GEOLOGY (GEOL)

GEOL 103  Our Dynamic Planet  3 Hours
Introduction to the spatial dimension of Earth's dynamic systems and how they affect people. These include the atmosphere, hydrosphere, and lithosphere. Colonnade E-NS | NS
Equivalent(s): GEOG 103
Recent Term(s) Offered: spring 2018; fall 2018; spring 2019; summer 2019; fall 2019; spring 2020

GEOL 106  Geology and Cinema  1.5 Hour
Examines how Hollywood depicts geology and geologists in movies. Addresses facts and fallacies in selected movies and in so doing explores basic geological processes and Earth materials. No credit for the Geology major or minor.
Recent Term(s) Offered: None

GEOL 107  Backyard Geology  1.5 Hour
Applies basic geologic principles to local surroundings. Explains how geologic processes create local rock forms and structures. Field trips required. No credit for the Geology major or minor.
Recent Term(s) Offered: None

GEOL 111  The Earth  3 Hours
The study of Earth including rocks, mineral resources, energy, soils, surface geologic processes, earthquakes and Earth's interior, global tectonics, hydrology, and environmental geology. Students electing to meet their general education laboratory requirement through GEOL 113 must simultaneously enroll in the GEOL 111 lecture course. Laboratory work designed to accompany GEOL 111. Minerals, rocks, topographic maps, geologic maps, and aerial photographs are studied. This laboratory is required for Geology majors, minors, and some prospective science teachers, but is optional for most others. Colonnade E-NS | NS
Recent Term(s) Offered: spring 2018; summer 2018; fall 2018; spring 2019; summer 2019; fall 2019; spring 2020; summer 2020; fall 2020

GEOL 112  Earth's Past and Future  3 Hours
Deep time study of Earth, life, and climate to understand how the planet - our only home - has changed in the past and what this means for the future of human species. Students electing to meet their general education laboratory requirement through GEOL 114 must simultaneously enroll in GEOL 112. Laboratory (GEOL 114) is required for Geology majors and some prospective science teachers, but is optional for most others. Colonnade E-NS | NS
Recent Term(s) Offered: spring 2018; fall 2018; spring 2019; fall 2019; spring 2020; summer 2020; fall 2020

GEOL 113  The Earth Laboratory  1 Hour
Laboratory work designed to accompany GEOL 111. Minerals, rocks, topographic maps, geologic maps, and aerial photographs are studied. This laboratory is required for Geology majors, minors and some prospective science teachers, but is optional for most others. Colonnade E-SL | SL
Prerequisite(s): (GEOL 111 (may be taken concurrently) or GEOG 103 (may be taken concurrently) or GEOL 103 (may be taken concurrently))
Course Fee: $15
Recent Term(s) Offered: spring 2018; summer 2018; fall 2018; spring 2019; summer 2019; fall 2019; spring 2020; fall 2020

GEOL 114  Earth's Past and Future Lab  1 Hour
To make it concise and to reflect corresponding changes in GEOL 112 listing. However, the learning objective for the course will remain unchanged. Colonnade E-SL | SL
Prerequisite(s): GEOL 112 (may be taken concurrently)
Course Fee: $15
Recent Term(s) Offered: spring 2018; fall 2018; spring 2019; fall 2019; spring 2020; fall 2020

GEOL 250  Environmental Geology  3 Hours
Survey of the geologic principles in relation to environmental problems arising from human actions. Topical environmental issues controlled by whole Earth processes, and the use of geologic knowledge in their remediation will be investigated. Colonnade E-NS, E-SL
Recent Term(s) Offered: fall 2020

GEOL 270  Analytical Techniques in Geology  3 Hours
Basic analytical techniques used to examine and analyze Earth materials. Topics include precision and accuracy, sample preparation, contamination, calibration techniques, analysis of data sets. Note: Permission of instructor may be required.
Prerequisite(s): GEOL 111 and GEOL 112
Course Fee: $50
Recent Term(s) Offered: fall 2018; fall 2019

GEOL 295  Introduction to Research Methodology  1 Hour
To familiarize Ogden Research Scholars and other research oriented students with the fundamentals of choosing a research topic, performing a bibliographical search on a subject, classification of instruments, data taking, data reduction, professional ethics and other research oriented topics. The common points of research methodology in the different scientific areas will be accentuated. Examples will be drawn from the various disciplines. Use of computers will be emphasized. Course does not count toward any major or minor. Note: Ogden Research Scholar, or 3.2 grade point average at the end of freshman year, or OCSTH faculty member recommendation.
Equivalent(s): PHYS 295, CS 295, BIOL 295, CHEM 295, MATH 295, ENGR 295
Recent Term(s) Offered: None

GEOL 301  Geology and Climate: Past and Future  3 Hours
Survey of Earth's past climate changes, the present state, and what these mean for the future of our planet – our only home. Factors and processes that influence Earth's climate over a variety of timescales are examined. Colonnade K-SY
Prerequisite(s): (GEOL 103 or GEOG 103 or GEOL 111 or GEOL 112) and 21 hours of Foundations and Explorations Courses, or junior status
Recent Term(s) Offered: fall 2020

GEOL 305  Earth System Science for Teachers  3 Hours
Collaborative, problem-based learning (PBL) experience, using real-world examples to enhance student understanding of earth system science, with a focus on relevance in science teaching grades K-12. Includes PBL-based lesson plan development. Applicable towards a major in Geology only for those students seeking teacher certification.
Prerequisite(s): (GEOL 111 and GEOL 113) or (GEOL 112 and GEOL 114)
Recent Term(s) Offered: fall 2018; fall 2020
GEOL 310  Global Hydrology  3 Hours
An introduction to descriptive and quantitative hydrology. The hydrologic cycle, precipitation, evaporation, and transpiration will be covered under descriptive hydrology. Hydrographs, runoff relations, ground water, and storage routing will be covered under quantitative hydrology. Consideration is given to use and management of water as a resource.
Prerequisite(s): (GEOL 111 or GEOG 103 or GEOL 103)
Equivalent(s): GEOG 310
Recent Term(s) Offered: fall 2018; fall 2020

GEOL 311  General Oceanography  3 Hours
A course in basic fundamentals pertaining to the geological, chemical, physical and biological aspects of the marine environment. Topics for discussion include the topography, structure and history of the ocean basins and their margins, ocean waters and oceanic circulation, tides and waves, marine geochemistry, ocean sediments and sedimentation, near-shore geologic processes and the ocean as a biogeochemical system. The resources of the ocean and the influence of humans are also considered. Note: Permission of instructor may be required.
Prerequisite(s): GEOL 111 and GEOL 113
Course Fee: $15
Recent Term(s) Offered: spring 2018; spring 2019; spring 2020

GEOL 315  Energy, Climate and Carbon  3 Hours
Energy, Climate and Carbon investigates our current reliance upon carbon-based sources of energy, the effect of fossil-fuel emissions on the environment and climate at local-to-global scales, and current efforts to limit fossil-fuel emissions and global climate change. The course is particularly focused on carbon-capture technologies, geological carbon sequestration and renewable energy resources. Colonnade K-SY
Prerequisite(s): (GEOL 111 or GEOL 112 or GEOL 103 or GEOG 103) and 21 hours of Foundations and Explorations Courses, or junior status
Recent Term(s) Offered: fall 2018; fall 2019; spring 2020

GEOL 325  Introduction to Minerals and Crystalline Rocks  3 Hours
The sight identification of minerals and crystalline rocks is stressed. The description, origin and classification, economic uses, and occurrences of the major mineral and crystalline rock groups are discussed. Appropriate rock and mineral specimens are examined in the laboratory.
Prerequisite(s): (GEOG 103 or GEOL 103 or GEOL 111) and GEOL 113
Recent Term(s) Offered: None

GEOL 330  Mineralogy  4 Hours (repeatable max of 4 hrs)
The systematic study of minerals. Includes crystallography, crystal chemistry, mineral stability, the classification of minerals, and the origin, characteristics and occurrences of the major mineral groups. Laboratory work includes crystal symmetry, mineral identification, and an introduction to the optical microscope. A field trip may be required. Note: One semester of college chemistry or permission of instructor required.
Prerequisite(s): GEOL 111 and GEOL 113
Course Fee: $35
Recent Term(s) Offered: fall 2018; fall 2019; fall 2020

