

# GEOLOGY (GY) (GY)

## GY 111 Physical Geology 3 cr

Materials that make up the Earth as well as the properties and geological processes that operate in the Earth. Special topics include plate tectonics, mineral chemistry, the rock cycle, sedimentary processes, metamorphism and geological map reading. Core course.

**Corequisite:** GY 111L

## GY 111L Physical Geology Lab 1 cr

Laboratory course for Physical Geology.

**Corequisite:** GY 111

## GY 112 Earth History 3 cr

The origin and history of the earth as seen in the rocks and their contained life record. Core Course.

**Corequisite:** GY 112L

## GY 112L Earth History Lab 1 cr

Laboratory course for Earth History.

**Prerequisite:** GY 111 Minimum Grade of D and GY 111L Minimum Grade of D

**Corequisite:** GY 112

## GY 113 Honors Geoscience Field - H 3 cr

A two-week field course emphasizing the recognition and understanding of geologic processes in the field environment. The course is based in the Taos Ski Valley, New Mexico, with field trips ranging across northern New Mexico and southern Colorado during the interim session.

**Prerequisite:** ((GY 101 Minimum Grade of D or (GY 111 Minimum Grade of D and GY 111L Minimum Grade of S) and ((GY 103 Minimum Grade of D or (GY 112 Minimum Grade of D and GY 112L Minimum Grade of S))

## GY 301 Geomorphology 3 cr

Principles of landform development as it relates to specific processes (fluvial erosion, glacial erosion, etc.), construction of topographic base maps with Alidade/Total Station, GPS navigation and surveying, and rock/mineral resource evaluation.

**Prerequisite:** (GY 101 Minimum Grade of D or GY 111 Minimum Grade of D)

## GY 302 Crystallography and Mineralogy 4 cr

Introduction to elementary crystallography, crystal chemistry, and atomic structure of minerals, as well as the identification, characterization and use of common rock-forming minerals and important ore minerals.

**Prerequisite:** (GY 101 Minimum Grade of D or (GY 111 Minimum Grade of D and GY 111L Minimum Grade of D)) and (GY 103 Minimum Grade of D or (GY 112 Minimum Grade of D and GY 112L Minimum Grade of D)) and (CH 131 (may be taken concurrently) Minimum Grade of D or CH 115 Minimum Grade of D)

## GY 303 Igneous & Meta Petrology 4 cr

The study of the formation and classification of igneous and metamorphic rocks.

**Prerequisite:** (GY 101 Minimum Grade of D or GY 111 Minimum Grade of D) and (GY 232 Minimum Grade of D or GY 302 Minimum Grade of D or GY 342 Minimum Grade of D)

## GY 304 Stratigraphy - W 3 cr

The development of the stratigraphic column; correlation and field procedures.

**Prerequisite:** (EH 102 (may be taken concurrently) Minimum Grade of C or EH 105 Minimum Grade of C) and (GY 103 Minimum Grade of D or GY 112 Minimum Grade of D)

## GY 305 Geophysics 4 cr

Application of classical physics to the study of the Earth and the solution of problems in Earth sciences, including analysis of seismic refraction and reflection surveys, earthquakes, gravity and magnetic fields, and electrical geophysical surveys.

**Prerequisite:** GY 111 Minimum Grade of D and GY 301 Minimum Grade of D

## GY 306 Sedimentology & Stratigraphy-W 4 cr

Study the principles pertaining to the description and classification of sedimentary rocks, with emphasis on sedimentary processes and depositional environments.

**Prerequisite:** GY 111 Minimum Grade of D and GY 111L Minimum Grade of D and GY 112 Minimum Grade of D and EH 102 Minimum Grade of C or EH 105 Minimum Grade of C

**Cross-Listed:** GY 344, GY 402

## GY 310 Environmental Earth Science 3 cr

A spatial perspective on major global environmental problems. Topics include population pressure, loss of biodiversity, ozone depletion, global warming, water, energy and mineral resources, food supplies, waste disposal, geological hazards and political/economic forces (identical to GEO 310).

