



Geology

Geology is the study of the rocks and minerals that make up earth and the physical and biological processes that shape earth, both at and below the surface. These processes include plate tectonics, volcanism, earthquakes, mountain building, and erosion. Traditionally, geologists have been concerned with industrial application of their skills in such areas as the search for oil and minerals. Today, geologists find that their insight and assistance is also valued in rapidly expanding fields such as geography, environmental studies, engineering, and hydrogeology and in such diverse fields as paleontology and oceanography.

The minor in Geology, coupled with a strong science major, is valuable as preparation for graduate study in geology and related areas. A graduate degree is usually required for career advancement beyond entry-level positions.

Programs

- Geology *minor*

Career Directions

- Consultant
- Geochemist
- Geologist
- Geophysicist
- Hydrologist
- Mineralogist
- Paleontologist
- Petrologist
- Planetary Geologist
- Science Writer
- Stratigrapher
- Teacher
- Also: Graduate Study

Preparation

Recommended High School Courses

- Algebra
- Biology
- Chemistry
- Physics
- Trigonometry

Geology *minor*

Required Credits: 18

Required GPA: 2.00

I REQUIRED COURSES

Complete the following courses:

- GEOL 1110 Physical Geology (4 credits)
or GEOL 1120 Intro to Fossils and History of Planet Earth (4 credits)
- GEOL 2110 Crystals, Minerals and Rocks (4 credits)
- GEOL 3600 Stratigraphy and Sedimentation (3 credits)

II REQUIRED ELECTIVES

Select 7-8 additional credits from the following:

- GEOL 2730 Introduction to Planetary Science (4 credits)
- GEOL 3120 Soils (4 credits)
or BIOL 3120 Soils (4 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- GEOL 3212 Hydrogeology (3 credits)
- GEOL 3400 Glacial and Pleistocene Geology (3 credits)
- GEOL 3500 Topics in Paleontology (3 credits)
- GEOL 3700 Environmental Geophysics (3 credits)
- GEOL 4300 Global Environmental Change (3 credits)
- GEOL 4910 Directed Independent Study (3 credits)
- GEOG 3226 Cartography (3 credits)

Geology Courses

GEOL 1110 Physical Geology (4 credits)

Physical geology is the study of the Earth system, minerals, rocks, the processes that operate upon Earth, the landforms that originate from them. Natural hazards and mineral resources are also studied. The course will demonstrate that the planet is a completely integrated, continually evolving and dynamic system. The course is also aimed to create an awareness of how it affects our life and our responsibility to the planet and its future. Lecture and laboratory. [Core Curriculum Goal Area(s) 3 & 10 (LC)]

GEOL 1120 Intro to Fossils and History of Planet Earth (4 credits)

The course focuses on the study of fossils and the application of fundamental geologic principles to decipher Earth's history: understanding Earth materials and processes, fossils identification and classification, geologic time, and the conditions that led to the major events (extinctions, diversifications, and environmental transitions) in the history of life. Lecture and laboratory. [Core Curriculum Goal Area 3 (LC)]

GEOL 1910 Directed Independent Study (3 credits)

Arranged individual study.

GEOL 1920 Directed Group Study (3 credits)

Arranged group study.

GEOL 1930 Experimental Course (3 credits)

A course proposed for inclusion in the University curriculum. May not be offered more than two times as an experimental course.

GEOL 1940 In-Service Course (3 credits)

A course for practitioners seeking additional training or expertise in their current vocation or profession. The in-service format typically includes an educational experience in which a University faculty member and a group of students concentrate on working toward the resolution of a specific problem.

GEOL 1950 Workshop, Institute, Tour (3 credits)

An intense, credit-granting academic experience of short duration (usually from two days to two weeks) that is not listed in the current University curriculum. Provides for the practical application of theoretical learning within a group setting, and may include the development of methods and skills and the discussion of ideas and principles.

GEOL 1960 Special Purpose Instruction (3 credits)

A course intended for specific groups or organizations outside the University community.

GEOL 1970 Internship (3 credits)

Graded Satisfactory/Unsatisfactory only. Student internships may be either full-time or part-time in a public or private agency appropriate to the degree objective. Internships consist of closely supervised periods of service that are arranged in advance of the course registration. Students should consult their advisor concerning prerequisites.

