**ELECTRICAL ENGINEERING**

Bachelor of Science

Electrical engineers are in high demand for a wide range of influential positions. Professional duties range from analytical problem solving to the design of components and systems. The scope of employment requires a unique breadth and depth of knowledge and technical skills, which are reflected in the Electrical Engineering program. This program also offers an excellent preparation for graduate education.

Building on a foundation of mathematical and physical sciences, students progress into the application of these in the engineering science areas of circuits, electronics, communications, controls, power, and electromagnetics. In these subjects, students also begin to apply the concepts and techniques learned to the design of circuits and systems. Senior technical design courses offer the opportunity to further develop expertise in a selected area.

In addition to these technical skills, students learn to communicate effectively, both orally and in writing. In Society Requirements.

Also, many project design assignments enable the development of interpersonal, teamwork, and management skills, which are necessary for success in a professional engineering career.

### Freshman Year

**First Semester**

- 4 - CH 1010 General Chemistry
- 3 - ENGL 1030 Composition and Rhetoric
- 2 - ENGR 1020 Engineering Disciplines and Skills
- 4 - MATH 1060 Calculus of One Variable I
- 3 - Arts and Humanities Requirement or Social Science Requirement

**Second Semester**

- 4 - CH 1020 General Chemistry
- 3 - ENGR 1410 Programming and Problem Solving
- 4 - MATH 1080 Calculus of One Variable II
- 3 - PHYS 1220 Physics with Calculus I
- 3 - Arts and Humanities Requirement or Social Science Requirement

### Sophomore Year

**First Semester**

- 3 - CPSC 1110 Introduction to Programming in C
- 2 - ECE 2010 Logic and Computing Devices
- 3 - ECE 2020 Electric Circuits I
- 1 - ECE 2090 Logic and Computing Devices Lab.
- 1 - ECE 2110 Electrical Engineering Lab. I
- 4 - MATH 2060 Calculus of Several Variables
- 3 - PHYS 2210 Physics with Calculus II

**Second Semester**

- 1 - ECE 2120 Electrical Engineering Lab. II
- 3 - ECE 2620 Electric Circuits II
- 3 - ECE 2720 Computer Organization
- 1 - ECE 2730 Computer Organization Laboratory
- 4 - MATH 2080 Intro. to Ordinary Diff. Equations
- 3 - Arts and Humanities Requirement or Social Science Requirement

### Junior Year

**First Semester**

- 1 - ECE 3110 Electrical Engineering Lab. III
- 3 - ECE 3200 Electronics I
- 3 - ECE 3300 Signals, Systems, and Transforms
- 3 - ECE 3600 Electric Power Engineering
- 3 - ECE 3800 Electromagnetics
- 3 - Advanced Mathematics Requirement

**Second Semester**

- 1 - ECE 3120 Electrical Engineering Lab. IV
- 3 - ECE 3710 Random Signal Analysis
- 3 - ECE 3210 Electronics II
- 3 - ECE 3710 Microcontroller Interfacing
- 1 - ECE 3720 Microcontroller Interfacing Lab.
- 3 - ECE 3810 Fields, Waves, and Circuits
- 3 - ENGL 3140 Technical Writing

### Senior Year

**First Semester**

- 3 - COMM 1500 Intro. to Human Comm. or COMM 2500 Public Speaking
- 3 - ECE 4090 Intro. to Linear Control Systems
- 3 - ECE 4270 Communications Systems
- 2 - ECE 4950 Integrated Systems Design I
- 2 - Electrical Engineering Technical Requirement

**Second Semester**

- 2 - ECE 4960 Integrated System Design II
- 3 - Arts and Humanities Requirement or Social Science Requirement
- 6 - Electrical Engineering Technical Requirement
- 3 - Special Requirement

126 Total Semester Hours

### Notes:

- 1. A student is allowed to enroll in ECE courses (excluding ECE 2700, 2080, 3080) only when all prerequisites have been passed with a grade of C or better.
- 2. All Electrical Engineering students must have a cumulative engineering grade point average of 2.0 to enroll in any 3000- or 4000-level ECE courses.
- 3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE course.

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**ENVIROMENTAL ENGINEERING**

Bachelor of Science

Our complex world faces many challenges, including contaminated water supplies, hazardous wastes, an increasing population and limited resources. Environmental engineers help to solve many of the environmental problems faced by society using the principles of biology, chemistry, physics, mathematics and earth sciences. An undergraduate degree in Environmental Engineering opens the door to a variety of rewarding career options. Environmental engineers protect water quality by designing water and wastewater treatment systems; ensure public safety by managing solid, hazardous and radioactive wastes; improve air quality by controlling emissions from mobile and stationary sources; reduce human health risks by tracking contaminants as they move through the environment; clean up toxic waste spills and restore historically contaminated sites; and design a more sustainable future by understanding our use of resources.

The curriculum for the Bachelor of Science degree in Environmental Engineering consists of 127 credit hours. All students participate in one professional seminar course and complete a capstone design project.

