GEOLOGY (GEOL)

GEOL 1403. Physical Geology. 4 Hours.
An introduction to the materials, processes, and structure of the earth. Topics include earthquakes, volcanoes, plate tectonics, mountain building, weathering and erosion, glaciation, oceans, and mineral resources. The laboratory taken concurrently with the lecture includes experiences that involve the study of rocks, minerals, and map interpretations. Fall, Spring, Summer.

GEOL 1404. Historical Geology. 4 Hours.
An introduction to the history of the earth and its past inhabitants, including a section on the dinosaurs and their extinction. This course gives a broad overview of the tectonic evolution of the planet, indicated by various major mountain-building events; ancient environments and changing sea levels recorded in sedimentary deposits; and the evolution of life represented by the fossil record. The laboratory taken concurrently with the lecture includes the study of common animal and plant fossils and problems which illustrate practical applications of geological principles. Fall, Spring, Summer.

GEOL 1405. Geologic Hazards & Resources. 4 Hours.
AAn introduction to the interrelationship between humans and the geologic environment. This includes the potential hazards posed by geologic processes, and the planning that needs to be done to lessen their impact. Earth materials and their uses by humans are also emphasized. The laboratory taken concurrently with the lecture includes map and air photo interpretation, analysis of remote sensing data, and study of economically important earth materials. Field trips and take-home computer exercises are also required. Fall, Spring, Summer.

GEOL 1436. Foundations Of Science. 4 Hours.
The course focuses on the nature of science as a reliable method of acquiring knowledge about the natural world. Students will learn how to apply key scientific facts, concepts, laws and theories to distinguish science from non-science, bad science, and psedudoscience by analyzing a variety of claims and case studies. By employing an innovative, interdisciplinary approach to science education, this course is designed to increase science literacy and critical thinking skills for introductory-level science students. Students must enroll concurrently in the corresponding lab for this course.

GEOL 3301. Field Methods. 3 Hours.
This course provides experience with common field techniques used in geologic mapping and geologic investigations. It emphasizes techniques and skills used for systematic field observations and data collection for construction of stratigraphic columns, structural cross-sections, and the development of geologic maps. The course has a mandatory two-week field component.
Prerequisite: GEOL 1304/GEOL 1104 or GEOL 1404 and GEOL 1303/GEOL 1103 or GEOL1403 or GEOL 1305/GEOL 1105 or GEOL 1405.

GEOL 3326. Environmental Geology. 3 Hours.
This course offers an introduction to geological processes and materials, and how they affect people and the environment. Specific topics include earthquakes, volcanism, mass wasting, floods, coastal hazards, and climatic change. Optional topics may include such items as energy and water resources, subsidence, and waste disposal. Even year, Fall.
Prerequisite: GEOL 1303, GEOL 1103.

GEOL 3330. Oceanography. 3 Hours.
A survey of the general principles of oceanography is made. The geology of ocean basins, tide-water processes and the chemistry of sea water are studied. Biophysics of the sea and environmental problems are considered. Spring, Summer I.
Prerequisite: GEOL 1303, GEOL 1103.

GEOL 3332. Forensic Geology. 3 Hours.
The course covers many of the basic geological principles and techniques used in solving crime. A significant part of the course will involve case studies as well as hands-on field and laboratory analyses. Even year Fall.
Prerequisite: GEL132/112 or GEOL 1303, GEOL 1103 plus CHEM 1311, CHEM 1111, CHEM 1312, CHEM 1112, and MATH 1316.

GEOL 3404. Mineralogy. 4 Hours.
This course covers crystallography, genesis of minerals, identification and classification of minerals, and optical mineralogy. Includes lab work. Odd year, Fall.
Prerequisite: GEOL 1303/GEOL 1103 or GEOL 1403 or GEOL 1305/GEOL1105 or GEOL 1405 and GEOL 1304/GEOL 1104 or GEOL 1404 and CHEM 1311/CHEM 1111 or CHEM 1411 and CHEM 1312/CHEM 1112 or CHEM 1412 and MATH 1316 or MATH 1410.

GEOL 3405. Petrology. 4 Hours.
The classification, origin, occurrence and associations of igneous, sedimentary, and metamorphic rocks. Includes optical petrology using thin sections. Spring.
Prerequisite: GEOL 3404.

GEOL 3415. Paleontology of Invertebrates. 4 Hours.
The focus of this course will be the fundamental concepts, principles, and methods involved in deciphering the origin, development, and extinction of past life as revealed through the study of invertebrate fossils.
Prerequisite: GEOL 1404.

GEOL 4095. Special Topics in Geology. 1-3 Hours.
Individual study in special areas of geology. Topic content will usually be selected and agreed upon by the student and a member of the Geology faculty. Sometimes special topics courses will be offered by the Geology faculty. This course may be taken for Academic Distinction credit. See Academic Distinction Program in this catalog. Fall, Spring, Summer. Variable Credit (1-3). May be repeated for credit.
Prerequisite: Prerequisites and credit will be determined by the faculty member.

GEOL 4304. Geochemistry. 3 Hours.
A general introduction to all types of geochemistry that includes a discussion of the underlying chemical concepts, with an emphasis on the applications to geological environments. The chemical concepts include isotopic chemistry, thermodynamics, crystal chemistry, and aqueous solutions. The geological metasomatism, geothermobarometry, and environmental geochemistry. Even year Fall.
Prerequisite: GEOL 1305, GEOL 1105 or GEOL 1303, GEOL 1103 plus CHEM 1311, CHEM 1111.

GEOL 4312. Economic Geology. 3 Hours.
This course is concerned with the origin and occurrence of economically important minerals. A portion of the course is devoted to petroleum. W Odd year Spring.
Prerequisite: GEOL 1403 or GEOL 1405 plus GEOL 1404.

GEOL 4320. Petroleum Geology. 3 Hours.
This course reviews the origin and development of petroleum and natural gas deposits, and surveys the various tools used to prospect for commercial deposits of oil and natural gas.
Prerequisite: GEOL 1304, GEOL 1104 and GEOL 1303, GEOL 1103 or GEOL 1305, GEOL 1105.

GEOL 4331. Geology Of North America. 3 Hours.
A study of the geologic history of the continent of North America. Topics include paleogeography, major depositional areas and stratigraphic units, and paleotectonics. Even year Spring.
Prerequisite: GEOL 1303/GEOL 1103 or GEOL 1403 or GEOL 1305/1105 or GEOL 1405 and GEOL 1304/GEOL 1104 or GEOL 1404.

GEOL 4337. Plate Tectonics. 3 Hours.
An introduction to the movement of lithospheric plates. Topics to be covered include earthquakes, volcanism, seismic tomography, the evolution of continents and ocean basins, and the influence of the earth?s interior on these processes. Lecture only. Odd year Fall.
Prerequisite: GEOL 1303/1103 or GEOL 1403 or GEOL 1305/1105 or GEOL 1405 and GEOL 1304/1104 or GEOL 1404.

GEOL 4360. Field Geology. 3 Hours.
These courses will consist of on-site studies in structure, stratigraphy, petrology and paleontology. Field trips will be taken to appropriate areas in Texas and/or surrounding states. Writing enhanced. T
Prerequisite: Senior standing.

GEOL 4361. Field Geology. 3 Hours.
These courses will consist of on-site studies in structure, stratigraphy, petrology and paleontology. Field trips will be taken to appropriate areas in Texas and/or surrounding states. Writing enhanced. T
Prerequisite: Senior standing.

GEOL 4400. Stratigraphy And Sedimentation. 4 Hours.
A study of the principles and methods used in describing, classifying and correlating strata. Includes studies of modern and ancient depositional environments. Lab/field work included. Odd year Spring.
Prerequisite: GEOL 1304/GEOL 1104 or GEOL 1404 and GEOL 1303/GEOL 1103 or GEOL 1403 or GEOL 1305/GEOL 1105 or GEOL 1405.

GEOL 4402. Structural Geology. 4 Hours.
This course covers the principles of deformation of the Earth?s lithosphere, with emphasis on mechanical principles, identification and interpretation of structures from the microscopic scale to the scale of mountain belts. Other topics include regional tectonics and application in petroleum exploration. Lab work will focus on graphical and quantitative techniques of analyzing geologic structures. Odd year Spring.
Prerequisite: GEOL 1303, GEOL 1103, PHYS 1301, PHYS 1102, MATH 1316.

GEOL 4413. Methods In Applied Geophysics. 4 Hours.
Applied Geophysics involves measurements made on the surface of the Earth that are interpreted to yield the distribution of subsurface properties, particularly those having economic and engineering importance. This course provides an introduction to the latest methods used to map the distribution of physical properties beneath the surface of the Earth, and is widely recommended for students who plan to pursue careers that directly or indirectly involve subsurface imaging and analysis. Odd year Fall.
Prerequisite: GEOL 1305, GEOL 1105 or GEOL 1303, GEOL 1103, MATH 1420, PHYS 1301, PHYS 1101, PHYS 1302, PHYS 1102, or by permission of instructor.

GEOL 4414. Sea Level Chng & Geolgl Record. 4 Hours.
This course will examine the various modern causes of relative and absolute sea level change. The course also will involve the analysis of ancient geological sedimentary and stratigraphic records from the perspective of what they reveal about rates and scales of sea level change in the past, as well as implications for the future. Sequence stratigraphic concepts (commonly used in the petroleum industry) will be critically examined via field-based, and paper and core-based studies. Even year Spring.
Prerequisite: GEOL 1305, GEOL 1105 or GEOL 1303, GEOL1103 and GEOL 1304, or permission of instructor.

GEOL 4426. Hydrogeology. 4 Hours.
An introduction to the study of groundwater and its role in the hydrologic cycle. Topics include properties and distribution of water on the surface, in the vadose zone and in aquifers; behavior, modeling, and geology of groundwater aquifers; human use and abuse of water resources, including groundwater contamination and extraction; and water law economics, and aquatic ecology. A lab with field trips will focus on measurement and modeling of groundwater.
Prerequisite: GEOL 1303, GEOL 1103, MATH 1316.