

Geology and Geophysics Department Course Offerings

GEOL 1001 General Geology: Physical (3)

[LCCN: CGEO 1103, Physical Geology] This is a General Education course. An honors course, GEOL 1002, is also available. Credit will not be given for both this course and GEOL 1002 or GEOL 1111. Earth materials and land forms; processes at work on and within the earth.

GEOL 1002 HONORS: General Geology: Physical (3)

This is a General Education course. Same as GEOL 1001, with special honors emphasis for qualified students. Credit will not be given for both this course and GEOL 1001 or GEOL 1111.

GEOL 1003 General Geology: Historical (3)

[LCCN: CGEO 1113, Historical Geology] This is a General Education course. An honors course, GEOL 1004, is also available. Prereq.: GEOL 1001 or GEOL 1111. Credit will not be given for this course and GEOL 1004. History of the earth and life on it, as deciphered from study of its rocks and fossils.

GEOL 1004 HONORS: General Geology: Historical (3)

This is a General Education course. Same as GEOL 1003, with special honors emphasis for qualified students. Credit will not be given for this course and GEOL 1003.

GEOL 1201 Principles of Geology I (4)

Prereq.: Credit or registration in MATH 1021, MATH 1022, MATH 1023, MATH 1550, or MATH 1551. Credit will not be given for this course and for GEOL 1001 and GEOL 1601 or GEOL 1002 and GEOL 1601. 3 hrs. lecture, 3 hrs. lab. For Geology majors and minors. Principles of physical geology with a focus on plate tectonics and on applying the mathematics to solve geologic problems.

GEOL 1202 Principles of Geology II (4)

Prereq.: GEOL 1001 and GEOL 1601 or GEOL 1201 and credit or registration in MATH 1022, MATH 1023, MATH 1550 or MATH 1551. Credit will not be given for this course and GEOL 1003 and GEOL 1602 or GEOL 1004 and GEOL 1602. 3 hrs. lecture, 3 hrs. lab. For geology majors and minors. Principles of and techniques used in reconstructing Earth's history.

GEOL 1111 Geology of National Park Areas (3)

Credit will not be given for this course and either GEOL 1001 or GEOL 1002. Geological study of areas supervised by the National Park Service. Areas covered will include most of the National Parks and Monuments, and many other federally owned lands.

GEOL 1601 Physical Geology Laboratory (1)

[LCCN: CGEO 1101, Physical Geology Lab] Prereq.: credit or concurrent enrollment in GEOL 1001. Lab related to GEOL 1001. Properties of minerals and rocks; practical application of geological principles, using topographic and geological maps; geological factors relating to energy exploration and environmental problems, with emphasis on south Louisiana.

GEOL 1602 Historical Geology Laboratory (1)

[LCCN: CGEO 1111, Historical Geology Lab] Prereq.: GEOL 1601; credit or concurrent enrollment in GEOL 1003. Lab related to GEOL 1003. Sedimentary rocks and environments, geobiological sequences, fossils and the historical geological record as interpreted from maps.

GEOL 2001 The Earth as a Planetary System (3)

Prereq.: Credit or registration in GEOL 1202 or GEOL 1602 or permission of department. Introduction to the ways of the earth functions as an integrated system through quantitative exploration of the solid earth interactions with the atmosphere, the ocean, and the biosphere.

GEOL 2020 Geology and the Environment (3)

This is a General Education course. Prereq.: GEOL 1001 or GEOL 1111.

Interaction between human activities and geological processes, hazards and materials; emphasis on environmental geology of Louisiana and the Gulf Coast region.

GEOL 2081 Mineralogy (4)

Prereq.: GEOL 1201 and credit or registration in CHEM 1202 or consent of instructor. Credit will not be given for this course and GEOL 3200. 3 hrs. lecture; 3 hrs. lab. Elementary crystallography; mineral identification; general chemical and physical properties of minerals; environments of minerals.

GEOL 2900 Introduction to Research in Geosciences (2)

Prereq.: GEOL 1201 or GEOL 1601 or permission of department. 1 hr. lecture; 2 hrs. lab. Introduction to the breadth of professional and research opportunities within geosciences.

