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
17
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
15
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 - MICR 3050 General Microbiology
3 - Arts and Humanities Requirement or Social Science Requirement
15
Second Semester
4 - CE 3410 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
17
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
15
Second Semester
3 - EES 4750 Capstone Design Project
6 - Engineering or Science Requirement or Arts and Humanities Requirement or Social Science Requirement
15
127 Total Semester Hours

CH 2230 may be substituted.
ENGR 2080 may be substituted.
May substitute PES 2020 for GEOL 1010 and GEOL 1030.
Select CE 3520 or IE 3840.
Select from BCHM 3050, 3060, BE 3220, 4150, 4220, 4240, 4600, 4680, BIOL 2110, 4100, 4430, 4440, CE 2060, 2550, 3120, 3310, 3420, 4430, 4470, 4620, CH 3300, 3310, 4130, ECE 2070, 2080, EES 3000, 3010, 4000, 4100, 4110, 4120, 4370, 4410, 4950, ENSP 4000, GEOL 2700, 3000, 3810, 4210, 4620, ME 4260, MICR 3050, 4000, MATH 3110, 3650, 4340, PES 4850, PHYS 2400, 2450, 4200

GEOLGY
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. All students go on to graduate school in the geosciences, environmental sciences, or related fields. Geology is a professional degree and 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
15
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
17
Sophomore Year
First Semester
3 - GEOL 2050 Mineralogy and Petrology
1 - GEOL 2070 Mineralogy and Intro. Petrology Lab.
1 - GEOL 2910 Introduction to Research I
3 - GEOL 2920 Introduction to Research II
1 - GEOL 2070 Mineralogy and Intro. Petrology Lab.
4 - MATH 1080 Calculus of One Variable I
17
Second Semester
4 - GEOL 2020 Earth History
1 - GEOL 2920 Introduction to Research II
3 - Quantitative Science Requirement
7 - STEM Requirement
15
Junior Year
First Semester
4 - GEOL 3020 Structural Geology
2 - GEOL 3910 Research Methods I
3 - Quantitative Science Requirement
3 - STEM Requirement
12
Second Semester
2 - GEOL 3920 Research Methods II
7 - Geology Requirement
3 - STEM Requirement

Second Semester
3 - GEOL 4920 Research Synthesis II
4 - Geology Requirement
6 - STEM Requirement

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 - BIOL 1030 General Biology I
1 - BIOL 1050 General Biology Lab. I
3 - ENSP 2000 Intro. to Environmental Science
3 - GEOL 2050 Mineralogy and Intro. Petrology
1 - GEOL 2070 Mineral. and Intro. Petrology Lab.
1 - GEOL 2910 Introduction to Research I
3 - Arts and Humanities (Literature) Requirement

Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II
3 - CH 2010 Survey of Organic Chemistry or
3 - CH 2230 Organic Chemistry
4 - GEOL 2020 Earth History
1 - GEOL 2920 Introduction to Research II
3 - PHYS 1220 Physics with Calculus I

Junior Year
First Semester
3 - GEOL 3000 Environmental Geology
4 - GEOL 3020 Structural Geology
2 - GEOL 3910 Research Methods I
4 - GEOL 4150 Analysis of Geological Processes

Second Semester
3 - GEOL 3180 Introduction to Geochemistry
2 - GEOL 3920 Research Methods II
3 - GEOL 4210 GIS Applications in Geology
3 - MATH 3020 Statistics for Science and Engr.
3 - Arts and Humanities (Literature) Requirement
4 - Environmental Science Requirement

Summer
6 - Field Experience

Sophomore Year
First Semester
3 - GEOL 4910 Research Synthesis I
2 - GEOL 3920 Research Methods II
4 - GEOL 3130 Sedimentology and Stratigraphy
2 - GEOL 3910 Research Methods I
10 - Environmental Science Requirement

Second Semester
3 - GEOL 4920 Research Synthesis II
10 - Environmental Science Requirement

Summer
6 - GEOL 4750 Summer Geology Field Camp
The Department of Industrial Engineering also offers a combined Bachelor's/Master's plan in which accepted students may count up to 12 hours of graduate credit (approved 6000- and 8000-level courses) toward both a bachelor's and a master's degree, with the stipulation that a minimum of 150 credit hours must be earned. To be eligible, the student must have senior standing and a minimum overall grade-point average of 3.4. Most students completing the joint BS/MS program in IE can only double count nine units. Details of the suggested curriculum and program information are available from the Industrial Engineering Department.

