General education courses are marked with stars (★).

★ 1001 General Geology: Physical (3) An honors course, GEOL 1002, is also available. Earth materials and land forms; processes at work on and within the earth.

★ 1002 HONORS: General Geology: Physical (3) Same as GEOL 1001, with special honors emphasis for qualified students.

★ 1003 General Geology: Historical (3) Prereq.: GEOL 1001. An honors course, GEOL 1004, is also available. History of the earth and life on it, as deciphered from study of its rocks and fossils.

★ 1004 HONORS: General Geology: Historical (3) Same as GEOL 1003, with special honors emphasis for qualified students.

★ 1066 Dinosaurs, Catastrophes, and Extinctions (3) Not for major credit for geology majors. History of dinosaur discoveries and methods of study; dinosaurs' relationship to birds and mammals; place of dinosaurs in earth's geological history; emphasis on catastrophes and patterns of extinction.

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.

★ 1601 Physical Geology Laboratory (1) 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.

★ 1602 Historical Geology Laboratory (1) Prereq.: GEOL 1601; credit or concurrent enrollment in GEOL 1001. Lab related to GEOL 1003. Sedimentary rocks and environments, geobiological sequences, fossils, and the historical geological record as interpreted from maps.

2020 Geology and the Environment (3) S Prereq.: GEOL 1001. Interaction between human activities and geological processes, hazards, and materials; emphasis on environmental geology of Louisiana and the Gulf Coast region.

2066 Continents Adrift and Global Tectonics (3) S Prereq.: GEOL 1001. Fundamental concepts of plate tectonics; implications for the evolution of continents and ocean basins; observational evidence for continental drift; historical development of plate tectonics as a scientific hypothesis.

2071 Structural Geography (4) Prereq.: GEOL 1003, 1602; credit in MATH 1550. 2 hrs. lecture; 6 hrs. lab. Description, classification, and interpretation of structures; introduction to tectonics.

2081 Mineralogy (3) Prereq.: CHEM 1201, 1202, and 1212; 2 hrs. lecture; 3 hrs. lab. Elementary crystallography; general chemical and physical properties of minerals.

2082 Petrography (3) Prereq.: GEOL 2081. 2 hrs. lecture, 3 hrs. lab. Optical mineralogy, phase diagrams, and rock forming minerals.

3011 Introduction to Paleontology (4) Prereq.: GEOL 1003, 1602; CHEM 1202, 1212; BIOL 1201. 3 hrs. lecture, 3 hrs. lab. One to two field trips required. Characteristics of modern/fossil animal groups, and biological and geological systems that produced them; systematics, evolution, taxonomy, and paleoecology.

3032 Introduction to Sedimentology and Depositional Environments (3) Prereq.: GEOL 1001, 1003, 1601, or equivalent; concurrent registration in GEOL 2082; or consent of instructor. 2 hrs. lecture, 2 hrs. lab. One field trip and one field exercise in nearby area. Sediment types, textures, sedimentary structures, and major minerals used to understand sedimentary processes leading to different depositional environments.

3041 Igneous and Metamorphic Petrology (3) Prereq.: GEOL 2082. 2 hrs. lecture; 3 hrs. lab. Composition, textures, structures, distribution, and origin of igneous and metamorphic rocks.

3066 Field Geology (6) Su only Prereq.: GEOL 2071 and 2082; or equivalent. Students planning to take this course should apply to the camp director no later than Feb. 15. Camp fees. Six weeks in the Front Range of Colorado and adjacent mountainous areas.

3909 Geological Research (1-3) F,S,Su Prereq.: GEOL 2082 and credit or enrollment in GEOL 3041. Advanced and/or emerging topics in the geosciences.

4002 Special Topics in Geology and Geophysics (3) V 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.

4012 Introduction to Micropaleontology (3) F Prereq.: GEOL 3011 or equivalent. 2 hrs. lecture; 3 hrs. lab. Morphology, classification, stratigraphy, paleoecology, and evolutionary patterns of common marine microfossils; emphasis on foraminifera.

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.

4031 Introductory Sedimentation (3) Prereq.: GEOL 1003, 1602. 2 hrs. lecture; 2 hrs. lab. Mineralogy, texture, structures, and stratigraphy of sediments and sedimentary rocks; their origin through weathering, erosion, transportation, deposition, and diagenesis.

4035 Advanced Sedimentology (3) Prereq.: GEOL 3032. Field trip required. Physical sedimentary processes in nonmarine and marine depositional systems, including fluvial, alluvial fan, lacustrine, eolian, and carbonate and clastic marine environments; influence of tectonics, climate, and sea level on sedimentary architecture and sequences.

4042 Principles of Economic Geology (3) Prereq.: GEOL 2071 and 2081. 2 hrs. lecture; 3 hrs. lab. Geology and genesis of metallic and nonmetallic earth resources.

4043 Earth Materials and the Environment (3) Prereq.: CHEM 1202, GEOL 1001, 2081 or permission of instructor. Earth materials as problems and solutions in environmental issues; physicochemical behavior of asbestos-form silicates, silica, zeolites, and associated health hazards; potential geological repositories for hazardous waste.

