

## **GEOLOGY COURSES (GEOL)**

### **100 Earth Science (4)**

Interdisciplinary overview of the planet Earth, including the origin and evolution of its physical features, the role of modern technology in refining plate tectonic theory, and a look toward Earth's future. On demand. Lecture 3 hours, laboratory 2 hours.

### **108 Geomorphology (3)**

Scientific account of the general configuration of Earth's surface and the evolution of land forms. On demand. Lecture 3 hours.

### **111 Physical Geology (3)**

Introduction to geology with emphasis on the origin of Earth, geological materials (minerals, rocks), geological processes and events (mountain building, erosion, earthquakes, volcanic activity) and geological features (oceans, land forms). Field trips. Every semester. Prerequisite: math placement level 20 or Mathematics 106. Corequisite: Geology 181 laboratory, or approval of department head.

### **112 Historical Geology (3)**

Geologic history of Earth, with emphasis on geologic time and the evolution of life as gleaned from the fossil record. Field trips. Every semester. Prerequisite: Geology 111 or approval of the instructor. Corequisite: Geology 182 laboratory, or approval of the head of the department.

### **116 Current Geological Perspectives of Earth (3)**

Geological perspectives of Earth and the ways in which it enhances and limits our life styles, including natural disasters and basic issues of sustainability. Promotes an understanding of Earth and the insights necessary to making conscientious environmental decisions. Specific topics may vary in keeping with current issues. On demand. Prerequisite: math placement level 20 or equivalent college math course. Cannot be used to satisfy Geology major requirements.

### **123 Environmental Geology (4)**

Natural, mining, and industry related environmental hazards, including interactions of water, rock, and air, and the attempts of humanity to remedy these problems. On demand. Lecture 3 hours, laboratory 1 hour.

### **181 Physical Geology Laboratory (1)**

Laboratory to accompany Geology 111. Laboratory studies of minerals and rocks, topographic maps and geologic process and events. Two hours per week. Every semester. Corequisite: Geology 111 or approval of the head of the department head.

### **182 Historical Geology Laboratory (1)**

Laboratory to accompany Geology 112. Laboratory studies of rocks, geologic maps and geologic structures, stratigraphic data sets, selected fossil and recent specimens of major taxonomic groups of organisms. Every semester. Two hours per week. Corequisite: Geology 112, or approval of the head of the department.

### 199r Special Projects (14)

Individual or group projects. On demand. Prerequisites: receipt of an acceptable proposal, and approval of the instructor and department head. Graded on a satisfactory/no credit basis. Cumulative limit of 4 hours.

### 225 Oceanography (3)

Study of the oceans, including chemical and physical properties of sea water, patterns of seawater circulation, life zones, origin and physiography of ocean basins, and mineral and energy resources of the oceans. On demand. Lecture 3 hours. May be registered as Environmental Science 225.

### 226 Oceanography Laboratory (1)

Laboratory exercises in oceanography. On demand. Corequisite: Geology 225.

### 303 Sedimentary Rocks and Stratigraphy (4)

Sedimentary rocks and stratigraphic correlation with emphasis on the classic stratigraphy of eastern North America, the facies concept, and paleogeographic reconstruction of the continents. Field trips. Fall semester, alternate years. Lecture 3 hours, laboratory 3 hours. Prerequisite: Geology 112/182.

### 307 Geology of Tennessee (3)

Geologic resources, structure, and history of Tennessee and adjacent areas. Lecture and field trips. On demand. Prerequisite: a previous course in geology.

### 321 Paleontology (4)

Study of animals that are preserved in the fossil record, particularly taxonomy and population, interpretation of faunal assemblages, and the concept of biostratigraphy. Laboratory exercises emphasize morphology and time ranges of major fossil groups. Field trips. Spring semester, alternate years. Lecture 3 hours, laboratory 3 hours. Prerequisite: Geology 112/182.

### 341 Mineralogy (4)

Crystallography, descriptive and determinative mineralogy, mineral chemistry, and methods of chemical analysis. Fall semester. Lecture 3 hours, laboratory 3 hours. Prerequisites: Geology 111/181, Chemistry 121/123.

### 342 Petrology (4)

In depth study of igneous and metamorphic rocks, including classification, genesis, and evolution. Field trips. Spring semester. Lecture 3 hours, laboratory 3 hours. Prerequisite: Geology 341.

### 330 Sedimentation (4)

Interpretation of ancient depositional environments from outcrop observations, well logs, and modern-day analogs. Extensive field work. On demand. Lecture 3 hours, laboratory 3 hours. Prerequisite: Geology 303 or approval of the instructor.

