

Geological Sciences

Course Descriptions

GES 101 Principles of Earth Science 3 hrs.
(Gen. Ed. FS)

The earth in space; weather, earth materials, and geological processes that control development of the earth's surface.

GES 102 Principles of Earth Science Laboratory 1 hr.
Laboratory related to GES 101. One two-hour laboratory per week. Prerequisite: GES 101 or equivalent, or concurrent enrollment.

GES 110 Principles of Historical Geology 3 hrs.
(Gen. Ed. FS)

Introduction to history of the earth and its life forms; methods used by geologists to decipher earth history using rocks and fossils. Theory of evolution, origins of life, fossilization, animal and plant extinctions, mountain building, plate tectonics, and the Ice Age.

GES 111 Principles of Historical Geology Laboratory 1 hr.
(Gen. Ed. FS)

Laboratory related to GES 110. Study and interpretation of topographic and geologic maps, earth history, and fossils. One two-hour laboratory per week. Prerequisite: GES 110 or equivalent, or concurrent enrollment.

GES 150 Principles of Engineering Geology 3 hrs.
For science or engineering students interested in technical aspects of geology. Sediments, rocks, structures, and hydrologic processes in civil engineering practice. Prerequisite: MTH 109, 110; or equivalents.

GES 201 Mineralogy 4 hrs.
The crystalline state: physical and chemical properties of minerals; occurrence, association, and origin of the silicate and more important non-silicate minerals. Lecture and laboratory. Prerequisites: GES 101; one semester of college chemistry, or consent of the instructor.

GES 202 Optical Crystallography 4 hrs.
Determination of optical constants of crystals; systematic identification of minerals. Lecture and laboratory. Prerequisite: GES 201.

GES 205 Directed Field Study 1-2 hrs.

Directed study of regional geologic structure, paleontology, lithology, topography, and stratigraphy. Emphasis on similarities and differences, and examination of processes responsible for their development. Structural framework of the continent: cratonic, shield, and geosynclinal elements. Prerequisite: GS major or consent of Department Chair.

GES 300 Oceanography: The Human Perspective 3 hrs.
(Gen. Ed. TS)

Introduction to scientific oceanography and its relationship to human life. History of oceanography and its technology; crustal movements; the ocean as a source of mineral resources; the variety of ocean life such as jellyfish and sharks, and their danger; whales and the human perspective of "lower" life; sound and submarine warfare, waves and their potential energy and destructive capacity; human pollution. Prerequisite: one college-level science course.

GES 302 Invertebrate Zoology 4 hrs.

Detailed biological survey of major groups of invertebrate animals. Emphasis on marine phyla with good fossil representation. Dissection of representative types. Lecture and laboratory. Cross listed as BIO 302. Prerequisite: elementary zoology or biology or historical geology with laboratory, or consent of instructor.

GES 305 Petrology and Petrography 4 hrs.

Origin of igneous and metamorphic rocks; processes responsible for their development. Microscopic and megascopic examination of textures and constituent minerals. Lecture and laboratory; field trip. Prerequisite: GES 201.

GES 311 Geomorphology 3 hrs.

Detailed analysis of the origin, control of development, evolution, and classification of landforms produced in various geologic materials and structures. Lecture and laboratory. Prerequisites: GES 101, 102; or consent of instructor.

GES 312 Structural Geology and Tectonics 4 hrs.

The earth's crust; emphasis on deformation in its upper part, and causes and effects of deformation as indicated in the rocks and rock units. Lecture and laboratory. Prerequisites: GES 101; trigonometry.

GES 321 Paleontology 4 hrs.
Life, from its earliest record to the present. Emphasis on large scale aspects of evolution. General survey of pertinent concepts in morphology, genetics, taxonomy, and ecology; introduction to elementary quantitative methods; megascopic and microscopic study of major types of fossils. Lectures, laboratory work, independent research, field trips. Prerequisite: GES 110, 111, 302; or consent of instructor.

GES 335 Weather Elements 3 hrs.
Analysis of fundamental physical processes of the atmosphere; their relationships to the daily weather pattern and weather forecasting in the U.S. Prerequisite: GES 101, or consent of the instructor.

GES 407 Sedimentology 4 hrs.
Geology of sedimentary deposits: sedimentary processes; genetic interpretation of sediments and sedimentary rocks. Lectures, laboratory, independent research, field trips. Prerequisite: GES 202.

GES 410 Principles of Geochemistry 3 hrs.
Origin and distribution of chemical elements in nature. Geochemical processes; their relationship to evolution of rock and mineral systems. Prerequisite: GES 202.

GES 421 Stratigraphy 4 hrs.
Concepts and methods in description, classification, correlation, and interpretation of stratified rocks. Field studies. Prerequisite: GES 321.

GES 450 Hydrogeology 3 hrs.
Introduction to geologic and hydrologic aspects of groundwater. Emphasis on hydrogeologic systems that may be impacted by pollutants: waste disposal, site exploration, site testing, and prediction of the fate of contaminants in the subsurface. Laboratory measurements of permeability, porosity, physical and chemical properties of soil, and hydrodynamic dispersion parameters. Prerequisites: PHY 201, MTH 122, and CS 104; or equivalents; or consent of instructor.

GES 461 Introductory Geophysics 3 hrs.
Introductory examination of the earth using principles of physics and applied mathematics. The earth's place in the Universe; the earth's structure, shape, heat flow, and magnetic and electric characteristics; processes responsible for these characteristics. Prerequisite: consent of instructor.

GES 493, 494 Special Topics in Geological Sciences 1-4 hrs. each
Topics of special interest which may vary each time course is offered. Topic stated in current Schedule of Classes. May be repeated under a different topic for a maximum of 8 hrs. credit per course.

GES 505 Field Observation in Natural History 4 hrs.

For non-majors: field oriented investigation of diverse topographic forms, mountain structures, and materials composing the earth. Develops understanding of rapidly deteriorating environment through observation of geophysical, astronomical, and biological variations. One week of classes; three week bus trip to marine station, and return. Not open to undergraduate geological sciences majors.

GES 546 Groundwater Hydrology & Hydraulics 3 hrs.
Groundwater in the hydrological cycle, fundamentals of groundwater flow; flow net analysis; steady-state and transient well testing techniques for parameter estimation; multiple well systems; leaky aquifers; sea water intrusion; groundwater investigation; artificial recharge of aquifers, design of wells; subsidence and lateral movement of land surface due to groundwater pumping. Design and computer applications. Cross listed as CE 546. Prerequisites: CE 202, 304, or consent of instructor.