4044 Petroleum Geology (3) Prereq.: GEOL 2082, 3012, 2071 and MATH 1550. Modern concepts of the origin, migration, entrapment and production of hydrocarbons from sedimentary basins.

4055 Volcanology (3) Prereq.: GEOL 2082 and credit or enrollment in GEOL 3041. Landforms and deposits produced by volcanism; significance of volcanism to earth and human history.

4062 Exploration and Environmental Geophysics (3) Prereq.: GEOL 2071 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.

4064 Solid Earth Geophysics (3) Prereq.: GEOL 2071 and MATH 1552. Concepts and methods used to study the structure and dynamics of the earth; rotation, gravity, seismology, heat flow, geomagnetism, paleomagnetism, radioactivity, and deformation.

4066 Plate Tectonics (3) Prereq.: GEOL 2071. Contemporary concepts of plate tectonics; geophysical observations and geological implications.

4067 Introduction to Seismology (3) Prereq.: MATH 2057, 2090, and either GEOL 2071 or consent of instructor. Fundamental concepts and methods in seismic wave analysis used to study earth's tectonics, bodywaves, plane wave reflection, surface waves, earthquakes, and focal mechanisms.

4068 Reflection Seismology (3) Prereq.: GEOL 4067 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.

4071 Advanced Structural Geology (3) Prereq.: minimum of 20 hrs. in geology courses, including GEOL 2071. 2 hrs. lecture, 3 hrs. lab. Structural geology of the U. S.; its application to problems of folding, faulting, rock mechanics, and plate interactions.

4081 Chemical Oceanography (3) Prereq.: consent of instructor. 3 hrs. lecture/seminar. Also offered as OCS 4126. Controls on the mass balance and distribution of major elements, trace elements, heavy metals, dissolved gases, and nutrients in estuarine and open-ocean systems.

4082 Introduction to Geochemistry (3) Prereq.: GEOL 2082 and MATH 1550, or equivalent. Principles of nuclear chemistry, radioactive decay, and isotopic fractionation processes; radiometric dating techniques and stable isotopic studies.

4085 Geochemistry of Sediments and Natural Waters (3) F Prereq.: GEOL 2082 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.

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.

4131 Basin Analysis (3) Prereq.: GEOL 4031. 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.

416 Gulf Coast Geology (3) Prereq.: GEOL 2071. Origin and evolution of the Gulf Basin; stratigraphy and structure of Mesozoic and Cenozoic rocks, sedimentary facies, sedimentary tectonics, geothermal heat flow, fluid migration, mineral and water diagenesis, salt and shale diapirism, structural deformation, and the occurrence of oil and gas.

4164 Deltaic Geology (3) Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Also offered as GEOG 4164. Processes of deltaic sedimentation and the nature of deltaic sediments; Mississippi River delta compared to other modern and ancient deltas.

4165 Subsurface Geology (3) Prereq.: GEOL 1001, 1003, 1601, 1602; PETE 4088 strongly recommended. 2 hrs. lecture; 3 hrs. lab. Principles and methods of exploration, analysis, and interpretation based on borehole data, electric logs, and samples of rocks and fluids; construction of geological maps and sections showing sediment facies, structural and stratigraphic, fluid pressure, and water salinity; analysis of fluid migration, and oil and gas accumulation, and geothermal resources.

4182 Physical Hydrogeology (3) S Prereq.: GEOL 3032 or 4031 and MATH 1552 or permission of instructor. Subsurface fluid flow in geological materials; emphasis on the control of 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.

4666 Coastal Field Geology (4) Su only Prereq.: consent of instructor. Also offered as OCS 4066. Camp fee. Four-week field course on the Louisiana coast utilizing facilities operated by Louisiana Universities Marine Consortium. Sedimentary environments, coastal processes, and environmental geological problems of the Mississippi delta plain.

6001 Topics in Earth Sciences for Teachers (3) 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.

7031 Deep-water Depositional Environments (3) Prereq.: introductory course in sedimentology, e.g., GEOL 4031. Different types of sediment in deep water and on various transport processes; emphasis on submarine fan systems, their lithologic and seismic response; geological factors responsible for variation in end products.

7043 Advanced Igneous Petrology (3) Prereq.: GEOL 3041 or equivalent. 2 hrs. lecture; 3 hrs. lab. Phase diagrams, magmatic origin of igneous rocks, and evolution of igneous provinces.

7052 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.

7062 Seismic Stratigraphy (3) Prereq.: GEOL 2071 or equivalent. Interpretation of seismic reflection data in terms of sedimentary facies, stratigraphic sequences, and implications for local and eustatic sea-level fluctuations.

7064 Numerical Methods in the Geological Sciences (3) Prereq.: CSC 2262, MATH 1552, and GEOL 4064; or equivalent. Numerical methods applied to geological research; interpolation and extrapolation, nonlinear equations, solutions of simultaneous linear equations, least squares approximations, numerical integration, numerical solution of differential equations, and Fourier transforms.