GEOL 350  Petrology  4 Hours (repeatable max of 4 hrs)
The study of the origin, characteristics, occurrence, and classification of igneous and metamorphic rocks, and of the processes that lead to their formation. Their occurrence in relation to plate tectonics is stressed. Laboratory work includes petrographic study of igneous and metamorphic rocks in hand specimen and in thin section. A field trip is required.
Prerequisite(s): GEOL 330
Course Fee: $35
Recent Term(s) Offered: spring 2018; spring 2019; spring 2020

GEOL 360  Sedimentology and Stratigraphy  4 Hours
Introduces sedimentary processes, including sediment origins, erosion, transportation, deposition, and diagenesis. Sedimentation patterns and stratigraphic architecture are studied in the context of depositional and tectonic settings.
Prerequisite(s): GEOL 112 and GEOL 114
Course Fee: $40
Recent Term(s) Offered: spring 2018; spring 2019; spring 2020

GEOL 380  Introductory Field Techniques  3 Hours
Techniques of geological field work. Topics include sampling, rock identification and description, field notes, and the transition from field to laboratory analysis. Field work is required.
Prerequisite(s): GEOL 111 and GEOL 113
Course Fee: $50
Recent Term(s) Offered: fall 2018; fall 2019; fall 2020

GEOL 399  Research Problems in Geology  1-3 Hours (repeatable max of 3 hrs)
Individual research projects are conducted under faculty supervision. May be repeated with a change of content, but only 3 hours will be counted toward the major. A written report is required. Note: Permission of research project director.
Recent Term(s) Offered: spring 2018; fall 2018; spring 2019; fall 2019; spring 2020; fall 2020

GEOL 405  Paleontology  4 Hours (repeatable max of 4 hrs)
A basic course in paleobiology including the nature of the fossil record, preservation, basic factors and theories relating to the origin and development of living systems and the process of evolution, the species concept, systematics, and paleoecology. Major invertebrate taxa with a significant fossil record are also studied. Laboratory work includes the examination, description, and classification of fossil specimens. Note: Permission of instructor may be required.
Prerequisite(s): GEOL 112 and GEOL 114 and BIOL 122 and BIOL 123
Course Fee: $40
Recent Term(s) Offered: None

GEOL 408  Structural Geology  4 Hours (repeatable max of 4 hrs)
This course introduces the mechanics, characteristics, occurrences, and resultant structures associated with the major processes of deformation of the earth's crust. Major structural regions of North America are discussed. The laboratory emphasizes graphical and mathematical solutions of structural problems. Field trip required.
Prerequisite(s): GEOL 111 and GEOL 113
Course Fee: $40
Recent Term(s) Offered: spring 2018; spring 2019; spring 2020

Western Kentucky University – 2020-2021 Catalog
GEOL 415 Applied Environmental Geology 3 Hours
The interrelationships of geologic processes, earth materials, and human activities. Assessment of geologic factors with respect to site selection, energy production, land use, waste disposal, planning, water resources, engineering practices, and the recognition and control of geologic hazards. Class exercises stress the application of geologic knowledge to specific environmental situations. Note: Permission of instructor may be required.
Prerequisite(s): GEOL 111 and GEOL 113
Recent Term(s) Offered: fall 2018; fall 2019

GEOL 420 Geomorphology 3 Hours (repeatable max of 4 hrs)
The study of the origin, history, and characteristics of landforms produced by fluvioglacial, glacial, wind, and wave erosion and mass-wasting and ground water or by combination of these, acting upon the major types of earth materials and structures. Laboratory work includes the interpretation of topographic and geologic maps, air photos, and stereopairs. A field trip may be required.
Prerequisite(s): GEOL 111 or GEOG 103 or GEOL 103
Equivalent(s): GEOG 420
Recent Term(s) Offered: fall 2019