GEOL 3032 Introduction to Sedimentology and Depositional Environments (4)

Prereq.: GEOL 1202; GEOL 2081 or consent of instructor. Credit will not be given for this course and GEOL 3200. One field trip and one field exercise in nearby area. 3 hrs. lecture; 3 hrs. lab. Sediment types, textures, sedimentary structures and major minerals used to understand sedimentary processes leading to different depositional environments.

GEOL 3041 Igneous and Metamorphic Petrology (4)

Prereq.: GEOL 2081. Credit will not be given for this course and GEOL 3200. 3 hrs. lecture; 3 hrs. lab. Classification, theoretical background and tectonic processes related to development of igneous and metamorphic rocks; and optical petrographic methods.

GEOL 3061 Evolution of the Biosphere (4)

Prereq.: GEOL 1202; GEOL 2081; BIOL 1201. One or two field trips required. 3 hrs. lecture; 3 hrs. lab. Characteristics and geologic history of selected taxa with significant fossil records; use of paleontologic data (paleobiologic, paleoenvironmental, geochemical and biostratigraphic) in geology and evolutionary studies; influence of the biosphere on Earth over geologic time.

GEOL 3071 Structural Geology (4)

Prereq.: GEOL 1202; credit in PHYS 2001 or PHYS 2110 or PHYS 1201 and MATH 1550. 2 hrs. lecture; 3 hrs. lab and a one week field-based project. Geometric, kinematic and dynamic analysis of geologic structures and structural systems resulting from deformation; introduction to tectonics; introduction to field techniques and geologic maps; generation of geologic maps and cross-sections.

GEOL 3200 Earth Materials for Petroleum Engineers (3)

Prereq.: GEOL 1001 and GEOL 1601, or GEOL 1002 and GEOL 1601, or GEOL 1201. Credit will not be given for this course and GEOL 2081 or GEOL 3032 or GEOL 3041. May not be taken by geology majors for credit. Introduction to the classification, occurrence and origin of rocks and rock forming minerals.

GEOL 3666 Field Geology (6)

Offered in Su Prereq.: GEOL 3032, GEOL 3041, GEOL 3061 and GEOL 3071 or equivalent with grades of C or better in all prerequisite courses. Students planning to take this course should apply to the camp director no later than March 15. Camp and trip fees. Six weeks of field-based projects in the Rocky Mountains of Colorado, New Mexico and Wyoming; fundamentals of the study of rocks and geologic features in their natural settings.

GEOL 3909 Geological Research (1-3)

Prereq.: Permission of Department required. May be repeated for a max. of 9 sem. hrs. of credit. Provides opportunities for individual research experiences under the direction of faculty. The Department's expectation is that the course provides meaningful research experiences that will enhance student learning and preparation for advanced training and not be limited to day-to-day laboratory tasks.

GEOL 3999 Undergraduate Thesis in Geology (3)

Prereq.: GEOL 3909; consent of department. Pass-fail grading. Defense committee of three faculty members must be approved by the department. Individual research on problems in the geological sciences. Includes writing, public presentation and defense of a research thesis.

GEOL 4002 Special Topics in Geology and Geophysics (3)

Prereq.: senior standing in geology or consent of instructor. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Advanced and/or emerging topics in the geosciences.

GEOL 4012 Introduction to Micropaleontology (3)

Prereq.: GEOL 3061 or equivalent. 2 hrs. lecture; 3 hrs. lab. Morphology, classification, stratigraphy, paleoecology and evolutionary patterns of common marine microfossils.

GEOL 4019 Geoarchaeology (4)

Also offered as ANTH 4019. Prereq.: GEOL 1001 or GEOL 1201 or ANTH 2015 or GEOG 2051 or permission of instructor. 3 hrs. lecture plus equivalent of 3 hrs of lab per week devoted to an applied fieldwork problem. Geological, stratigraphical, geochemical and geophysical techniques employed in the study of archaeological sites and materials.

GEOL 4020 Principles of Environmental Geochemistry (3)

Prereq.: GEOL 2081 and MATH 1550. Principles of equilibrium and kinetics of chemical reactions and the application of those principles to the natural environment with an emphasis on the chemistry of natural waters and environmental geochemistry.