7065 Geodynamics (3) Prereq.: MATH 2057 and 2090 or equivalent; and GEOL 4064 or equivalent. Fundamental physical processes involved in plate tectonics and other geological phenomena; concepts in mantle convection, rock rheology, faulting, flexure, and heat transfer.

7066 Earthquake Seismology (3) Prereq.: GEOL 4068 or equivalent. Basic principles of earthquakes; source mechanism, seismic waves and tectonic application; seismicity, magnitude, radiation pattern, source description, ray tracing, earthquake location, seismotectonics, and earthquake prediction.

7071 Geological Strain Analysis and Deformation Microstructures (4) Prereq.: GEOL 2071 and 3041; MATH 1552 (MATH 2057 and 2085 are recommended). 3 hrs. lecture; 3 hrs. lab. Techniques for measuring strain in deformed rocks; development of deformation textures and kinematic indicators.

7072 Mesoscopic and Macroscopic Structures (3) Prereq.: GEOL 2071 and 3041; MATH 1552; PHYS 2102; or equivalent. Description and origin of folds, diapirs, joints, and faults.

7081 Isotope Geochemistry (3) Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. 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.

7083 Mass Spectrometry for Isotope Geology (3) Prereq.: GEOL 4083 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Principles of thermal ionization mass spectrometry; chemical preparation of geological samples for isotopic ratio measurements; use of multielement solid source mass spectrometer; applications to geological studies.

7084 Isotope Stratigraphy (3) Prereq.: GEOL 7081. Application of isotope techniques to stratigraphy; isotope systematics of modern depositional environments; emphasis on utilization of isotopes as stratigraphic markers; interpretation of geological events from time-series isotopic records.

7111 Advanced Micropaleontology (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit. Advanced training in micropaleontology.

7115 Paleocology (3) Prereq.: GEOL 3011 and 4031. 2 hrs. lecture; 2 hrs. field trip. Diversity, structure, taphonomy, and evolution of fossil and modern marine assemblages; adaptations and functional morphology; organism-sediment relationships.

7117 Biostratigraphy (3) Prereq.: GEOL 3011 or equivalent. 2 hrs. lecture; 2 hrs. lab. Stratigraphic concepts; modern rules and procedures in interval and assemblage zonations; distribution of stratigraphically important fossil groups; event stratigraphy and biostratigraphic modeling using computer techniques; applications to global and regional problems.

7120 Paleobiology (3) Prereq.: GEOL 3011 or equivalent. Patterns and processes of evolution as discerned from the fossil record; tempo and mode of evolution, hierarchy and macroevolution, mass extinctions, patterns of diversification; emphasis on development of theories and case studies.

7131 Petrology of Sandstones (3) 2 hrs. lecture; 3 hrs. lab. Petrology and petrography of terrigenous sandstones; applications of sediment mineralogy and texture to the analysis of provenance, deposition, and diagenesis; emphasis on the interrelationship of tectonics and sedimentation.

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; fundamentals of fluid and sediment flows, deposition and the origin of primary structures, and hydrodynamic instability and soft-sediment deformation.

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 relationships and interpretation of depositional environments and mineral paragenesis of ancient carbonate sequences.

7134 Clay Mineralogy (3) 2 hrs. lecture; 3 hrs. lab. Discussion. Mineralogy, geochemistry, and geology of clay minerals; argillaceous sediments and rocks.

7163 Mesozoic and Cenozoic Stratigraphy (3) Prereq.: Paleogeographic development of the earth during the Mesozoic and Cenozoic Eras; emphasis on major reconstructions, and the stratigraphy of major basins.

7183 Physical Geochemistry of Burial Diagenesis (3) Prereq.: GEOL 4082 or equivalent. Quantitative techniques in thermodynamics, kinetics, and mass transport applied to problems of burial diagenesis of sedimentary minerals and fluids.

7666 Gulf Coast Field Geology (8) Su only Prereq.: GEOL 3666 or equivalent. Students requiring this course should contact the departmental office no later than Feb. 15. All incoming graduate students interested in "soft rock" specialties should enroll. Camp fee. Eight-week field course. Comparison of recent depositional environments with Paleozoic, Mesozoic, and Cenozoic counterparts in the Gulf Coastal Plain and its margins.
7900 Special Topics in Geology and Geophysics (3) V May be taken for a max. of 12 sem. hrs. of credit when topics vary. Advanced and/or emerging topics in geology and geophysics.

7909 Directed Research in Geology and Geophysics (1-6) May be taken for a max. of 10 sem. hrs. of credit when topics vary. General student-selected research topics and focused group research, including all topics in geology and geophysics.

7911 Seminar in Geology: Paleontology (2) May be repeated for credit.

7931 Seminar in Geology: Sedimentology (2) May be repeated for credit. Full semester: carbonate sedimentology; spring semester: clastic sedimentology and sedimentary environments.

7941 Seminar in Geology: Igneous and Metamorphic Petrology (2) May be repeated for credit.

7961 Seminar in Geology: Structural Geology (2) May be repeated for credit.

7966 Field Work (1-9)

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.

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.

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 hydrogeochemistry, isotope geochemistry, and the geochemistry of carbonates.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.

9000 Dissertation Research (1-12 per sem.) “S”/“U” grading.