| 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<br>or ME 351                                                        | Thermodynamics and Heat Transfer<br>Thermodynamics I        | 3         |
| PHYS 252                                                                   | University Physics II                                       | 4         |
| <b>Technical Electives Required: Select 12 credits from the following:</b> |                                                             | <b>12</b> |
| <b>Structures:</b>                                                         |                                                             |           |

|                            |                                                              |
|----------------------------|--------------------------------------------------------------|
| 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)       |
| <b>Water Resources:</b>    |                                                              |
| 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)                       |
| <b>Environmental:</b>      |                                                              |
| CE 410                     | Water and Wastewater Engineering (Design Credits 1.5)        |
| CE 471                     | Environmental Nanotechnology (Design Credits 1.5)            |
| CE 472                     | Solid and Hazardous Waste Management (Design Credits 1.5)    |
| ENVE 473                   | Air Pollution                                                |
| 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)                          |
| <b>Transportation:</b>     |                                                              |
| 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)                          |
| <b>Geotechnical:</b>       |                                                              |
| 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)                 |
| <b>Advanced Materials:</b> |                                                              |
| 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.

## 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.

**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.