

# GEOLOGY (GEOL)

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## **GEOL 107. Global Change - Past and Present. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

Introduction to major transformations of the physical, biological, and chemical components of Earth systems from a geological perspective including climate, tectonics, biodiversity, sea-level, and ocean circulation. Not open to students who have taken GEOL 204. Preference given to first-years and sophomores.

## **GEOL 108. When Rocks Attack. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

Students explore popular depictions of natural disasters to assess their geologic plausibility. Not open to students who have taken GEOL 117 or GEOL 203 or GEOL 250. Preference given to first-years and sophomores.

## **GEOL 109. Energy and Natural Resources. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

Origin, development, and use of natural resources for energy production with an emphasis on petroleum, natural gas, and nuclear energy and their impact on the environment. Not open to students who have taken GEOL 117, GEOL 203, or GEOL 250. Only open to first-years and sophomores.

## **GEOL 117. Environmental Geohazards. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

Geologic environmental hazards. Emphasis on hazards recognition and assessment in seminars, and field applications. Topics include: soils, slopes, floods, fans, earthquakes, land use, coastal, and groundwater hazards. Preference given to first-years and sophomores. Not open to Geology majors, except by permission of instructor, or students who have taken GEOL 108 or GEOL 316.

## **GEOL 203. Physical/Environmental Geology. 1 Credit.**

**Offered Both Fall and Spring; Lecture hours:3,Lab:4**

Introduction to Earth's dynamic systems, plate tectonic processes that make Earth a unique planet, and human interaction with Earth. Geologic factors and limitations that affect use or management of the environment. Not open to students who have taken GEOL 250. Prerequisite: first- or second-year status, others by permission.

## **GEOL 204. Evolution of the Earth. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3,Lab:4**

Introduction to the evolution of life, climate, plate tectonics, and catastrophes through time provides perspective for making decisions about ongoing and future environmental change. Preference given to first-years and sophomores.

## **GEOL 230. Environmental GIS. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:4**

Geographic Information Systems (GIS) in geologic mapping, environmental monitoring, and hydrologic modeling. Introduction to global positioning, (GPS), environmental databases, spatial analyses, and terrain modeling.

## **GEOL 250. Geology for Engineers. 1 Credit.**

**Offered Spring Semester Only; Lecture hours:3,Lab:4**

Basic principles, including properties of rocks and soils, hydrology, surface processes, rock mechanics, environmental parameters, geological hazards, and engineering case histories. Not open to students who have taken GEOL 203. GEOL 250 is restricted to first- and second-year civil and environmental engineering students and others by permission.

## **GEOL 298. Stream Restoration. 1 Credit.**

**Offered Alternate Fall or Spring; Lecture hours:3,Lab:4; Repeatable**

Scientific principles to integrate physical and biological approaches to stream restoration in watershed management. Team-taught field course highlights developing restoration plan for Bucknell's Miller Run. Crosslisted as ENST 298.

## **GEOL 299. Watershed Systems Science. 1 Credit.**

**Offered Alternate Fall or Spring; Lecture hours:3,Lab:4; Repeatable**

Watersheds regulate water flow and ecosystem health on our landscape. Team-taught field course integrating physical, chemical, and biological processes in watersheds, using the Susquehanna and tributaries. Crosslisted as ENST 299.

## **GEOL 304. Crystallography-Mineralogy. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3,Lab:3**

Principles of crystallography and mineralogy; crystal morphology, structure, chemistry, physical properties, genesis, occurrence, and identification of important minerals by various techniques including chemical analysis. Prerequisite: GEOL 203 or GEOL 250 or permission of the instructor.

## **GEOL 305. Introduction to Geochemistry. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3,Lab:4**

Element distribution, basic thermodynamics and kinetics, mineral and gas solubility, phase diagrams, stable and radioactive isotopes, oxidation-reduction processes, surface geochemistry, composition of natural water. Prerequisites: MATH 201, CHEM 201 - CHEM 202, and permission of the instructor.

**GEOL 309. Sedimentology and Stratigraphy. 1 Credit.**

**Offered Spring Semester Only; Lecture hours:3,Lab:4**

Principles and techniques of the study of depositional processes and environments. Emphasis on semester-long sedimentary basin analysis project including analysis of Paleozoic outcrops near campus. Prerequisite: GEOL 204.

