GEOLOGY (GEOL)

GEOL 1500  Environmental Geology  4 s.h.
An introductory course that examines interactions between human society and our changing planet, the affects of natural/geologic hazards on humans, and anthropogenic (human-caused) impacts on nature, geology, and society. Three hours of lecture and two hours lab per week.
Gen Ed: Environmental Sustainability, Natural Science, Social and Personal Awareness.

GEOL 1500L  Environmental Geology Laboratory  0 s.h.
Environmental Geology Laboratory.

GEOL 1504  The Dynamic Earth  3 s.h.
An examination of earth as consisting of interrelated geologic systems which are dynamic and constantly changing. Includes study of surface, lithologic and tectonic systems.
Gen Ed: Natural Science.

GEOL 1505  Physical Geology  4 s.h.
A study of the various physical and chemical processes acting on and within the earth, and their products. The laboratory component includes identification of minerals and rocks, and the interpretation of topographic and geologic maps. Three hours of lecture, two hours of lab per week.
Gen Ed: Natural Science.

GEOL 1505L  Physical Geology Laboratory  0 s.h.
Physical Geology Laboratory.

GEOL 1508  Geology of Gemstones and Allied Minerals  3 s.h.
Formation, occurrence, and distribution of gem materials. Properties and identification of gem stones; factors affecting their value. Introduction to synthetic/artificial gem materials. Not applicable toward the geology major.

GEOL 1509L  Geoscience Laboratory  1 s.h.
Problem solving and assessment of case histories to illustrate the scientific method and geologic principles and concepts. Two hours laboratory per week.

GEOL 1510  Geology of National Parks  3 s.h.
Geologic history of national parks; geologic processes observed in North American parks and Hawaii. Simulated field trips to several major parks. Not applicable toward the geology major.

GEOL 2602  Introduction to Oceanography  3 s.h.
Survey of geological, physical, chemical, and biological oceanography; description and distribution of properties and their relationship to circulation, shorelines, ocean features, sediments, organisms, and environments.
Gen Ed: Natural Science.

GEOL 2605  Historical Geology  4 s.h.
An in depth study of the origin and evolution of the Earth and its systems and life forms throughout geologic time. The course is designed to develop student critical thinking skills through analysis of concepts and issues, and the integration of maps, lithologic information, and fossil information. Three hours lecture and two hours lab per week. Field trips are an integral part of the course.
Prereq.: GEOL 1505 and GEOL 1505L.

GEOL 2611  Geology for Engineers  3 s.h.
Study of geologic principles, processes, and materials; focus on recognition of geologic factors as they apply to engineering operations and projects. Laboratory work includes examination of minerals, rocks, maps, and case histories. Two hours lecture, two hours laboratory per week.
Gen Ed: Natural Science.

GEOL 2614  Mesozoic Dinosaurs and Other Reptiles  3 s.h.
A survey of major Mesozoic dinosaurs and reptiles, including discussion of their environment, organic evolution, diversity, and controversies pertaining to their classification and extinction.
Prereq.: GEOL 3713.

GEOL 2615  Geology and the Environment  3 s.h.
A study of the interrelationship of human activity and the geologic environment. An examination of geologic hazards, geologic considerations in waste disposal, resource utilization, and land use.
Prereq.: GEOL 1504 or GEOL 1505 or GEOL 2611.

GEOL 2620  Intro to Natural Gas and Water Resources  3 s.h.
A survey of the history, science and technology of oil and gas exploration and production and water resource related issues with an emphasis on non-conventional production in the Appalachian Basin.
Prereq.: MATH 1513, CHEM 1516 and CHEM 1516L.

GEOL 2699  Individual Study  1-3 s.h.
The introductory study of problems or issues in geology, or a review of literature relating to a specific geologic topic. A maximum of 3 s.h. may be taken.
Prereq.: 8 s.h. in Geology, consent of department chairperson and instructor.

GEOL 3700  Mineralogy  4 s.h.
The occurrence, composition, and crystallography of common and economically important minerals. Identification of minerals using physical, chemical, optical and x-ray properties. The theory and use of the polarizing microscope and its application to the study of crystalline material, including asbestos materials. Two hours lecture, four hours of lab per week.
Prereq.: CHEM 1515 (may be concurrent) and GEOL 2605.

