

# GEOLOGY (GEOL)

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## Courses

### **GEOL-101 PHYSICAL GEOLOGY 4 Credits**

Introduction to basic concepts of geology in the context of geologic hazards and geologic resources. Topics covered include: global circulation of water and air, rocks and minerals, plate tectonics, geologic time, deductive reasoning from sparse evidence. Geologic and topographic map reading skills are taught and emphasized, using examples from the local area. Lecture and laboratory. Pre-requisite: Level C or higher. Core math ready (excluding 153P and 123P) or core math complete. See Course Placement Chart for equivalent courses and test scores.

### **GEOL-120 INTRODUCTION TO EARTH SYSTEMS 4 Credits**

This course will examine the formation of planet Earth, its structure, atmosphere, hydrosphere and biosphere. We will learn about the climate and how the various systems interact with each other. Human impacts on the atmosphere and climate will also be discussed from a scientific perspective. Three hours of lecture and 3 hours of laboratory time per week.

### **GEOL-190 DIRECTED STUDY IN GEOLOGY 1-12 Credits**

### **GEOL-202 HISTORICAL GEOLOGY 4 Credits**

Emphasis on geologic time; no other discipline offers such a long time perspective relevant to modern decision-making. Includes: review of basic Earth materials; plate-tectonic framework for interpreting Earth history; absolute dating techniques and the age of the Earth's formation; depositional environments and interpretation of sedimentary rocks as a tool of paleogeography; lithostratigraphic principles and relative dating by Steno's laws and cross-cutting relationships; basic principles of paleontology, including overview of taxonomy, processes of fossilization, evolutionary principles, biostratigraphic principles; systematic examination of tectonic setting, paleogeography, paleobiology, and paleoclimate for each period of Earth's history. Lecture and laboratory. Pre-requisite: A grade of 'C' or better in GEOL-101.

### **GEOL-290 DIRECTED STUDY IN GEOLOGY 1-12 Credits**

Additional library and/or field research by individuals based on student/faculty interests. This course can provide a mechanism for students to participate in faculty research projects for academic credit. Pre-requisite: Permission of instructor.

### **GEOL-291 WORKSHOP IN GEOLOGY 1-12 Credits**

### **GEOL-292 SPECIAL TOPICS IN GEOLOGY 1-12 Credits**

### **GEOL-295 PRACTICUM IN GEOLOGY 1-2 Credits**

### **GEOL-299 RESEARCH ASSISTANTSHIP 1-12 Credits**

### **GEOL-301 GEOLOGIC FIELD METHODS 1-6 Credits**

Six-week course in the field. Principles of geologic mapping in igneous, sedimentary and metamorphic terranes using examples from Hells Canyon. Pre-requisite: Permission of instructor. Lab fee.

### **GEOL-309 HYDROGEOLOGY 4 Credits**

Fundamentals of surface and groundwater movement in a geologic context. Includes hydrologic, geologic, and other factors controlling groundwater flow, occurrence, development, chemistry, and contamination. Groundwater flow theory and aquifer test methods are introduced. Interactions between surface and subsurface hydrologic systems are covered. Some field trips are possible. Introduction to aquifer pumping tests, aquifer analysis, watershed analysis, and water budgets. Field methods are emphasized through consideration of local examples. Lecture and laboratory. Pre-requisite: A grade of 'C' or better in GEOL-101.

### **GEOL-313 EARTH MATERIALS I 4 Credits**

The study of naturally occurring, inorganic crystalline solids with definite chemical structures which give them unique physical properties (minerals). It is an important curricular component for both (1) Geology majors who intend to pursue careers in the Earth Sciences as well as (2) students preparing for teaching careers who expect to teach Earth Science classes at the junior high or secondary level. The study of minerals has ancient roots and was associated with the development of geology, chemistry, and physics. Therefore, this course integrates many of these fields of study. This course introduces mineral chemistry, symmetry and classification; provides basic geologic skills in descriptive mineralogy, including space groups and the use of stereo nets; hand-sample petrography of igneous, metamorphic and sedimentary rocks; and elementary optical methods. Pre-requisite: A grade of 'C' or better in GEOL-101.