**Prerequisite:** GY 111 Minimum Grade of D or GEO 101 Minimum Grade of D or GEO 102 Minimum Grade of D

**Cross-Listed:** GEO 310

## GY 332 Remote Sensing I 4 cr

Interpretation of maps, air photos and satellite images (identical to GEO 332).

**Prerequisite:** GEO 102 (may be taken concurrently) Minimum Grade of C and GEO 102L (may be taken concurrently) Minimum Grade of C and GY 301 Minimum Grade of C

**Cross-Listed:** GEO 332

## GY 401 Paleontology 3 cr

Major invertebrate fossil groups, their identification, and their geologic distribution.

**Prerequisite:** (GY 103 Minimum Grade of D or (GY 112 Minimum Grade of D and GY 112L Minimum Grade of D))

## GY 403 Structural Geology 4 cr

Study of the deformation of the internal Earth and the structures that result.

**Prerequisite:** (GY 101 Minimum Grade of D or GY 111 Minimum Grade of D) and (GY 301 Minimum Grade of D or GY 325 Minimum Grade of D) and ((PH 112 Minimum Grade of D or PH 114 Minimum Grade of D) or (PH 201 Minimum Grade of D or PH 216 Minimum Grade of D))

## GY 411 Soils 3 cr

A review of soil formation, processes and properties (identical to GEO 411).

**Prerequisite:** (GEO 102 Minimum Grade of D and GEO 102L Minimum Grade of D and GY 301 Minimum Grade of D)

**Cross-Listed:** GEO 411

## GY 413 Coastal Geomorphology 2 cr

An introduction to coastal sediment processes and their applied coastal geomorphology with emphasis on waves, tides, sediments, and their interactions including the impacts of anthropogenic influences. Taught only at Dauphin Island Sea Lab.

**GY 420 Geostatistics 3 cr**

Applied bivariate and multivariate statistics to problems in Geography, Geology, and Meteorology; parametric and non-parametric procedures in correlation, regression, analysis of variance, etc. Time series analysis, trend surface analysis, kriging and analysis of spatial (map) data. Identical to GEO 420.

**Prerequisite:** (GY 111 Minimum Grade of C and GY 112 Minimum Grade of C) and (MA 112 Minimum Grade of C or ST 210 Minimum Grade of C)

**Cross-Listed:** GEO 420, GY 520

**GY 421 Applied Environ Geology - W 3 cr**

A geological applications course designed to familiarize students with techniques used by environmental and engineering geologists in their studies of land use, land development and assessment of geological hazards. Material is illustrated with case studies from the Mobile area.

**Prerequisite:** (GY 101 Minimum Grade of D or GY 111 Minimum Grade of D) and (EH 102 Minimum Grade of C or EH 105 Minimum Grade of C)

**GY 422 Sedimentary Geology 3 cr**

A course examining sedimentation with emphasis on environments of deposition, sea-level and other controls on sedimentation in the rock record, and petroleum exploration. Credit for both GY 422 and GY 522 will not be allowed.

**Prerequisite:** (GY 101 Minimum Grade of D or GY 111 Minimum Grade of D) and (GY 103 Minimum Grade of D or GY 112 Minimum Grade of D)

**GY 425 Hydrology 4 cr**

Principles of sources, occurrences, and movement of groundwater. Surface and subsurface investigations of groundwater and elementary groundwater hydrology and chemistry. Credit for both GY 425 and GY 525 will not be allowed.

**GY 426 Contaminant Hydrogeology 3 cr**

Flow systems, mass transport in the vadose and saturated zones; advection and dispersion; transformation, retardation and attenuation of solutes; low temperature geochemical processes and kinetics of chemical reactions; contaminant modeling using finite difference-finite element methods. Credit for both GY 426 and GY 526 will not be allowed.

**Prerequisite:** (GY 425 Minimum Grade of D or GY 475 Minimum Grade of D)

**GY 431 Optical Mineralogy-Crystallogr 4 cr**

Theory and use of the petrographic microscope in the recognition and identification of crystallographic and optical properties in non-opaque minerals.

**Prerequisite:** (GY 232 Minimum Grade of D or GY 302 Minimum Grade of D or GY 342 Minimum Grade of D)

**GY 433 X-Ray Analytical Methods 4 cr**

Theory and use of x-ray diffraction systems as applied to crystallography, mineralogy, chemistry, and metallurgy.

**Prerequisite:** GY 302 Minimum Grade of D

**Cross-Listed:** GY 533

**GY 442 Remote Sensing II 4 cr**

Analysis of remotely sensed digital data for detection and mapping of Earth resources (identical to GEO 442). Prerequisite: GY 332 or GEO 332. Minimum grade of 'B' needed in course prerequisite.

**Prerequisite:** GEO 332 Minimum Grade of B or GY 332 Minimum Grade of B

**Cross-Listed:** GEO 442

**GY 446 Marine Geology 4 cr**

A study of the geology of the ocean basins, with special emphasis on the continental shelves, their sediments, and sedimentary processes at work there.

**Prerequisite:** (GY 101 Minimum Grade of D or GY 111 Minimum Grade of D) and (GY 103 Minimum Grade of D or GY 112 Minimum Grade of D)

**GY 450 Thin-Section Techniques 1 cr**

A laboratory based course illustrating techniques employed by geologists to prepare thin-sections from geological materials. Students will produce thin-sections and write up reports detailing the petrography of the samples examined.

**Prerequisite:** (GY 232 Minimum Grade of D or GY 302 Minimum Grade of D or GY 342 Minimum Grade of D) and (GY 233 Minimum Grade of D or GY 303 Minimum Grade of D or GY 343 Minimum Grade of D) and (GY 344 Minimum Grade of D or GY 402 (may be taken concurrently) Minimum Grade of D)

**GY 460 Introduction to GIS 4 cr**

Fundamentals of Geographic Information Systems technology, including software functionality (ArcGIS), data processing, cartography and spatial analysis (identical to GEO 460). Prerequisite: CIS 150 with a grade of B or better or passing the computer proficiency exam.

**Prerequisite:** CIS Proficiency Exam P or CIS 150 Minimum Grade of B

**Cross-Listed:** GEO 460

**GY 461 GIS Apps I-Environment 4 cr**

Application of Geographic Information Systems to studies of the natural environment (identical to GEO 461). Prerequisite: GY 460 or GEO 460 or permission of instructor. Minimum grade of 'B' needed in course prerequisite.

**Prerequisite:** GEO 460 Minimum Grade of B or GY 460 Minimum Grade of B

**Cross-Listed:** GEO 461

**GY 480 Field Geology 6 cr**

A six-week, summer field course on the methods of geologic surveying, the nature and construction of geologic maps and cross-sections, measurements of stratigraphic sections and preparation of geologic reports. This course serves as a capstone class for geology majors.

**Prerequisite:** (GY 303 Minimum Grade of D and GY 403 Minimum Grade of D and GY 402 Minimum Grade of D and HS 170 Minimum Grade of P)

**GY 490 Special Topics 1-4 cr**

Geological topics not covered in current geology courses. Prerequisite: Junior or Senior standing.

**GY 492 Seminar - 1-3 cr**

Departmental seminar investigating a selected field of geology (topic announced prior to registration). May be repeated when content varies for a maximum of 3 credits

**GY 494 Directed Studies 1-4 cr**

Independent research in the field or laboratory under the direction of a member of the Geology faculty. Students must have an acceptable project approved before registering for this course. Prerequisite: Permission of the Chair, Junior or Senior standing. No more than 8 hours of directed study is allowed.

**GY 496 Internship in Geology 1-3 cr**

On-the-job training through occupational or professional work through an approved geological organization. Only open to geology majors. Prerequisite: Permission of chair; Junior or Senior standing. No more than 3 hours of internship is allowed.

**GY 520 Geostatistics 4 cr**

Applied bivariate and multivariate statistics to problems in Geography, Geology, and Meteorology; parametric and non-parametric procedures in correlation, regression, analysis of variance, etc. Time series analysis, trend surface analysis, kriging and analysis of spatial (map) data. Identical to GEO/GY 420. Credit for both GY 420 and GY 520 will not be allowed.

**Prerequisite:** (ST 175 Minimum Grade of B or ST 210 Minimum Grade of B) or (MA 125 Minimum Grade of C or MA 132 Minimum Grade of C)

**Cross-Listed:** GEO 420, GY 420

**GY 531 Optical Mineralogy-Crystallogr 4 cr**

Theory and use of the petrographic microscope in the recognition and identification of crystallographic and optical properties in non-opaque minerals. Graduate credit will require an additional project specified by the instructor. Credit for both GY 431 and GY 531 will not be allowed.

**Prerequisite:** (GY 232 Minimum Grade of D or GY 302 Minimum Grade of D or GY 342 Minimum Grade of D)

**GY 533 X-Ray Analytical Methods 4 cr**

Theory and use of x-ray diffraction systems as applied to crystallography, mineralogy, chemistry, and metallurgy.

**Prerequisite:** (GY 231 Minimum Grade of D or GY 341 Minimum Grade of D)

**Cross-Listed:** GY 433

**GY 543 Sel Appls in Remote Sensing 3 cr**

Critical assessment of selected remote sensing applications in earth science. Application subject designation prior to registration. Graduate credit will require an additional project specified by the instructor. Credit for both 443 and 543 will not be allowed.

**Prerequisite:** GY 332 Minimum Grade of D or GEO 332 Minimum Grade of D

**Cross-Listed:** GY 442

**GY 544 Sedimentary Geology 3 cr**

A study examining sedimentation with emphasis on environments of deposition, sea-level and other controls on sedimentation in the rock record, and petroleum exploration. Credit for both GY 444 and GY 544 will not be allowed.

**Prerequisite:** MAS 603 Minimum Grade of C or GY 344 Minimum Grade of D

**Cross-Listed:** GY 444

**GY 575 Hydrology 4 cr**

Principles of sources, occurrences, and movement of ground water. Surface and sub-surface investigations of ground water and elementary ground water hydrology and chemistry.

**Prerequisite:** (GY 232 Minimum Grade of D or GY 342 Minimum Grade of D)

**Cross-Listed:** GY 475

**GY 576 Contaminant Hydrogeology 4 cr**

Flow systems, mass transport in the vadose and saturated zones; advection and dispersion; transformation, retardation and attenuation of solutes; low temperature geochemical processes and kinetics of chemical reactions; contaminant modeling using finite difference-finite element methods. Credit for both GY 426 and GY 576 will not be allowed.

**Prerequisite:** GY 425 Minimum Grade of D or GY 475 Minimum Grade of D or GY 575 Minimum Grade of D

**Cross-Listed:** GY 476

**GY 590 Sp Top - 1-6 cr**

An in-depth course for advanced students in geology. Topics and titles will be selected to examine the subject matter in an area of current interest to students and in an area of particular faculty expertise. To include specializing topics not currently listed in Bulletin course offerings.

**GY 592 Seminar - 1-6 cr**

Students and faculty meet weekly in an interactive discussion of current literature in geological sciences. The focus will be on 'state of the art' theories and methodologies as they occur in the primary literature. Student presentation is required to receive credit.

**GY 594 Directed Research 1-6 cr**

Independent research under the direction of a member of the graduate faculty. May be used to learn new techniques or to explore research questions of special interest. A maximum of 6 hours may be earned for this course.