GEOL 3701  Geomorphology  3 s.h.
A study of landforms and the processes which create them, using aerial photographs, geologic maps, and topographic maps. The laboratory work emphasizes recognition and interpretation of landforms. Two hours lecture, two hours laboratory per week.
Prereq.: GEOL 2605.

GEOL 3702  Glacial Geology  3 s.h.
A study of glacier types: their origin, movement, erosional/depositional contributions, and their relationship to various non-glacial features. Emphasis is on the Pleistocene glacial succession in North America. Field trips are an integral part of the course.
Prereq.: GEOL 2605.

GEOL 3704  Structural Geology  2 s.h.
Description and interpretation of geologic structures, mechanical properties; stress-strain relationships, regional structure of North America, and major tectonic theories. Geology majors must take GEOL 3704L concurrently with GEOL 3704.
Prereq.: GEOL 3701 and GEOL 3718.

GEOL 3704L  Structural Geology Laboratory  1 s.h.
Structural geology techniques and analyses, including orthographic solutions, stereographic projections, and interpretation of maps. Two hours lab per week.
Prereq. or concurrent: GEOL 3704.

GEOL 3706  Geology of Economic Mineral Deposits  3 s.h.
A study of the occurrence, origin, and distribution of mineral deposits, with special attention to their economic use. Field trips are mandatory.
Prereq.: GEOL 3700.

GEOL 3709  Subsurface Investigations  3 s.h.
An introduction to subsurface investigative methods that integrate principles of geophysics, geochemistry, interpretation of well logs and other bore hole data, outcrops and published information in the solution of actual geological problems. Two hours lecture, two hours lab per week. Students are expected to perform field work in addition to regularly scheduled class time.
Prereq.: GEOL 3701; MATH 1571 recommended.

GEOL 3714  Principles of Paleontology  3 s.h.
A detailed study of fossil invertebrates, including their origin, classification, paleoecology and stratigraphic utilization. Two hours lecture and two hours lab per week.
Prereq.: GEOL 2605.
GEOL 3716  Environmental Impact of Abandoned Mines  3 s.h.
Mining methods, types of mines, information retrieval, mine stabilization, and
the effects of abandoned mines on environmental and human activities,
especially of deep coal mines in the Mahoning valley and adjacent areas. Two
hours lecture and two hours lab per week.
Prereq.: GEOL 2605.

GEOL 3717  Igneous and Metamorphic Petrology  4 s.h.
An in-depth study of the petrogenesis of igneous and metamorphic rocks
based on their chemical and petrographic characteristics. Three hours lecture,
three hours lab per week.
Prereq.: GEOL 3700.

GEOL 3720  Field Investigations in Geology  1-4 s.h.
A field-based approach to the study of geologic concepts and problems.
Class and travel supervised by the Geology faculty; location, duration of stay,
hours, credit, and grading criteria dependent on the site and nature of the
geologic concepts and problems investigated. The course may be repeated.
A maximum of 4 s.h. may be applied toward Geology major requirements.
Prereq.: By permit only.

GEOL 3750  Geoscience Seminar  1 s.h.
Guest lecture and student presentation forum course designed to provide
students with exposure to a broad range of topics and current research
relevant to the geosciences. Course may be repeated.
Prereq.: GEOL 1505.

GEOL 3775  Research Methods for Undergraduates  1 s.h.
This course introduces the student to the fundamental and practical aspects
of conducting research. The course emphasizes the scientific method,
research methodologies, literature review, writing research proposals, and how
research results are presented. Learn the process of developing, funding and
conducting research. This course must be taken prior to any undergraduate
research.
Prereq.: junior or senior standing.

GEOL 4804  Ground Water  3 s.h.
A study of the geologic and hydrologic factors controlling the occurrence and
behavior of water beneath the earth's surface. Two hours lecture, two hours lab
per week.
Prereq.: GEOL 2605; MATH 1571 recommended.

GEOL 4812  GIS Applications to Geology  3 s.h.
This course covers a variety of geologic applications of GIS software; topics
covered include: flood mapping, landslide hazard mapping, modeling soil
erosion, watershed delineation, etc. Although you will be exposed to the basic
functions of ArcGIS, the course is designed primarily to provide experience in
obtaining, managing, interpreting, displaying, and presenting geo-spatial data
in a meaningful context.
Prereq.: GEOL 3701, GEOG 2611.