GEOL 4023 Coastal and Shallow-Marine Depositional Systems (3)

Also offered as GEOG 4023. Dynamics of sediment transport in coastal zones and on continental shelves; sea-level changes; morphological, sedimentary and stratigraphic attributes of coastal and shallow-marine lithosomes.

GEOG 4025 Fluvial Geomorphology (3)

Also offered as GEOL 4025. Prereq.: GEOG 2051, or permission of department. Physical processes and landforms associated with river systems.

GEOL 4043 Earth Materials and the Environment (3)

Prereq.: CHEM 1202, GEOL 2081 or permission of instructor. Earth materials as problems and solutions in environmental issues; physiochemical behavior of asbestiform silicates, silica, zeolites and associated health hazards; potential geological repositories for hazardous waste.

GEOL 4044 Petroleum Geology (3)

Prereq.: GEOL 3032 or GEOL 3200 or permission of instructor.

Modern concepts of the origin, migration, entrapment and production of hydrocarbons from sedimentary basins.

GEOL 4045 Stratigraphy (3)

Prereq.: GEOL 3032 or permission of instructor. The succession and age relationships of rock strata including their form, lithologic components, fossil content, geophysical and geochemical properties and their interpretation in terms of environment, mode of origin and geologic history.

GEOL 4051 Computer Programming and Data Analysis in Earth Sciences (3)

Prereq.: MATH 1552 and GEOL 2081, or permission of instructor. 2 hrs. lecture; 2 hrs. lab. Computer programming and application of data analysis principles to problems in Earth Sciences.

GEOL 4060 Solid Earth Geophysics (3)

Prereq.: GEOL 3071 or currently enrolled. Principles and methods of geophysics applied to investigate the structures and dynamic processes of the solid earth system. Emphasis on tectonic plate motions, geomagnetism, global seismology, gravity, and isostasy.

GEOL 4062 Exploration and Environmental Geophysics (3)

Prereq.: GEOL 3071 and MATH 1552 or permission of instructor. 2 hrs. lecture; 3 hrs. lab. Principles and methods of acquisition, processing and interpretation of geophysical data used to investigate the shallow subsurface; seismic refraction, seismic reflection, gravity, magnetics, electrical resistivity, well logs and ground penetrating radar.

GEOL 4066 Plate Tectonics (3)

Prereq.: GEOL 3071. Contemporary concepts of plate tectonics; geophysical observations and geological implications.

GEOL 4068 Reflection Seismology (3)

Prereq.: MATH 1550 and PHYS 1202 or PHYS 2113 or PHYS 2002 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Seismic reflection techniques used to investigate shallow earth structure; waves in layered media, correlation, convolution, deconvolution and spectral analysis; interpretation of seismic record sections.

GEOL 4081 Chemical Oceanography (3)

Also offered as OCS 4126. Prereq.: consent of instructor. 3 hrs. lecture/seminar. Controls on the mass balance and distribution of major elements, trace elements, heavy metals, dissolved gases and nutrients in estuarine and open-ocean systems.

GEOL 4084 Geomicrobiology (3)

Also offered as BIOL 4084. Prereq.: GEOL 3032 or BIOL 2051 or consent of instructor. Microbial effects and controls on geologic, geochemical and ecological processes; biochemical tracers and fossils of microbially mediated processes through time; introduction to biogeochemical processes.

GEOL 4085 Geochemistry of Sediments and Natural Waters (3)

Prereq.: GEOL 2081 and MATH 1550. Controls on the composition of natural waters and the role of fluid-rock interactions in the geochemical evolution of sedimentary rocks, the ocean and the atmosphere; major geochemical cycles.

GEOL 4107 Introduction to Seismology (3)

Prereq.: PHYS 1201, PHYS 2001, or PHYS 2110, MATH 1550 or MATH 1551, and GEOL 3071 or permission of the instructor. Introduction and overview of seismology, seismological concepts, intellectual frameworks, and investigation techniques; Studying seismic sources and earth structures using seismograms; Characterization and interpretation of seismograms.

GEOL 4111 Vertebrate Paleontology (3)

Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Phylogenetic survey of fossil vertebrates; their origins and transitions; vertebrate taphonomy, biostratigraphy and fossil collection and preparation.

