Geology - GEOL

Courses

GEOL 1100 DYNAMIC EARTH (4) LEC. 3. LAB. 2. Science Core. General physical geology. Survey of the important minerals and rocks. Origin and classification of geologic structures, earthquakes, and landforms. Study of geologic maps. Credit will not be given for both GEOL 1100 and GEOL 3150.

GEOL 1107 HONORS DYNAMIC EARTH (4) LEC. 3. LAB. 2. Pr. Honors College. General physical geology for Honors students and for Geology majors. Topics similar to GEOL 1110 but covered in greater depth. Science Core.

GEOL 1110 EARTH AND LIFE THROUGH TIME (4) LEC. 3. LAB. 2. Pr. GEOL 1100 or GEOL 1103 or GEOL 1107. Science Core. Physical and biological history of the Earth, with emphasis on the interaction between life, the atmosphere, rocks, and oceans.

GEOL 1117 HONORS EARTH AND LIFE THROUGH TIME (4) LEC. 3. LAB. 2. Pr. GEOL 1100 or GEOL 1103 or GEOL 1107. Physical and biological history of the Earth, with emphasis on the interaction between life, the atmosphere, rocks, and oceans. For Honors students and Geology majors. Science Core.

GEOL 2000 PROFESSIONAL DEVELOPMENT (1) LEC. 1. Introduction to career opportunities in the Geosciences; goal selection and charting a pathway to success as a professional. Includes writing skills, research and funding opportunities, internships, creation of resumes and ePortfolios, and job applications.

GEOL 2010 MINERALOGY AND OPTICAL CRYSTALLOGRAPHY (5) LEC. 4. LAB. 2. Physical and chemical properties of minerals, classification and roles with emphasis on natural systems, materials science, health, and environment. Credit will not be given for both GEOL 2010 and GEOL 2013.

GEOL 2050 IGNEOUS AND METAMORPHIC PETROLOGY (4) LEC. 3. LAB. 2. Pr. GEOL 2010 or GEOL 2013. Principles and processes of igneous and metamorphic activity in a plate tectonic and petrologic context. Description, classification and interpretation of igneous and metamorphic rocks.

GEOL 2100 ENVIRONMENTAL GEOLOGY (4) LEC. 3. LAB. 2. Pr. GEOL 1100 or GEOL 1103 or GEOL 1107. Emphasis on geology as an environmental science; applied geology, geological hazards and environmental regulations as applied to geologic environmental remediation.

GEOL 3060 LUNAR AND PLANETARY GEOLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 1100 or GEOL 1103 or GEOL 1107. Departmental approval. Geology of the planets, moons, asteroids and comets. Origin of the solar system. Space exploration. Impact cratering.

GEOL 3200 INTRODUCTION TO PALEOBIOLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 1110 or GEOL 1113 or GEOL 1117. The nature of the fossil record, applications of that data to geological and biological questions with emphasis on the concepts using examples from all biotic groups.

GEOL 3300 EVOLUTION AND EXTINCTION OF THE DINOSAURIA (3) LEC. 2. LAB. 2. Pr. GEOL 1100 or GEOL 1103 or GEOL 1107. Departmental approval. Survey of the dinosaurs, their evolution and extinction. Southeastern U.S. dinosaurs.

GEOL 3400 STRUCTURAL GEOLOGY (4) LEC. 3. LAB. 2. Pr. GEOL 2050. Fundamentals of rock deformation. The mechanics of rock flow, fracture, and folding. Geometric techniques of structural analysis.

GEOL 3550 FIELD GEOLOGY: METHODS AND APPLICATION (3) LEC. 2. LAB. 2, AAB/LLB. 2. Pr. GEOL 1100 and GEOL 1110. Departmental approval. Through a combination of classroom, laboratory, and field-based activities, this course develops skills of geologic data collection, observation, interpretation, and communication.

GEOL 3650 ADVANCED FIELD GEOLOGY (3) LEC. 1. LAB. 10. Pr. GEOL 3400 and GEOL 3550. Instruments and methods used in geological field mapping, interpretation of sedimentary, igneous and metamorphic rocks and deformational analysis. Summer only.

GEOL 4010 SEDIMENTARY PETROLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 2050. Departmental approval. Detailed description and classification of sediments and sedimentary rocks with emphasis on interpretation of origins, transport histories, depositional environments and diagnetic histories.

GEOL 4110 STRATIGRAPHY (3) LEC. 2. LAB. 2. Pr. GEOL 4010. Departmental approval. Description and correlation of layered earth materials. Synthesis and interpretation of stratigraphic correlations. North American Stratigraphic Code. History and theory of stratigraphy.

GEOL 4210 ECONOMIC GEOLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 3400. The origin, distribution and classification of mineral deposits formed by igneous, metamorphic and sedimentary processes. Introduction of methods of exploration and development.