GEOL 1980 Research (3 credits)

Research carried out by the student that is based on appropriate methodology and scholarship.

GEOL 1990 Thesis (3 credits)

A thesis written by the student that reports extensive original research carried out by the student and demonstrates appropriate methodology and scholarship.

GEOL 2110 Crystals, Minerals and Rocks (4 credits)

The course provides understanding of how crystals and crystalline structures are formed, as well as minerals and igneous and metamorphic rocks. It includes learning to use tools and diagnostic tests for identification of minerals in hand samples and in the polarizing microscope and other instruments. The course also includes the study of the genesis, classification, and identification of igneous, and metamorphic rocks. Finally, the potential of a region to produce mineral resources is discussed. Lecture and laboratory. [Core Curriculum Goal Area 3 (LC)]

GEOL 2730 Introduction to Planetary Science (4 credits)

An introduction to the solar system and its components. The course includes a discussion of missions, devices, and technologies for its exploration. It also involves the study of star evolution, laws, and principles for movement of celestial objects: planets, satellites, asteroids, comets, and meteorites. Analysis of physical characteristics and geological features of planets and moons of the solar system. Introduction to exoplanets and the search for life. Finally, a discussion of the solar system evolution, Planet Earth's future and human influence is included. Lecture and laboratory. [Core Curriculum Goal Area 3 (LC)]

GEOL 2910 Directed Independent Study (3 credits)

Arranged individual study.

GEOL 2920 Directed Group Study (3 credits)

Arranged group study.

GEOL 2925 People of the Environment: Earth Science Perspective (3 credits)

Application of the Earth Sciences in understanding the causes of, and solutions to, environmental problems. Environmental perspectives on geologic hazards.

GEOL 2930 Experimental Course (3 credits)

A course proposed for inclusion in the University curriculum. May not be offered more than two times as an experimental course.

GEOL 2950 Workshop, Institute, Tour (3 credits)

An intense, credit-granting academic experience of short duration (usually from two days to two weeks) that is not listed in the current University curriculum. Provides for the practical application of theoretical learning within a group setting, and may include the development of methods and skills and the discussion of ideas and principles.

GEOL 2960 Special Purpose Instruction (3 credits)

A course intended for specific groups or organizations outside the University community.

GEOL 2970 Internship (3 credits)

Graded Satisfactory/Unsatisfactory only. Student internships may be either full-time or part-time in a public or private agency appropriate to the degree objective. Internships consist of closely supervised periods of service that are arranged in advance of the course registration. Students should consult their advisor concerning prerequisites.

GEOL 2980 Research (3 credits)

Research carried out by the student that is based on appropriate methodology and scholarship.

GEOL 2990 Thesis (3 credits)

A thesis written by the student that reports extensive original research carried out by the student and demonstrates appropriate methodology and scholarship.

GEOL 3120 Soils (4 credits)

Introduction to principles of soil genesis, classification, physical and chemical properties, and biological significance. Lecture and laboratory. Prerequisites: (BIOL 1400 or BIOL 1120) and (GEOL 1110 or BIOL 1500) or consent of instructor. May not be offered every year.

GEOL 3211 Environmental Hydrology (3 credits)

The course provides a basic understanding of the principles and processes governing the movement of water through the hydrologic cycle, including atmospheric moisture flow, surface runoff, infiltration, and groundwater flow. Environmentally relevant applications based on case studies will be studied. The course includes coverage of contemporary global issues related to water resources, sustainable development, and climate change. Prerequisites: GEOL 1110 and MATH 1170 or equivalent, or consent of instructor.

GEOL 3212 Hydrogeology (3 credits)

Groundwater flow to wells, aquifer test analysis, groundwater exploration techniques, application of computer models in groundwater studies, hydrogeologic field methods, contaminant hydrogeology, vadose zone hydrology. Lecture and laboratory. Prerequisites: GEOL 3211 or consent of instructor. May not be offered every year.

GEOL 3400 Glacial and Pleistocene Geology (3 credits)

Modern concepts of glaciology and glacial geology. Interpretation of the phenomena and effects on the landscape. Lecture and laboratory. Prerequisite: GEOL 1110 or consent of instructor.