**Freshman Year**

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

**Second Semester**
1. ENGR 2100 Computer-Aided Design and Engineering Graphics
2. ENGR 1410 Programming and Problem Solving
3. MATH 1080 Calculus of One Variable II
4. PHYS 1220 Physics with Calculus I
5. Arts and Humanities Requirement or Social Science Requirement
6. Lab Science Requirement

**Sophomore Year**

**First Semester**
1. CE 2010 Statics
2. ENGR 2080 Engineering Graphics and Machine Design
3. ENGR 2090 Intro to Engineering/Computer Graphics
4. ENGR 2100 Computer-Aided Design and Engineering Graphics
5. MATH 2060 Calculus of Several Variables
6. MATH 3110 Linear Algebra
7. PHYS 2210 Physics with Calculus II
8. PHYS 2230 Physics Lab. II

**Second Semester**
1. IE 2100 Design and Analysis of Work Systems
2. IE 3010 Systems Design I
3. IE 3140 Seminar in Industrial Engineering
4. IE 3600 Industrial Apps of Prob/Stat I
5. IE 3800 Deterministic Operations Research
6. MSE 2100 Introduction to Materials Science

**Junior Year**

**First Semester**
1. IE 3610 Industrial Apps of Prob/Stat II
2. IE 3810 Probabilistic Operations Research
3. IE 3840 Engineering Economic Analysis
4. IE 4400 Decision Support Systems in IE
5. Arts and Humanities Requirement or Social Science Requirement

**Second Semester**
1. IE 3860 Production Planning and Control
2. IE 4610 Quality Engineering
3. IE 4650 Facilities Planning and Design
4. IE 4820 Systems Modeling
5. Oral Communication Requirement

**Senior Year**

**First Semester**
1. IE 4880 Human Factors Engineering
2. Electrical Engineering Requirement
3. Ethics and Professional Practice Requirement
4. Technical Requirement

**Second Semester**
1. IE 4670 Systems Design II
2. Management Requirement
3. Arts and Humanities Requirement or Social Science Requirement
4. Technical Requirement

**Total Semester Hours**

- 121 Total Semester Hours
- 125 Total Semester Hours

*Notes:
- This course must be passed with a C or better to transfer into IE from General Engineering or to satisfy later course prerequisites.
- ENGR 1050 and 1060 may be substituted for ENGR 1020
- See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
- ENGR 1070, 1080 and 1090 may be substituted for ENGR 1410
- Select from BIOL 1030/1050, 1040/1060, 1100, 1220/1220, 1230/1230, CH 1020, GEOL 1010/1030
- ME 2030 may be substituted.
- PHYS 1240 may be substituted.
- See General Education Requirements. COMM 1500 is recommended.
- Select either ECE 2020 and 2110, or ECE 2070 and 2080.
- Select from PHIL 1030, 3440, 3450, 3460, LAW 1220
- Select from IE 4000, 4020, 4030, 4040, 4300, 4460, 4520, 4560, 4570, 4600, 4620, 4630, 4810, 4850, 4860, 4870, 4990, 4910
- Select from ACCT 2010, 2020, AS 3900, ELE 4000, MGT 2010, 3070, 4110, MKT 4210, ML 3010

**Industrial Engineering**

Bachelor of Science

Industrial engineers design, install, and improve the complex systems that provide goods and services vital to our society and economy. These systems place unique demands for breadth of preparation on our students, who must be prepared to effectively deal with colleagues at every level in the organization.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry; however, many practicing industrial engineers are employed in non-manufacturing institutions such as hospitals, financial institutions, consulting firms and government agencies. In addition to numerous employment opportunities in professional practice, industrial engineering graduates may further their formal education. The Department of Industrial Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees.