GEOL - Geology

Courses

GEOL 101 Principles of Geology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(GEOL 1103 and 1303, 1403*) Principles of Geology. Physical and chemical nature of the Earth and dynamic processes that shape it; plate tectonics, Earth's interior, materials it is made of, age and evolution, earthquakes, volcanism, erosion and deposition; introduces physical and chemical principles applied to the Earth. Not open to students who have taken GEOL 103 or GEOL 104.

GEOL 104 Physical Geology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Earth materials, structures, external and internal characteristics; physical processes at work upon or within the planet. A working knowledge of high school chemistry and mathematics is required.

GEOL 106 Historical Geology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(GEOL 1104 and 1304, 1404*) Historical Geology. Hypotheses of Earth's origin; age dating of geologic materials; development and history of life; plate tectonic reconstructions, geologic history, and paleogeography, with emphasis on the North American plate.
Prerequisite: GEOL 101 or equivalent.

GEOL 108 Dinosaur Life and Times
Credit 1. 1 Lecture Hour.
Dinosaur paleobiology and paleoecology; terrestrial paleoclimate and paleoenvironments of the Mesozoic; dinosaur ancestors; appearance and radiation of dinosaurs; paleoecology and paleobiology of major dinosaur groups; extinction of large dinosaurs and the Cretaceous-Paleogene mass extinction; the appearance and ancestry of birds. Not open to students who have taken GEOL 307.

GEOL 203 Mineralogy
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Crystallography, crystal chemistry, mineral chemistry, optical crystallography, physical properties, and geologic occurrence of rock-forming and economic minerals.
Prerequisites: GEOL 101, GEOL 104 or GEOL 320; CHEM 101; MATH 131 or MATH 151 or approval of instructor.

GEOL 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed studies in specific problem areas of geology.
Prerequisite: Approval of instructor.

GEOL 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of a faculty member in geology. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Freshman or sophomore classification and approval of instructor.

GEOL 300 Field Geology
Credits 6. 6 Other Hours.
Basic concepts of field relationships and field techniques are used to develop geologic maps, stratigraphic columns, cross-sections and geologic interpretations for a variety of geologic provinces. Course conducted off-campus in a field camp for six weeks.
Prerequisites: GEOL 302, GEOL 306, GEOL 309, GEOL 312 or approval of instructor.*

GEOL 301 Mineral Resources
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Origin, geologic relations and geographic distribution of mineral and energy resources; mineral economics, mining and reclamation and global economics in the resource industry; identification and classification of economic minerals including energy resources, base and precious metals, chemical industrial minerals and gemstones.
Prerequisites: GEOL 101 or GEOL 320; CHEM 106 or higher.*

GEOL 302 Introduction to Petrology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to the origin and evolution of igneous, sedimentary, and metamorphic rocks; classification and petrographic analysis of major rock types; relationships to tectonic settings.
Prerequisites: GEOL 104 and GEOL 203 or approval of instructor.

GEOL 304 Igneous and Metamorphic Petrology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Origin, identification and classification of igneous and metamorphic rocks; genetic processes inferred from laboratory studies and field occurrences.
Prerequisites: GEOL 302 and GEOL 309 or approval of instructor.*

GEOL 305 Paleobiology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles of paleobiology; study of organisms important in the marine fossil record; application of paleontology to geologic problems.
Prerequisite: GEOL 106 or approval of instructor.

GEOL 306 Sedimentology and Stratigraphy
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Origin of sediments and sedimentary rocks; climate, weathering, and weathering products; transport, deposition, and depositional environments for sediments; field and laboratory studies in description and interpretation of genesis of sedimentary rocks; principles of stratigraphy and basin analysis; plate tectonics and the formation of sedimentary basins; stratigraphic nomenclature; geologic time and correlation; sequence stratigraphy and basin architecture.
Prerequisite: GEOL 101 or GEOL 104 or approval of instructor.*

GEOL 308 Integrated Earth Science
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Integrated processes shaping Earth's crust, continents, ocean basins, atmosphere and biosphere; place of Earth in the universe; relationship between Earth and human society; related fundamental physical and biological science principles and processes within an integrated Earth science context. Not an elective for students pursuing degrees for careers as professional geologists.
Prerequisite: GEOL 101 or GEOG 203.*
GEOL 309 Introduction to Geological Field Methods  
Credits 3. 1 Lecture Hour. 6 Lab Hours.  
Geological mapping methods, field observation procedures and data gathering and recording; use of Brunton compass; pace-and-compass mapping; topographic map use and interpretation; measurement of structural elements; interpretation of geologic map patterns; measurement of stratigraphic sections; construction of geologic cross sections; six day geologic mapping project during either spring break or two three-day weekends.  
Prerequisites: GEOL 101 or GEOL 104; GEOL 106.*

GEOL 310 Planetary Geology  
Credits 3. 3 Lecture Hours.  
Introduction to planetary science; organization and composition of the solar system, including the planets, satellites and asteroids; surface features and internal structures of the terrestrial planets and moons; the dynamic processes of planetary resurfacing, including volcanism, tectonism, weathering and impacts; the history and future of solar system exploration.  
Prerequisites: GEOL 101 or 104; junior or senior classification or approval of instructor.

GEOL 311 Principles of Geological Writing  
Credit 1. 1 Lecture Hour.  
Principles of writing for geological reports; format and style for abstracts, grant proposals, journal manuscripts and industry reports; evaluating written reports for revision and editing; using proper referencing and citation style; methods of maintaining clarity in documents; using web tools for geological communication.

GEOL 312 Structural Geology and Tectonics  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Interpretation of rock structures; their relation to stratigraphic, physiographic and economic problems; regional tectonics of several selected areas.  
Prerequisites: GEOL 101, GEOL 104 or GEOL 320; approval of instructor.*

GEOL 316 Team Research in Geology and Geophysics  
Credits 3. 0 Lecture Hours. 9 Lab Hours.  
Team-based research in geology and geophysics; hypothesis development, data collection, data interpretation; communication of geological/geophysical interpretations and data. May be taken four times for credit.  
Prerequisites: GEOL 203 or concurrent enrollment and approval of instructor.

GEOL 320 Geology for Civil Engineers  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Principles of physical and engineering geology; properties of minerals, rocks and soils; active surface and subsurface processes; applications to the siting, design, construction, operation and maintenance of engineered works and the protection of the environment. A three-day field trip is required (a field trip fee is charged at registration).  
Prerequisite: Sophomore classification.*

GEOL 330 Geologic Field Trips  
Credits 1 to 3. 1 to 3 Other Hours.  
Field trips to observe, analyze and interpret the geology and geophysics of selected localities in Texas and adjacent regions; complements classroom experience. Trip frequencies, duration, dates and study localities vary with semester.  
Prerequisite: GEOL 101 or GEOL 104 or approval of instructor. May be repeated for credit.*

GEOL 352/GEOG 352 GNSS in the Geosciences  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Fundamentals of Global Navigation Satellite Systems (GNSS); basic geodesy, figure of the earth; frames of reference, map projection, datums, ellipsoids; GPS accuracy and precision; applications in earth resource mapping and database creation; elementary GPS phase data processing.  
Prerequisites: Junior or senior classification; approval of instructor.  
Cross Listing: GEOG 352/GEOL 352.

GEOL 400 Reservoir Description  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
An integrated reservoir characterization and design experience for seniors in petroleum engineering, geology and geophysics; includes using geophysical, geological, petrophysical and engineering data; emphasis on reservoir description (reservoir and well data analysis and interpretation), reservoir modeling (simulation), reservoir management (production optimization) and economic analysis (property evaluation).  
Prerequisite: Junior or senior classification or approval of instructor.

GEOL 404 Geology of Petroleum  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Origin, migration and accumulation of petroleum; typical U.S. oil and gas fluids; laboratory work in subsurface geology.  
Prerequisites: GEOL 312; senior classification in geology.

GEOL 410 Hydrogeology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Geologic conditions determining the distribution and movement of ground water and their effect on the hydrologic properties of aquifers.  
Prerequisite: Junior or senior classification or approval of instructor.

GEOL 411 Principles of Geological Writing  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Techniques for building, solving and analyzing numerical models applied to a wide variety of problems in geology, geochemistry, geobiology and geophysics; derivation and scaling of conservation laws; finite difference and finite element techniques; programming in MATLAB or a higher-level language.  
Prerequisites: MATH 151; MATH 152; junior or senior classification.
GEOL 484 Internship  
Credits 0.0 Other Hours.  
Directed internship in a private firm, government agency or non-governmental organization to provide work experience related to the student's degree program and career objectives. May be taken two times.  
Prerequisites: Junior or senior classification and approval of internship agency and approval of instructor.

GEOL 485 Directed Studies  
Credits 1.0 to 12.0 Other Hours.  
Advanced problems in geology.

GEOL 489 Special Topics in...  
Credits 1.0 to 4.0 Lecture Hours. 0.0 to 4.0 Lab Hours.  
Selected topics in an identified area of geology. May be repeated for credit.  
Prerequisite: Approval of instructor.

GEOL 491 Research  
Credits 0.0 to 4.0 Other Hours.  
Research conducted under the direction of faculty member in geology. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.