GEOL 3500 Topics in Paleontology (3 credits)

Introduction to major groups of organisms that are commonly preserved as fossils. Focus of class may vary between offerings; including invertebrate and vertebrate paleontology, introductory micropaleontology, palynology and pollen analysis. May be repeated as topics change. Lecture and laboratory. Prerequisite: GEOL 1120. (May not be offered every year.)

GEOL 3600 Stratigraphy and Sedimentation (3 credits)

Study of sedimentary rocks. Recognition of the physical and biologic factors affecting deposition. Introduction to stratigraphic principles. Lecture and laboratory. Prerequisites: GEOL 1110 or GEOL 1120, and GEOL 2110.

GEOL 3700 Environmental Geophysics (3 credits)

Introduction to geophysical processes and geophysical field methods commonly used in environmental evaluation. Interdisciplinary approach to an understanding of the physical environment. Lecture and laboratory. (Might not be offered every year.)

GEOL 3910 Directed Independent Study (3 credits)

Arranged individual study.

GEOL 3920 Directed Group Study (3 credits)

Arranged group study.

GEOL 3930 Experimental Course (3 credits)

A course proposed for inclusion in the University curriculum. May not be offered more than two times as an experimental course.

GEOL 3940 In-Service Course (3 credits)

A course for practitioners seeking additional training or expertise in their current vocation or profession. The in-service format typically includes an educational experience in which a University faculty member and a group of students concentrate on working toward the resolution of a specific problem.

GEOL 3950 Workshop, Institute, Tour (3 credits)

An intense, credit-granting academic experience of short duration (usually from two days to two weeks) that is not listed in the current University curriculum. Provides for the practical application of theoretical learning within a group setting, and may include the development of methods and skills and the discussion of ideas and principles.

GEOL 3960 Special Purpose Instruction (3 credits)

A course intended for specific groups or organizations outside the University community.

GEOL 3970 Internship (3 credits)

Graded Satisfactory/Unsatisfactory only. Student internships may be either full-time or part-time in a public or private agency appropriate to the degree objective. Internships consist of closely supervised periods of service that are arranged in advance of the course registration. Students should consult their advisor concerning prerequisites.

GEOL 3980 Research (3 credits)

Research carried out by the student that is based on appropriate methodology and scholarship.

GEOL 3990 Thesis (3 credits)

A thesis written by the student that reports extensive original research carried out by the student and demonstrates appropriate methodology and scholarship.

GEOL 4300 Global Environmental Change (3 credits)

This class offers an interdisciplinary introduction to the principles of climate, ecosystems, and biogeochemistry needed to understand human impacts on the natural environment. We will also discuss global change prediction and the scientific bases for global change assessments and policy measures. Key topics are the physical climate system and its variability, the carbon cycle and related biogeochemistry and ecosystem processes, land use issues, the interactions among climate, ecosystems, and biogeochemistry, and the impact of global change on societally relevant parameters. Common threads in all of these topics will pervade the whole semester; these include the use of observations and models, the consideration of multiple scales of change (temporal and spatial), the interaction of human behaviors and choices with natural systems, and the linkages among aspects of global change science (may not be offered every year). Prerequisites: ENVR 2000 or GEOG 2100 or Consent of Instructor.

GEOL 4910 Directed Independent Study (3 credits)

Arranged individual study.

GEOL 4917 DIS Tchg Assoc | (1-2 credits)

Directed Independent Study | Teaching Associate

GEOL 4920 Directed Group Study (3 credits)

Arranged group study.

GEOL 4930 Experimental Course (3 credits)

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GEOL 4940 In-Service Course (3 credits)

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GEOL 4970 Internship (3 credits)

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GEOL 4980 Research (3 credits)

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GEOL 4990 Thesis (3 credits)

A thesis written by the student that reports extensive original research carried out by the student and demonstrates appropriate methodology and scholarship.

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
 1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
 1930, 2930, 3930, 4930 EXPERIMENTAL COURSE
 1940, 2940, 3940, 4940 IN-SERVICE COURSE
 1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
 1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
 1970, 2970, 3970, 4970 INTERNSHIP
 1980, 2980, 3980, 4980 RESEARCH
 1990, 2990, 3990, 4990 THESIS