GEOL 4131 Basin Analysis (3)

Prereq.: GEOL 3071 and GEOL 3032 or GEOL 3200 or permission of instructor. Basic environment of sediment deposition; sedimentological models and their relationships within depositional basins; analysis of theoretical basin models and comparison with modern and ancient sedimentary basins.

GEOL 4150 Hydrology & Hydrogeology (4)

Prereq.: GEOL 3032 and MATH 1552. Students will be required to participate in weekend field trip(s). 3 hrs. lecture, 1 hr. recitation. Contemporary concepts of surface and groundwater flow including contaminant transport, aquifer tests, and Darcy's law.

GEOL 4164 Deltaic Geology (3)

Also offered as GEOG 4164. Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Processes of deltaic sedimentation and the nature of deltaic sediments; Mississippi River delta compared to other modern and ancient deltas.

GEOL 4165 Subsurface Geology (3)

Prereq.: GEOL 3032 or GEOL 3071 or GEOL 3200 or PETE 3036.

2 hrs. lecture; 3 hrs. lab. Principles and methods of exploration, analysis and interpretation using borehole data, electric logs and samples of rocks and fluids; construction of geological maps and sections showing sediment facies, geological structure, geotemperature, fluid pressure and water salinity; analysis of fluid migration, oil and gas accumulation and geothermal resources.

GEOL 4182 Physical Hydrogeology (3)

Prereq.: grade of "C" or better in GEOL 3032, GEOL 3071, and MATH 1552 or permission of instructor. Subsurface fluid flow in geological materials; emphasis on geological controls of the origin and migration of pore water, including saline brines, in sedimentary basins; topics including crustal scale flow, petroleum migration, ore formation and subsurface flow regimes in Louisiana

GEOL 6001 Topics in Earth Sciences for Teachers (3)

Offered in Su May be taken for a max. of 9 sem. hrs. when topics vary. Consent of instructor is required for the second and third times. Various aspects of the earth sciences for elementary, middle and high school teachers of science.

GEOL 7044 Advanced Metamorphic Petrology (3)

Prereq.: GEOL 3041 or equivalent. 2 hrs. lecture; 3 hrs. lab. Facies concept, theoretical and field relations, textures and their significance.

GEOL 7061 Sequence Stratigraphy (3)

Prereq.: introductory course in sedimentology, GEOL 3032 or equivalent. One week field trip to the southern Rocky Mountains is required. Principles of physical stratigraphy with emphasis on contemporary concepts about the interaction of tectonics, sea level and sediment supply in generating a predictable architecture of sedimentary basin fills.

GEOL 7062 Seismic Stratigraphy (3)

Prereq.: GEOL 3071 or equivalent. Interpretation of seismic reflection data in terms of sedimentary facies, stratigraphic sequences and implications for local and eustatic sea-level fluctuations.

GEOL 7081 Isotope Geochemistry (3)

Prereq.: consent of instructor. Stable isotope fractionation in natural systems; emphasis on oxygen, hydrogen, and carbon isotope-ratio variation in natural waters, carbonates and silicates with application to the solution of petrologic problems.

GEOL 7107 Petroleum Seismology (3)

Prereq.: Permission of instructor. Fundamentals of mathematical physics, seismology, and signal theory used to understand resources, including petroleum, geological processes, and structure in the earth.

GEOL 7115 Paleoecology (3)

Prereq.: GEOL 3061 and GEOL 3032. 2 hrs. lecture; 2 hrs. lab; field trip. Diversity, structure, taphonomy and evolution of fossil and modern marine assemblages; adaptations and functional morphology; organism-sediment relationships.

GEOL 7130 Permian Basin (3)

Prereq.: Permission of instructor. 2 hrs. lecture per week; equivalent of 2 hrs. lab per week devoted to a required four-day field trip. An in-depth study of the Permian Basin including biostratigraphy, sequence stratigraphy, oil and gas production, and includes a required four-day field trip.

GEOL 7132 Dynamics of Sedimentation (3)

2 hrs. lecture; 3 hrs. lab. Fluid mechanics as applied to sedimentation, fluid-particle interactions, erosion, mechanics of sediment transport including fluid and sediment flows, deposition and the origin of primary structures, and hydrodynamic instability and soft-sediment deformation.

