Civil & Environmental Engineering

The graduate program stresses applied research for the practicing engineer. The goal is to prepare you to solve more sophisticated design problems that will help you advance in your engineering career. Small classes promote interaction with the faculty and keep you up to date with the most recent technology. This is combined with research projects that offer you the opportunity to become an expert in your chosen field.

- **Excellence in Engineering and Management (E²M).** Receive a Master’s degree in one of the above areas and an MBA. (See enclosed sheet on the E²M program.)

### Unique Features

- **NFS Funded GIS Laboratory (Geographical Information Systems).** This laboratory uses computers to store and then analyze information contained on maps. It has applications in city planning, transportation systems, surveying, water resources, and environmental protection programs.

- **Structural Engineering.** State-of-the-art computational facilities are used for the application of finite element analysis in the design and analysis of large and small structural components.

- **NSF Funded Environmental Engineering Laboratory.** Here, specialties include the advancement of physical, chemical, and biological processes for water treatment and the remediation of sites contaminated with hazardous materials.

- **NSF Funded Instructional Design Laboratory** provides state-of-the-art facilities for conducting design and simulation projects. It also has facilities for multimedia presentation and Web-based educational technology tools.
Requirements for the Master of Engineering Degree

Civil Engineering (30 credits)

Core Courses (15 credits required)
- CE 500  Advanced Mechanics of Materials
- CE 501  Advanced Structural Design
- CE 507  Finite Element Analysis
- CE 530  Geotechnical Engineering II
- CE 601  Structural Dynamics

Mathematics (3 credits required)
- M  515   Methods of Applied Mathematics I

Engineering Management (3 credits required)
- EM 601  Engineering Program Management

Independent Studies (3 credits required)
- CE 600  Independent Study (3 to 9 credits) – Independent Study cannot begin until the student has completed 12 credits of course work toward the degree.

Electives (6 credits from the following list)
- CE 600  Independent Study in Civil Engineering
- CE 603  Theory of Elasticity
- CE 604  Theory of Plates and Shells
- ME 503  Vibrations II
- ME 602  Continuum Mechanics
- M  516  Methods of Applied Mathematics II
- M  517  Applied Engineering Statistics
- EM 600  Engineering and the Corporation
**Environmental Engineering (30 credits)**

**Core Courses (9 credits required)**
- CE 609  Advanced Air Quality Engineering
- CE 610  Hazardous Waste Management
- CE 612  Advanced Water Quality Engineering

**Chemistry Courses (3 credits required)**
- CH 519  Applied Environmental Chemistry

**Mathematics (3 credits required)**
- M  517  Applied Engineering Statistics  OR
- MBA 610  Quantitative Decision Making

**Engineering Management (3 credits required)**
- EM 601  Engineering Program Management

**Independent Studies (3 credits required, up to 6 additional credits as electives, if elective credits are available)**
- CE 600  Independent Study (3-9 credits)

**Elective Courses (9 credits required)**
- CE 502  Groundwater Hydrology
- CE 503  Geographic Information Systems
- CE 507  Finite Element Analysis
- CE 523  Engineering Hydrology
- CE 524  Solid Waste Management
- CE 539  Organic Chemistry for Environmental Engineers
- CE 608  Analysis of Environmental Impact
- CH 539  Organic Chemistry for Environmental Engineers
- M   515  Methods of Applied Mathematics I
- EM 600  Engineering and the Corporation
- CE 591  Special Topics
  - CT Environmental Law and Regulations
  - Pollution Prevention
Research Topics and Projects

- **Research Topics:**
  - Applications of Remote Sensing Environmental Engineering
  - Applications of GIS in Civil and Environmental Engineering
  - Surface Water Modeling
  - Watershed Modeling
  - Aeration and Mass Transfer Applications of Finite Element Methods in Analysis and Design of Structures

- **Student Projects:**

  **Civil Engineering**
  - Investigation, Analysis, and Rehabilitation of Large Reinforced Concrete Beams for the Original, Deteriorated, and Rebuilt Conditions
  - Application of Geographic Information System (GIS) to Pavement Management Systems (PMS)
  - Use of Neural Networks in Civil Engineering Practice
  - Design of a Chamber for Safe Disposal of PEN Explosive Caps
  - North Connector Roadway Design

  **Environmental Engineering**
  - Integrating Geographic Information System (GIS) with Wastewater Facilities Planning and Design
  - Achieving Environmental Stewardship – A Case Study
  - Comparison of Mixed Oxidents and Free Chlorine for Reducing Disinfection By-Products