GEOL 4820  Water Pollution Control  3 s.h.
Sources and prevention methods of water pollution, human activities and
natural conditions that influence water quality, protection methods and
regulations of water quality, contamination and remediation of groundwater.
Prereq.: GEOL 1505 or ENST 2600.

GEOL 4824  Tectonics  3 s.h.
Geodynamics and the workings of plate tectonics. Kinetics and dynamics of
plate motion, plate driving forces, thermal structure of the earth, and
thermal convection in the earth. Tectonic and structural features on the earth.
Geophysical, stratigraphic and structural signatures of extensional rifting,
slide-slip faulting, subduction zones, plate collisions and mountain belts.
Prereq.: GEOL 3704.

GEOL 4825  Geophysical Well Log Analysis  3 s.h.
An introduction to geophysical well logging, analysis, and interpretation
applications in the oil and gas industry. Topics include well construction,
drilling mud properties, and interpretation of gamma ray, SP, resistivity, sonic,
neutron density, and cement bond logs.
Prereq.: GEOL 2620 or permission of instructor; GEOL 3704, PHYS 1502 or
PHYS 2611 recommended.

GEOL 4830  Senior Thesis  4 s.h.
Designed to be completed during the student's senior year and is expected
to be a significant research-based contribution to the geosciences. A typical
senior thesis topic will support the research program of full-time GES faculty.
Students may develop their own research topic provided they have the support
of one or more full-time GES faculty.
Prereq.: Junior standing, minimum cumulative GPA of 3.0, submission of
approved research proposal, permission of GES Chairperson.

GEOL 4899  Special Topics  1-3 s.h.
Selected aspects of geology not covered in existing courses. Topics to be
announced each time course is offered. May be repeated for different topics.
Prereq.: appropriate 3700- or 4800- geology course and permission of the
chairperson.

GEOL 5802  Sedimentology and Stratigraphy  3 s.h.
The study and interpretation of sedimentary rocks, including physical
characteristics, petrography, depositional environments, principles of
correlation, and principles of basin analysis. Two hours lecture, two hours lab
per week.
Prereq.: GEOL 3704.

GEOL 5805  Special Problems in Geology  1-4 s.h.
An in-depth study of a specific problem in one of the branches of geology.
The problem depends on the student’s interest and qualifications and the
equipment availability. A maximum of 8 s.h. may be taken.
Prereq.: 8 s.h. in Geology, consent of the department chairperson and
instructor.

GEOL 5810  Groundwater Resource Evaluation  3 s.h.
Geologic and hydrologic interpretation of groundwater data with emphasis
on regional groundwater resources, groundwater management, groundwater
supplies, and design and construction of water wells.
Prereq.: GEOL 2605 or permission of instructor.

GEOL 5815  Geology and the Environment  2 3 s.h.
In-depth examination of earth processes, earth resources, and properties
of earth materials as they relate to human activities, and their geologic
consequences.
Prereq.: GEOL 2615 or ENST 2600.

GEOL 5817  Environmental Geochemistry  3 s.h.
An application of low-temperature aqueous geochemistry and geochemical
computer modeling to environmental problems such as acid mine drainage,
geochemical cycling of trace elements and nutrients, hazardous waste
remediation, nuclear waste disposal, and surface and ground-water
contamination.
Prereq.: GEOL 3700 and CHEM 1516.

GEOL 6900  Geology Workshop  1-6 s.h.
Intensive study and activity in a topic related to geology or geoscience
education. May be repeated once. Grading is S/U.
Prereq.: Permission of instructor.

GEOL 6901  Geology of Ohio and Pennsylvania  3 s.h.
The geologic history and development of the rocks, structure, landforms, and
mineral resources of Ohio and Pennsylvania.
Prereq.: GEOL 5802 or equivalent.

GEOL 6910  Advanced Aquifer and Well Hydraulics  3 s.h.
Computer-based test analyses; heat flow in the subsurface; and modeling of
groundwater flow and contaminant transport.
Prereq.: Permission of instructor.

GEOL 6950  Selected Topics in Geology  1-3 s.h.
Addresses specific topics in geology. The topics may vary and will be
announced prior to registration. The course may be repeated provided different
topics are addressed.