GEOL 430 Optical Mineralogy 3 Hours
A study of the optical properties and phenomena exhibited by and characteristic of crystalline mineral materials. Topics covered include the behavior of light in crystalline solids, the origin and nature of interference colors, refractive index, birefringence, optical character, and optical identification of minerals. Laboratory work concerns techniques employed with the petrographic microscope and the use of the microscope in mineral identification.
Prerequisite(s): GEOL 325 or GEOL 330
Recent Term(s) Offered: None

GEOL 432 Diffraction and Spectroscopy 4 Hours
Theory and experimental practices of modern analytical techniques for the analysis of crystal structures. Focuses on the study of crystallography, crystal chemistry, and their physical and chemical properties. Laboratory fee required.
Prerequisite(s): GEOL 325 or GEOL 330 or CHEM 222 or PHYS 266
Recent Term(s) Offered: None

GEOL 440 Hydrogeology 3 Hours
Origin, occurrence, and movement of ground water; water wells and aquifer evaluations; exploratory investigations; quality of ground water supplies; legal aspects.
Prerequisite(s): MATH 136 (may be taken concurrently) and (GEOL 310 or GEOL 310)
Recent Term(s) Offered: spring 2018

GEOL 445 Aqueous Geochemistry 3 Hours
An introduction to geochemical processes of surface and ground water including concentrations of ions and organic compounds, chemical equilibria, and analytical techniques. Carbonate and clay minerals will be studied in detail.
Prerequisite(s): CHEM 120 and CHEM 121
Recent Term(s) Offered: spring 2019

GEOL 455 Field Geology 1-6 Hours (repeatable max of 6 hrs)
Geological field experiences in a variety of settings and locations, designed to teach the hands-on methods of fieldwork and data collection, and the preparation of geologic maps, cross sections and reports.
Prerequisite(s): GEOL 111 and GEOL 113 or permission of instructor
Recent Term(s) Offered: None

GEOL 465 Geophysics 3 Hours
The fundamentals of general and exploration geophysics. Topics include the origin of the earth and solar system, the earth's interior, geochronology, gravity and isostasy, seismology, the earth's heat, geomagnetism, upper atmosphere, continents and ocean basins, ridges and island arcs, and plate tectonics. The theory and applications of exploration geophysics are also covered, especially gravity, magnetic, and seismic methods. Note: One year of college physics or permission of instructor required.
Prerequisite(s): GEOL 111
Recent Term(s) Offered: fall 2018; spring 2020

GEOL 470 Tectonics 3 Hours
Deformational structure and style of various crustal regions. Regional tectonics of North America is emphasized.
Prerequisite(s): GEOL 308
Course Fee: $20
Recent Term(s) Offered: fall 2018

GEOL 475 Special Topics in Geology 1-3 Hours (repeatable max of 12 hrs)
A lecture-discussion or supervised research course in which advanced or special topics in geology are considered in detail. Special topics courses may not replace required courses in the geology major/minor but may be applied as elective credit. Note: Permission of instructor required.
Recent Term(s) Offered: spring 2018; summer 2018; spring 2019; fall 2019; spring 2020; fall 2020

GEOL 485 Geology of Fossil Fuels 3 Hours
Formation of coal, petroleum, and natural gas including depositional setting, source materials, and processes of thermal maturation. Stratigraphic and structural relations, modes of occurrence, exploration techniques, and resource evaluation are emphasized. Field trip required. Note: Permission of instructor may be required.
Prerequisite(s): GEOL 308
Recent Term(s) Offered: spring 2018; spring 2019

GEOL 490 Petroleum Geology 3 Hours
Concepts of oil formation, source-rock evaluation, thermal maturation, and petroleum migration are reviewed. Emphasis is placed on characterization of petroleum reservoirs and traps and on the techniques employed by geologists in exploration for oil and gas accumulations. Field trip required.
Recent Term(s) Offered: None

GEOL 499 Professional Preparation in Geology 2 Hours
Professional career preparation in geology including senior assessment, resume writing, college-to-career transition, professional ethics, and selected seminar topics. Outside speakers from industry and academia will be included.
Restriction(s): Students with a semester level of Academy Junior, Academy Senior, Freshman, Junior or Sophomore may not enroll.
Recent Term(s) Offered: fall 2018; fall 2019; fall 2020