

# Civil and Environmental Engineering

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## Department Information

- **Interim Department Chair:**  
Achintya Bezbaruah, Ph.D.
- **Graduate Program Coordinator:**  
Kalpana Katti, Ph.D.
- **Department Location:**  
201 Civil and Industrial Engineering Bldg.
- **Department Phone:**  
(701) 231-7244
- **Department Web Site:**  
[www.ndsu.edu/ccee/](http://www.ndsu.edu/ccee/) (<http://www.ndsu.edu/ccee/>)
- **Application Deadline:**  
February 15 for fall admission; September 15 for spring admission
- **Credential Offered:**  
Ph.D., M.S.
- **English Proficiency Requirements:**  
TOEFL iBT 71, IELTS 6; Duolingo 105

## Master of Science

The Master of Science degree is a Plan A - Master's Thesis option. This format emphasizes research, the ability to analyze and interpret data, and to prepare a scholarly thesis. The student and adviser develop a program of study consisting of at least 30 credit hours of graduate level material to meet individual educational goals. A cumulative GPA of 3.0 or better is required. An oral defense of the research-based thesis is required.

## Accelerated Master's Program

### Curriculum for the Accelerated (4+1) program

| Code                              | Title                                       | Credits   |
|-----------------------------------|---|-----------|
| <b>*Required Courses</b>          |   | <b>12</b> |
| Management/Business/Communication |   | 5         |
| MGMT 630                          | Leadership in Organization                  |           |
| CE 740                            | (**)  |           |
| CE 757                            | Pavement Evaluation and Rehabilitation (**) |           |
| CM&E 603                          | Scheduling and Project Control              |           |
| CM&E 660                          | Infrastructure Management                   |           |
| COMM 711                          | Communication Theory                        |           |
| COMM 782                          | Theories of Persuasion                      |           |
| MIS 770                           | Information Resources Management            |           |
| NRM 702                           | Natural Resources Management Planning       |           |
| Engineering Tool                  |   | 6         |
| CE 641                            | Finite Element Analysis                     |           |
| CE 739                            | Computational Methods for Engineering (**)  |           |
| ENGR 729                          | Machine Learning for Engineers              |           |
| GEOG 665                          | Remote Sensing of the Environment           |           |
| IME 661                           | Quality Assurance and Control               |           |
| IME 662                           | Total Quality In Industrial Management      |           |
| IME 663                           | Reliability Engineering                     |           |
| IME 765                           | Data Analysis                               |           |
| ME 711                            | Advanced Engineering Analysis               |           |
| STAT 661                          | Applied Regression Models                   |           |
| STAT 726                          | Applied Regression and Analysis of Variance |           |
| CE 790                            | Graduate Seminar                            | 1         |

|  |   |           |
|--|---|-----------|
| CE 798   | Master's Thesis   | 6         |
| <b>*Focus Area Courses - Select at least 12 credits from one of the following focus areas.</b> |   | <b>12</b> |
| <b>Focus Area 1 - Civil Infrastructure</b>   |   |           |
| Structure  |   |           |
| CE 611   | Design of Pre-stressed Concrete   | 2         |
| CE 625   | Bridge Evaluation and Rehabilitation  | 3         |
| CE 630   | Timber and Form Design  | 3         |
| CE 645   | Advanced Steel Design   | 2         |
| CE 646   | Basic Dynamics of Structures  | 3         |
| CE 647   | Stability of Structures   | 3         |
| CE 720   | Continuum Mechanics   | 3         |
| CE 793   | Individual Study/Tutorial (Deep Learning for Engineers)                         | 2         |
| CM&E 665   | Bridge Engineering and Management   | 3         |
| Transportation   |   |           |
| CE 619   | Pavement Design   | 3         |
| CE 652   | Fundamentals of Oil & Gas Pipeline: Design, Operation, Inspection & Maintenance | 3         |
| CE 654   | Geometric Highway Design  | 3         |
| CE 656   | Railroad Planning and Design  | 3         |
| CE 782   | Introduction to Intelligent Infrastructure                                      | 3         |
| Geotechnical   |   |           |
| CE 617   | Slope Stability and Retaining Walls   | 3         |
| CE 661   | Foundation Engineering  | 3         |
| CE 662   | Designing with Geosynthetics  | 2         |
| CE 663   | Geotechnical Earthquake Engineering   | 3         |
| CE 664   | Advanced Soil Mechanics   | 2         |
| <b>Focus Area 2 - Water Environmental</b>  |   |           |
| Environmental  |   |           |
| CE 610   | Water & Wastewater Engineering  | 3         |
| CE 671   | Environmental Nanotechnology  | 3         |
| CE 672   | Solid and Hazardous Waste Management  | 3         |
| CE 673   | Air Pollution   | 3         |
| CE 679   | Advanced Water and Wastewater Treatment   | 3         |
| CE 790   | Graduate Seminar (Small Community Water Supply and Sanitation)                  | 3         |
| CE 696   | Special Topics (Environmental Engineering Design)                               | 3         |
| Water Resources  |   |           |
| CE 621   | Open Channel Flow   | 3         |
| CE 674   | Groundwater Sustainability Design   | 3         |
| CE 676   | Watershed Modeling  | 3         |
| CE 677   | Applied Hydrology   | 3         |
| CE 776   | Ground Water and Seepage  | 3         |
| CE 793   | Individual Study/Tutorial (Advanced Fluid Mechanics)                            | 3         |

\* The above course list will be updated as new courses are considered or to be offered.

\*\* Courses can be taken either in Category A or B but cannot be double counted.

\*\*\* Courses to be developed when the program starts.

## Doctor of Philosophy

The Doctor of Philosophy degree requires 90 credits beyond the baccalaureate degree in civil engineering with a cumulative GPA of 3.0 or higher (60 credits beyond an M.S. degree in Civil Engineering or a sub-area of Civil Engineering) for graduation. A dissertation supervisory committee should be formed and a plan of study be filed by the end of first year of study. A minimum of 30 hours of additional course work chosen by the student and the supervisory committee from appropriate existing Civil Engineering graduate courses, new courses, and courses outside the department must be completed.

An M.S. degree from another institution may substitute for up to 30 credits of the 90 credits required; however, suitability of transfer or use of courses and research credits in the plan of study would be decided by the adviser and supervisory committee.

A comprehensive preliminary examination is administered after completion of the greater portion of the course work. The committee chair will coordinate the examination. The format and duration will be determined by the committee. The student will present a research proposal within one year after the preliminary examination. A minimum of 30 and a maximum of 40 credit hours can be earned for research, preparation, and defense of a dissertation in Civil Engineering. A minimum of 12 credit hours in a minor or cognate area as deemed appropriate by the student and the supervisory committee may be completed by the student. The student will defend the dissertation in a final examination attended by the supervisory committee members and other academics.