GEOL 4260 INTRODUCTION TO GEOCHEMISTRY (3) LEC. 3. Pr. CHEM 1040 and GEOL 2050. Principles governing the distribution of major, minor and trace elements within the earth; differentiation of elements due to geologic processes and the hydrosphere.

GEOL 4300 GEODYNAMICS (3) LEC. 3. Pr. GEOL 3400 and (MATH 1620 or MATH 1623 or MATH 1627) and PHYS 1510. Structure and dynamics of the earth deduced from seismology, gravity, heat flow and magnetism.

GEOL 4740 SENIOR SEMINAR (2) SEM. 2. Geology majors with upperclass standing. Individual research by geoscience undergraduates is coupled with improved written and oral communication skills along with resume and ePortfolio development. May count either GEOL 4740 or GEOG 4740.

GEOL 4920 INTERNSHIP (1-3) INT. SU. Geology majors with upper-class standing (juniors or seniors). An opportunity to apply classroom experience to a real job setting. Course may be repeated for a maximum of 6 credit hours.

GEOL 4930 DIRECTED STUDIES IN UNDERGRADUATE RESEARCH (1-3) AAB. Departmental approval. Directed studies in areas of geology not covered by an existing course or to supplement knowledge gained from an existing course. Course may be repeated for a maximum of 3 credit hours.

GEOL 4970 SPECIAL TOPICS IN GEOLOGY (1-4) ST1. Instruction and discussion of selected topics in geosciences. Course may be repeated for a maximum of 8 credit hours.

GEOL 4980 UNDERGRADUATE RESEARCH METHODS (1-3) IND. Departmental approval. Active participation in original research under supervision of a senior investigator. Course may be repeated for a maximum of 3 credit hours.

GEOL 5060 INTRODUCTION TO MICROPALEONTOLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 3200 and (BIOL 1030 or BIOL 1037). A survey of major groups of fossils small enough to require a microscope for their study. Foraminifera, radiolaria, and ostracodes are emphasized; minor groups of interest include conodonts, diatoms, dinoflagellates, acritarchs, and chitinozoans. Includes laboratory, discussion sessions, and field work.

GEOL 5100 HYDROGEOLOGY (3) LEC. 2. LAB. 2. Pr. (GEOL 1100 or GEOL 1103 or GEOL 1107) and CHEM 1030 and (MATH 1610 or MATH 1613 or MATH 1617) and PHYS 1500. Departmental approval. Fundamentals of groundwater flow in porous media, hydrodynamic dispersion, determination of aquifer properties and geological aspects of groundwater occurrences.

GEOL 5220 GEOMORPHOLOGY (3) LEC. 2. LAB. 1. Study of the origin of landforms with emphasis on the geologic processes and structures that generate the landforms and applications of landform analysis. Two all-day weekend trips are required. Two one-hour classes and one two-hour laboratory per week.

GEOL 5300 BASIN ANALYSIS (3) LEC. 2. LAB. 2. Pr. P/C GEOL 4010. Study of analytical techniques of sedimentary basin fills, including thermal history, litho and biofacies analyses, depositional systems, subsurface logs, seismic reflection, provenance history, evolution, sedimentation and subsidence history.

GEOL 5440 ELECTRON MICROPROBE ANALYSIS (3) LEC. 2. LAB. 1. Pr. CHEM 1040 and PHYS 1510. Instruction in the theory and application of EMPA (electron microprobe analysis) and SEM (scanning electron microscopy). The course provides an understanding the EMPA as a research tool for evaluating the composition and structure of a wide range of materials.

GEOL 5500 PETROLEUM GEOLOGY (3) LEC. 3. Pr. GEOL 4010. Coverage of petroleum source rocks, migration, reservoir rock characters, and trapping mechanics. Overview of exploration methods including well-log analysis and seismic interpretation.

GEOL 5600 APPLIED GEOPHYSICS (4) LEC. 3. LAB. 2. Pr. (GEOL 1100 or GEOL 1103 or GEOL 1107 or GEOL 3150) and (MATH 1620 or MATH 1623 or MATH 1627) and PHYS 1510. Departmental approval. Overview of geophysical methods with applications to resource, tectonic and environmental analyses. Seismic refraction and reflection, gravity, magnetics, electrical and electromagnetic methods will be included.

GEOL 5700 GEOHEALTH (3) LEC. 3. Pr. GEOL 1100 and CHEM 1030. The effects of the composition of Earth materials and the local geological phenomena on human, plant, and animal health. The application of principles of geology and chemistry to predict and prevent diseases.

GEOL 5840 CLIMATE CHANGE AND SOCIETY (3) LEC. 3. The science of Earth's changing climate, the societal influences on climate change, as well as the expected impacts based on the collected scientific evidence. Analyzes key aspects of climate science, the drivers of climate change, Earth's climate trends, the evidence of climate change, the predicted future climate scenarios, the expected impacts, and the array of possible response options.

GEOL 6060 INTRODUCTION TO MICROPALEONTOLOGY (3) LEC. 3. LAB. 1. A survey of major groups of fossils small enough to require a microscope for their study. Foraminifera, radiolaria, and ostracodes are emphasized; minor groups of interest include conodonts, diatoms, dinoflagellates, acritarchs, and chitinozoans. Includes laboratory, discussion sessions, and field work.

GEOL 6100 HYDROGEOLOGY (3) LEC. 2. LAB. 2. Pr. (GEOL 1100 or GEOL 1103 or GEOL 1107) and CHEM 1030 and (MATH 1610 or MATH 1613 or MATH 1617) and PHYS 1500. Departmental approval. Fundamentals of groundwater flow in porous media, hydrodynamic dispersion, determination of aquifer properties and geological aspects of groundwater occurrences.

GEOL 6220 GEOMORPHOLOGY (3) LEC. 2. LAB. 1. Study of origin of landforms with emphasis on geologic processes and structures that generate landforms; includes the applications of landform analysis. May count either GEOL 6220 or GEOG 6220.

GEOL 6300 BASIN ANALYSIS (3) LEC. 2. LAB. 2. Pr. GEOL 4010. Departmental approval. Study of analytical techniques of sedimentary basin fills, including thermal history, litho and biofacies analyses, depositional systems, subsurface logs, seismic reflection, provenance history, evolution, sedimentation and subsidence history.

GEOL 6400 PRINCIPLES OF EARTH SCIENCE (3) LEC. 2. LAB. 2. Departmental approval. A special course for in-service and future teachers only. Internal and surficial geologic processes, meteorology and oceanography.

GEOL 6440 ELECTRON MICROPROBE ANALYSIS (3) LEC. 2. LAB. 1. Pr. CHEM 1040 and PHYS 1510. Instruction to theory and application of EMPA (electron microprobe analysis) and SEM (scanning electron microscopy). Provides an understanding of EMPA as a research tool for evaluating composition and structure of wide range of materials. GEOL 5440 or GEOL 6440.

GEOL 6500 PETROLEUM GEOLOGY (3) LEC. 3. Pr. P/C GEOL 4010. Geology/Geography graduate students who took GEOL 4010 ("P/C"). Coverage of petroleum source rocks, migration, reservoir rock characters, and trapping mechanics. Overview of exploration methods including well-log analysis and seismic interpretation.

GEOL 6600 APPLIED GEOPHYSICS (4) LEC. 3. LAB. 2. Pr. (GEOL 1100 or GEOL 1103 or GEOL 1107 or GEOL 3150) and (MATH 1620 or MATH 1623 or MATH 1627) and PHYS 1510. Departmental approval. Overview of geophysical methods with applications to resource, tectonic and environmental analyses. Seismic refraction and reflection, gravity, magnetics, electrical and electromagnetic methods will be included.

GEOL 6700 GEOHEALTH (3) LEC. 3. The effects of the composition of Earth materials and the local geological phenomena on human, plant, and animal health. The application of principles of geology and chemistry to predict and prevent diseases.

GEOL 6840 CLIMATE CHANGE AND SOCIETY (3) LEC. 3. The course will investigate the science of Earth's changing climate, the societal influences on climate change, as well as the expected impacts based on the collected scientific evidence. Analysis of peer-reviewed literature on the key aspects of climate science, the drivers of climate change, Earth's climate trends, the evidence of climate change, predicted future climate scenarios, expected impacts, and the array of possible societal response options to prevent/mitigate the consequences of anthropogenic climate change. The class will have a strong component of discussion of literature and foundational knowledge as well as reflection on what students have learned and the implications of this knowledge for their areas of interest and generally for their lives.

GEOL 7100 GEOCOMMUNICATION (3) LEC. 3. Departmental approval. Instruction and practice in written and oral communication skills necessary for a successful career in the geosciences; emphasis on preparation of scientific articles, technical reports, abstracts, and thesis; preparation and delivery of oral presentations.

GEOL 7170 IMPACT AND PLANETARY GEOLOGY (3) LEC. 3. Pr. GEOL 1100 and GEOL 1110. Study of impact craters and their formation. Identification of impact crates. Role of impacts in planetary evolution and in evolution and extinction of life on Earth. Study of rocky and icy geologic surface terrains and their geologic processes.

GEOL 7200 TECTONICS (3) LEC. 2. LAB. 2. Pr. GEOL 2050 and GEOL 4010. Departmental approval. Emphasis will be placed on plate tectonics and driving forces, evolution of collisional, transform and extensional systems, and dynamic indicators of past and current tectonic processes.