**GEOL 314. Structural Geology. 1 Credit.**

**Offered Fall Semester Only; Lecture hours:3,Lab:4**

Orientation and geometric analyses of rock structures, kinematics and mechanics of rock deformation at all scales. Prerequisite: GEOL 203 or GEOL 250 or permission of the instructor. Crosslisted as GEOL 614.

**GEOL 316. Geomorphology. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3,Lab:4**

Physical processes shaping the Earth's surface and evolution of resulting landforms. Emphasis on linkages between landscape components and understanding complex relationships between process and form. Prerequisite: GEOL 203 or GEOL 250 or permission of the instructor. Crosslisted as GEOL 616.

**GEOL 317. Paleontology. 1 Credit.**

**Offered Alternate Fall or Spring; Lecture hours:3,Lab:4**

Principles of evolution and ecology applied to investigation of ancient life. Emphasis on analysis of field collections of marine invertebrate fossils from Paleozoic outcrops near campus. Prerequisite: GEOL 204 or permission of the instructor.

**GEOL 318. Undergraduate Research. .5-1 Credits.**

**Offered Summer Session Only; Lecture hours:Varies; Repeatable**

Research course for qualified students in any branch of geology. Prerequisite: permission of the instructor.

**GEOL 319. Undergraduate Research. .5-1 Credits.**

**Offered Fall Semester Only; Lecture hours:Varies; Repeatable**

Research course for qualified students in any branch of geology. Prerequisite: permission of the instructor.

**GEOL 320. Undergraduate Research. .5-1 Credits.**

**Offered Spring Semester Only; Lecture hours:Varies; Repeatable**

Research course for qualified students in any branch of geology. Prerequisite: permission of the instructor.

**GEOL 321. Special Topics in Geology. .5-1 Credits.**

**Offered Fall Semester Only; Lecture hours:Varies; Repeatable**

Investigation, report, or discussion on currently significant topics in geology. Prerequisite: permission of the instructor.

**GEOL 322. Special Topics in Geology. .5-1 Credits.**

**Offered Spring Semester Only; Lecture hours:Varies; Repeatable**

Investigation, report, or discussion on currently significant topics in geology. Prerequisite: permission of the instructor.

**GEOL 325. Independent Study. .5-1 Credits.**

**Offered Both Fall and Spring; Lecture hours:Varies,Other:Varies; Repeatable**

Independent study course for qualified students in any branch of geology. Prerequisite: permission of the instructor.

**GEOL 326. Independent Study. .5-1 Credits.**

**Offered Both Fall and Spring; Lecture hours:Varies,Other:Varies; Repeatable**

Independent study course for qualified students in any branch of geology. Prerequisite: permission of the instructor.

**GEOL 334. Geophysics. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:4,Lab:3**

Introduction to geophysical principles and methods (seismic, gravity, magnetic, electrical, electromagnetic and GPR) applied to both near-surface and solid earth studies. Emphasis placed on active learning by hands-on geophysical data collection focused on environmental and engineering applications. Prerequisites: One 200-level geology course and MATH 201 or permission of the instructor.

**GEOL 336. Hydrogeology. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3,Lab:4**

Water properties, fundamental flow equations, surface and subsurface flow, well hydraulics, regional flow, and contamination. Prerequisites: GEOL 203 or GEOL 250 and MATH 192 or MATH 201, or permission of the instructor.

**GEOL 338. Applied Environmental Geomorphology. 1 Credit.**

**Offered Alternating Spring Semester; Lecture hours:3,Lab:4**

Surviving on a complex and dynamic earth surface. Understanding environmental problems and geologic hazards with geologic principles set in a multidisciplinary framework. Prerequisites: GEOL 316 and permission of the instructor.

**GEOL 340. Igneous and Metamorphic Petrology. 1 Credit.**

**Offered Spring Semester Only; Lecture hours:3,Lab:4**

This class examines the mineralogy, petrography, geochemistry, origin and tectonic significance of igneous and metamorphic rocks. Prerequisite: GEOL 304.