### Freshman Year

**First Semester**

- 4 - CH 1010 General Chemistry
- 3 - ENGL 1030 Composition and Rhetoric
- 2 - ENGR 1410 Programming and Problem Solving
- 4 - MATH 1080 Calculus of One Variable II
- 3 - PHYS 1220 Physics with Calculus I
- 3 - Arts and Humanities Requirement or Social Science Requirement

**Second Semester**

- 4 - CH 1020 General Chemistry
- 3 - ENGR 1410 Programming and Problem Solving
- 4 - MATH 1080 Calculus of One Variable II
- 3 - PHYS 1220 Physics with Calculus I
Sophomore Year
First Semester
3 - BIOL 1030 General Biology
1 - BIOL 1050 General Biology Lab
3 - CE 2010 Statics
3 - EES 2010 Environmental Engineering Fund. I
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II

Second Semester
2 - CE 2080 Dynamics
3 - CH 2010 Survey of Organic Chemistry
4 - EES 2020 Environmental Engineering Fund. II
2 - ENGR 2100 Computer-Aided Design and Engineering Applications
4 - MATH 2080 Intro. to Ordinary Diff. Equations

Junior Year
First Semester
2 - EES 1030 Water Treatment
2 - EES 1040 Wastewater Treatment
1 - EES 1050 Water and Wastewater Treatment Lab
3 - MATH 3020 Statistics for Science and Engineering
4 - MIRC 3050 General Microbiology
3 - Arts and Humanities Requirement or
3 - Social Science Requirement

Second Semester
4 - CE 3140 Introduction to Fluid Mechanics
3 - EES 4840 Municipal Solid Waste Mgt.
3 - EES 4850 Hazardous Waste Management
3 - GEOL 1010 Physical Geology
1 - GEOL 1030 Physical Geology Lab
3 - ME 3100 Thermodynamics and Heat Transfer

Senior Year
First Semester
3 - EES 4300 Air Pollution Engineering
1 - EES 4500 Environ. Engr. Senior Seminar
3 - EES 4800 Environmental Risk Assessment
3 - EES 4860 Environmental Sustainability
2 - Engineering Economics Requirement
3 - Engineering or Science Requirement

Second Semester
3 - EES 4750 Capstone Design Project
6 - Engineering or Science Requirement or
6 - Arts and Humanities Requirement or
6 - Social Science Requirement

127 Total Semester Hours

GEOLOGY
Bachelor of Science
Geology is the study of the Earth. It is an applied science that integrates principles from physics, chemistry, biology, engineering, and other disciplines to better understand the natural processes and human influences that shape our planet. Geology helps people deduce Earth’s natural history, locate natural resources needed to support society, develop sustainable approaches to energy and resource management, and predict, assess, and manage global change and natural disasters.

Employment opportunities for geologists are numerous and varied. Examples include environmental and engineering consulting firms, energy exploration and production firms, mineral and metal industries, municipal, state, and federal governments, natural resource conservation organizations, and water authorities. Many students go on to graduate school in the geosciences, environmental sciences, or related fields. Geology is a professional degree and state certification as a Registered Professional Geologist is obtainable. Given the various career options that are possible, students are provided the opportunity to develop a broad range of skills and knowledge within the Geology program.

The Geology curriculum provides students with a well-rounded background in geology and related fields and is built around three critical themes: (1) appreciation for spatial and temporal scales, (2) knowledge of earth materials and compositions of environmental systems, and (3) understanding of geological and environmental processes. While providing solid fundamentals within science and engineering, the Geology program is also flexible, allowing students to choose among many electives to tailor their education to specific interests and career goals. The program has been carefully designed to help students develop quantitative and other critical skills, while familiarizing them with the topics, technologies, and resources needed for a variety of career paths in the geosciences. As students progress through the program they have multiple opportunities to enhance their skills of observation, computation, synthesis, communication and problem solving. Because Geology is inherently a field-based discipline, all students are required to take one or more courses that provide them with field experience. All Geology majors also participate in a multi-semester research program that provides them with hands-on experiences conducting geologic research and solving real-world problems in their chosen area of interest. It is also possible for Geology majors to pursue the Engineering Cluster Minor; students interested in this pathway should consult with their advisor early in their program of study.

Within the Geology curriculum, students who are particularly interested in environmental or water resources issues may choose to specialize in the Environmental Science Concentration or the Hydrogeology Concentration. These two concentrations provide more structured course pathways through the curriculum and help prepare students for careers in these specific areas. The Environmental Science Concentration in Geology focuses on environmental aspects of geoscience and is well suited for students interested in topics such as environmental policy, natural hazard assessment and remediation, evaluation of land use impacts, understanding geochemical cycles, and environmental systems analysis. This concentration provides a rigorous background in the sciences so that students can scientifically address environmental issues and integrate material from several fields to solve complex environmental problems. The Hydrogeology Concentration in Geology is designed for students who want to specialize in areas such as surface- and ground-water systems, treatment of water and cleanup of contaminated sites, contaminant flow and fluid transport, and water resource sustainability.

Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - GEOL 1010 Physical Geology
1 - GEOL 1030 Physical Geology Lab.
4 - MATH 1060 Calculus of One Variable I

Second Semester
4 - CH 1020 General Chemistry
3 - GEOL 1120 Earth Resources
4 - MATH 1080 Calculus of One Variable II
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Social Science Requirement

Sophomore Year
First Semester
3 - GEOL 2020 Earth History
4 - GEOL 2910 Introduction to Research I
3 - PHYS 1220 Physics with Calculus I
1 - GEOL 2910 Introduction to Research I
3 - Phys. 1220 Physics with Calculus I
3 - Arts and Humanities (Literature) Requirement
3 - Social Science Requirement
3 - STEM Requirement

Second Semester
4 - GEOL 2020 Earth History
1 - GEOL 2920 Introduction to Research II
3 - Quantitative Science Requirement
7 - STEM Requirement

Junior Year
First Semester
4 - GEOL 3020 Structural Geology
2 - GEOL 3910 Research Methods I
3 - Quantitative Science Requirement
3 - STEM Requirement