#### 405 Principles of Geochemistry (4)

Origin, distribution, and behavior of chemical elements on Earth. Applications of chemistry to geologic problems. On demand. Lecture 3 hours, laboratory and recitation 2 hours. Prerequisites: Geology 111/181 and 1 year of college chemistry. Calculus level math is highly recommended.

#### 406 Lithology: Study of Rocks (4)

Identification and study of common rocks and their plate tectonic environments. Lecture 3 hours, laboratory 2 hours. Prerequisite: Approval of instructor.

#### 407 The Dynamic Earth (3)

History, theory, and application of plate tectonics models to explain the dynamic character of the Earth. On demand. Lecture 3 hours. Prerequisite: Geology 111/181 or approval of instructor.

#### 431 Sedimentary Petrology (3)

In depth study of sedimentary rocks, including genesis and classification of clastic and chemical varieties. Field work. On demand. Variable lecture and laboratory time dependent on topic. Prerequisite; Geology 330.

#### 436 Fossil Fuels (3)

Stratigraphic and sedimentological study of fossil fuel deposits and the scientific basis for fossil fuel exploration, including interpretation of gamma ray well logs and preparation of panel diagrams, structure contour maps and isopach maps. On demand. Prerequisite: Geology 111/181.

#### 442 XRay Diffraction Methods (1)

Theory and use of Xray diffraction to identify and characterize minerals. Powder diffraction methods are emphasized. Fall Semester. Lecture 1 hour. Pre or Corequisite: Geology 341 or approval of instructor.

#### 445 Hydrology (3)

Occurrence and behavior of water in the geologic environment, including drainage systems, erosional and depositional processes, causes and controls of flooding, groundwater systems, and water quality problems. Field work. On demand. Prerequisites: Geology 111/181 and Chemistry 121/123.

#### 450 Economic Geology (4)

Origin, distribution, and classification of mineral deposits found in igneous, sedimentary, and metamorphic rocks with an introduction to methods of exploration and mining. On demand. Lecture 3 hours, laboratory 3 hours. Prerequisites: Geology 342; Chemistry 122/124.

#### 451 Structural Geology (4)

Theory and principles of rock deformation, description and classification of common geologic structures, and laboratory methods to solve structural problems. Field trips. Fall semester, alternate years. Lecture 3 hours, laboratory 3 hours. Prerequisite: Geology 342.

#### 452 Field Methods in Structural Geology (4)

Methods of gathering data in the field and interpretation of field relationships, as necessary to geologic mapping and analysis of geologic structures. Extensive field work. Spring semester, alternate years. . Lecture 3 hours , laboratory 3 hours. Prerequisite: Geology 451.

#### 454 Geologic Mapping (3)

Mapping of lithology and structural features in sedimentary and crystalline rocks. Extensive field work. On demand. Prerequisites: Environmental Science 340 or Geology 352 and approval of the instructor.

#### 474 Water Quality Survey (3)

Concepts of water quality, including sampling methods, units of concentration, and simple analytical procedures. Concepts are augmented by field and laboratory studies of ground and surface water. Field work. On demand. Prerequisites: Geology 111/181 or 123; Chemistry 121/123, 122 /124; senior standing, and approval of the instructor. Chemistry 351/353 and Geology 341 are recommended.

#### 480 Geology Seminar (1)

Seminar and discussion of topics of current interest in the earth sciences. Student presentations required. Spring semester. Prerequisite: Upper level or graduate standing.

#### 490 Senior Seminar (2)

Culminating senior experience giving students an opportunity to design and conduct research related to geologic problems. Spring semester. Prerequisites: Geology 480 and approval of the instructor.

#### 495r Departmental Honors (1–3 hours per term, 4 hours for the two terms)

On demand. Graded on a satisfactory/no credit basis.

#### 496r Geology Field Experience (1–4)

Participation in the examination of the geology of a region based on a department sponsored geologic expedition. Pre and post trip written reports are required. On demand. Prerequisites: introductory course in the natural sciences, and approval of the instructor.

#### 497r Research (1–4)

On demand. Prerequisites: receipt of acceptable research proposal, and approval of the instructor and department head. Graded on a satisfactory/no credit basis. Cumulative limit of 4 hours.

#### 498r Individual Studies (1–4)

On demand. Consent of instructor, receipt of an acceptable proposal, and approval of the department head. Graded on a satisfactory/no credit basis. Cumulative limit of 4 hours.

#### 499r Group Studies (1–4)

On demand. Approval of instructor. Cumulative limit of 4 hours.