### **GEOL-314 EARTH MATERIALS II 4 Credits**

Introduction of descriptive igneous, sedimentary and metamorphic petrography; plate-tectonic framework for interpreting petrogenesis; phase equilibria and basic geochemistry of magmatic systems; geochemistry of weathering and soil formation; pressure-temperature-time relationships of metamorphic facies; and economic geology, including ore mineralogy and resource extraction. Labs emphasize microscopic identification of minerals and textures, and the formulation of petrogenetic interpretations. Lecture and laboratory. Pre-requisite: A grade of 'C' or better in GEOL-313.

### **GEOL-335 EARTH SURFACE PROCESSES 4 Credits**

This course examines the evolution of natural landscapes by water, wind, ice and tectonic processes. Topics include: weathering and mass wasting, neotectonics, fluvial geomorphology, glacial geomorphology, and Quaternary geology field techniques. Approximately one third of instructional time is spent in the field. Lecture and laboratory. Pre-requisite: A grade of 'C' or better in GEOL-101.

**GEOL-390 DIRECTED STUDY IN GEOLOGY 1-12 Credits**

**GEOL-392 SPECIAL TOPICS IN GEOLOGY 1-12 Credits**

**GEOL-393 SERVICE LEARNING IN GEOLOGY 1-12 Credits**  
SERVICE LEARNING IN GEOLOGY.

**GEOL-394 INTERNSHIP IN GEOLOGY 1-12 Credits**

**GEOL-395 PRACTICUM IN GEOLOGY 1-12 Credits**

**GEOL-399 RESEARCH ASSISTANTSHIP 1-3 Credits**

**GEOL-420 PRINCIPLES OF GEOCHEMISTRY 3 Credits**

This 400-level course is designed to draw together the themes and topics from other courses in the Earth Science major into an integrated picture of Earth and its interrelated systems, as well as applying chemistry to these systems. The focal discussion will be on the interactions between the atmosphere, hydrosphere, biosphere and lithosphere and current topics of interest related to them. Of particular interest are scientific problems involving Earth's systems such as coral bleaching, climate change, and water pollution. Pre-requisite: CHEM-112 with a grade of C or better.

Crosslisted with CHEM-420.

**GEOL-421 STRUCTURAL GEOLOGY 4 Credits**

Emphasizes 3-dimensional thinking; no other scientific discipline requires the same spatial thinking skills that geology does. This class covers classical and modern concepts of structural geology including: the recognition and description of folds, faults, joints, and metamorphic fabrics in rocks; description and interpretation of stress and strain from these structures; preparation and interpretation of geologic maps and cross-sections. Lecture and laboratory. Pre-requisites: a grade of 'C' or better in GEOL-101.

**GEOL-450 EARTH SYSTEMS CAPSTONE 3 Credits**

This course is designed to draw together the themes and topics from other courses in the Earth Science major into an integrated picture of Earth and its interrelated systems. The focal discussion will be on the interactions between the major systems and current topics of interest related to them. Of particular interest are scientific problems involving Earth's systems that are, as of yet, unresolved. Pre-requisite: GEOL-120 and NS-380.

**GEOL-490 DIRECTED STUDY IN GEOLOGY 1-12 Credits**

**GEOL-491 WORKSHOP IN GEOLOGY 1-12 Credits**

**GEOL-492 SPECIAL TOPICS IN GEOLOGY 1-12 Credits**

**GEOL-495 PRACTICUM IN GEOLOGY 1-12 Credits**

**GEOL-499 RESEARCH PROJECT AND SEMINAR IN GEOLOGY 1-3 Credits**

Students will conduct and communicate the results of a research project in the Natural Sciences Division. Topics may include the historical, philosophical, cultural and environmental aspects, and the processes of natural science. Requirements of students include satisfactory oral presentation and defense of their research and submission of a written report approved by their advisor to the Natural Sciences Division. Prerequisite: NS-398.