GEOL 7133 Sedimentary Petrography of Carbonates (3)

2 hrs. lecture; 3 hrs. lab. Principles governing formation, deposition and diagenesis of carbonate sediments and sedimentary rocks; lab stresses textural, fabric and mineral relationship and interpretation of depositional environments and mineral paragenesis of ancient carbonate sequences.

GEOL 7134 Clay Mineralogy (3)

2 hrs. lecture; 3 hrs. lab/discussion. Mineralogy; geochemistry and geology of clay minerals; argillaceous sediments and rocks.

GEOL 7194 Oil and Gas Exploration (3)

Prereq.: Graduate standing in Geology & Geophysics and permission of instructor. 1 hrs. lecture; 4 hrs. lab. Focus on oil and gas exploration techniques, such as paleogeographic reconstructions, understanding of the regional geological setting, interpretation of seismic data and well-log data, basin modeling incorporating thermal history, determining critical moments, and an assessment of exploration risks.

GEOL 7195 Reservoir Characterization (3)

Also offered as PETE 7195. Prereq.: GEOL 4182 or PETE 4051 or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Origin, description, exploration and development of oil and gas reservoirs; topics include accommodation space, reservoir occurrence, origin of petroleum, oil and gas properties, rock properties, drilling, exploration and appraisal, reservoir flow modeling and production engineering; emphasis on integration of geology, geophysics and petroleum engineering.

GEOL 7200 Scientific Communication and Visualization (3)

Methods for written, oral and visual communication with an emphasis on scientific approaches, analysis and presentation of scientific quantitative information.

GEOL 7900 Special Topics in Geology and Geophysics (3)

May be taken for a max. of 12 sem. hrs. of credit when topics vary. Advanced and/or emerging topics in geology and geophysics.

GEOL 7909 Directed Research in Geology and Geophysics (1-6)

May be taken for a max. of 6 sem. hrs. of credit when topics vary. General student-selected research topics and focused group research, including all topics in geology and geophysics.

GEOL 7911 Seminar in Geology: Paleontology (2)

May be repeated for credit.

GEOL 7921 Departmental Seminar in Geology and Geophysics (1)

Presentations on specialized subjects of current interest in geological sciences.

GEOL 7931 Seminar in Geology: Sedimentology (2)

May be repeated for credit. Fall semester: carbonate sedimentology; spring semester: clastic sedimentology and sedimentary environments.

GEOL 7941 Seminar in Geology: Igneous and Metamorphic Petrology (2)

May be repeated for credit.

GEOG 7943 Paleoclimatology (3)

Also offered as ANTH 7943 and GEOL 7943. Prereq.: GEOG 2050 and GEOG 2051 or GEOL 1001 and GEOL 1003 or consent of instructor. Theory and methods of reconstructing climatic variability from biological and geological proxy records as well as historical archives.

GEOL 7961 Seminar in Geology: Structural Geology (2)

May be repeated for credit.

GEOL 7966 Field Work (1-9)

Field work and field trips mandatory. Collection of field data, including samples of ice, rock, water, sediment from remote location(s), generation of field maps, in association with required research projects.

GEOL 7971 Seminar in Tectonics (3)

May be taken for a max. of 9 sem. hrs. of credit when topics vary. Plate tectonics, diapirism, isostasy and the tectonics of specific areas.

GEOL 7972 Seminar in Geophysics (3)

May be taken for a max. of 9 sem. hrs. of credit when topics vary. Structure and composition of the mantle; physical processes at ridges, trenches and transform faults; dynamics of plate interiors; intraplate stress; and thermal histories of the earth and other terrestrial planets; physics of rock magnetism; and hydrodynamics of sedimentary basins.

GEOL 7981 Seminar in Geochemistry (2)

Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit. Mineralogy, paragenesis, geochemistry and natural occurrence of authigenic silica in sediments; other topics such as hydro geochemistry, isotope geochemistry and the geochemistry of carbonates.

GEOL 8000 Thesis Research (1-12 per sem.)

“S”/“U” grading.

GEOL 9000 Dissertation Research (1-12 per sem.)

“S”/“U” grading.