GEOL 7250 GROUNDWATER HYDROGEOLOGIC MODELING (3) LEC. 2. LAB. 2. Pr. GEOL 6100. Departmental approval. Overview of groundwater modeling techniques with environmental and geologic applications. Interaction of geology and subsurface groundwater flow. Basin hydrology modeling. Practical experience in computer simulations of subsurface hydrogeologic processes.

GEOL 7260 AQUEOUS AND ENVIRONMENTAL GEOCHEMISTRY (3) LEC. 2. LAB. 2. Pr. CHEM 1040 and GEOL 2050. Departmental approval. Study of water-rock reactions that control the chemical composition of groundwater; aqueous geochemistry of trace elements; groundwater pollution, remediation and geomic robiology.

GEOL 7300 CYCLES THROUGH EARTH HISTORY (3) LEC. 2. LAB. 2. Pr. GEOL 4100 and GEOL 4260. Discussion of the fundamental processes controlling sedimentary cycles at different physical, biotic, and temporal scales.

GEOL 7400 ADVANCED ECONOMIC GEOLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 4210. Departmental approval. The practical and theoretical aspects of economic geology as applied to exploration and development of natural resources.

GEOL 7410 GEOLOGY OF ORGANIC MATTER (3) LEC. 2. LAB. 2. Pr. GEOL 4010 and GEOL 4110. Departmental approval. The origins, classifications, taphonomy of organic matter, modern and ancient processes and environments of deposition of organic-rich strata, including hydrocarbon- source rocks and coals. Laboratory and field trips required.

GEOL 7450 MINERAL RESOURCES AND THE ENVIRONMENT (3) LEC. 2. LAB. 2. Pr. CHEM 1040 and GEOL 2050. Overview of geology and geographic distribution of mineral resources; economic aspects affecting their extraction; environmental impacts and cost of mineral resource extraction.

GEOL 7500 PALEOCLIMATOLOGY (3) LEC. 3. Explores how Earth's climate has evolved dynamically over time, varying within restricted boundaries that allowed life to exist and evolve. Explores interactions among Earth's surface abiotic and biotic components, and includes plate tectonics, atmospheric chemistry and physics, and ocean productivity.

GEOL 7550 ADVANCED GEOPHYSICAL METHODS (3) LEC. 2. LAB. 2. Pr. GEOL 6600. Departmental approval. Advanced treatment of geophysical methods, data interpretation and modeling. Applications to resource development and environmental assessments will be explored, with emphasis on seismic methods.

GEOL 7600 PETROLOGY (3) LEC. 2. LAB. 2. Pr. GEOL 2050 and GEOL 4010. Departmental approval. The description, classification, formative processes, and petrologic interpretation of igneous, metamorphic and sedimentary rocks.

GEOL 7610 STRUCTURAL AND METAMORPHIC ANALYSIS (3) LEC. 2. LAB. 2. Pr. GEOL 2050 and GEOL 3400 and GEOL 3650. Quantitative analysis of dynamic, kinematic and chemical responses of rocks and minerals to crustal movements and dynamo thermal metamorphism.

GEOL 7650 FACIES ANALYSIS AND SEQUENCE STRATIGRAPHY (3) LEC. 2. LAB. 2. Pr. GEOL 4010 and GEOL 4110. Departmental approval. Systematic analysis of modern and ancient deposition facies, and their interpretation in a sequence stratigrahic context. Laboratory and field trips required.

GEOL 7700 ANALYTICAL ISOTOPE GEOCHEMISTRY (3) LEC. 2. LAB. 1. Pr. CHEM 1040 or PHYS 1510 or MATH 1620. Biweekly lectures will teach the theory and principles of isotope geochemistry and mass spectrometry, leading to applications in geoscience research. Lab sessions and problem sets will support lectures and emphasize work with various mass spectrometers in the Department of Geosciences.

GEOL 7930 DIRECTED STUDIES (1-3) LEC. 3. Departmental approval. Directed studies. May incorporate literature, field and/or laboratory research in any proportion. Subject matter and credit hours shall be determined by student and directing faculty. Course may be repeated for a maximum of 3 credit hours.

GEOL 7980 CAPSTONE PROJECT (1-3) LEC. SU. Literature, field and/or laboratory research directed towards completion of capstone project required for non-thesis option. Course may be repeated for a maximum of 3 credit hours.

GEOL 7990 RESEARCH AND THESIS (1-10) MST. Departmental Approval. Course may be repeated with change in topics.

GEOL 8900 DIRECTED STUDY (1-6) IND. 3. Provides exposure to discipline-specific research procedures in Earth System Science. Students will work closely with their mentors to explore an Earth-system problem through directed readings, literature searches, field work, laboratory experimentation, and quantitative analysis. Course may be repeated for a maximum of 6 credit hours.