

Geology (GEOL)

GEOL 1101 Earth Science NonSci Maj I Lab **1 SCH (0-2)**

A laboratory experience that focuses on laboratory techniques, data collection, and analysis. Reinforces and promotes greater understanding of concepts presented in GEOL 1301. Prerequisite: credit or registration in GEOL 1301.

Fee: \$5.00

GEOL 1102 Intro Ocean Astron & Atmos Lab **1 SCH (0-2)**

A laboratory experience that focuses on laboratory techniques, data collection, and analysis. Reinforces and promotes greater understanding of concepts of the oceans, the hydrosphere and atmosphere, and astronomy as presented in GEOL 1302. Prerequisite: credit of registration in GEOL 1302.

Fee: \$5.00

GEOL 1103 Physical Geology Laboratory **1 SCH (0-2)**

A laboratory experience that focuses on laboratory techniques, data collection and analysis. The experience reinforces and promotes greater understanding of earth materials and the physical processes at work on and in the earth. Prerequisite or corequisite: GEOL 1303.

Fee: \$5.00

GEOL 1104 Historical Geology Lab **1 SCH (0-2)**

A laboratory experience that focuses on laboratory techniques, data collection and analysis. The experience reinforces and promotes greater understanding of the events and processes that have shaped the earth and influenced the development of life through time. Prerequisite or corequisite: GEOL 1304.

Fee: \$5.00

GEOL 1301 Earth Sciences for Non-Sci Maj **3 SCH (3-0)**

Study of the earth and the concepts and physical properties responsible for its problems including volcanoes, earthquakes, floods and droughts. Includes the study of plate tectonics, physical geology and geomorphology. Field trips may be arranged. Designed for students not majoring in science or engineering.

GEOL 1302 Intro Ocean, Astron & Atmos **3 SCH (3-0)**

Survey of earth's dynamic systems: the oceans, the hydrosphere and the atmosphere. Survey of astronomy emphasizing earth's place in the universe. Field trips may be arranged. Designed for students not majoring in science or engineering. Open to geosciences majors.

GEOL 1303 Physical Geology **3 SCH (3-0)**

General composition and form of the earth's surface and the volcanic, erosional, depositional and deformational processes which operate on it. The properties of the interior of the earth inferred from earthquakes and other external evidence. Occasional field trips may be arranged.

GEOL 1304 Historical Geology **3 SCH (3-0)**

The important change through which the earth has passed since its origin as a planet; especially, the history of the orderly evolution of life and physical features evidenced in the rocks of the earth. Field trip and field trip fee required. Prerequisite: GEOL 1303. Field Trip Fee will be required.

Fee: \$20.00

GEOL 2376 Nature of Earth and Universe **3 SCH (3-2)**

Survey of the basic concepts of geosciences. This course begins with an introduction to astronomy and the Earth's position in our solar system. The course includes the interrelationships between the solid portion, hydrosphere, atmosphere and biosphere of the Earth. Prerequisite: BIOL 2375, CHEM 1376.

GEOL 3107 Field Geology Laboratory **1 SCH (0-3)**

Methods of collection of geological field data and its presentation; proper use of geological field and lab equipment and instruments; interpretation of various types of map systems. Overnight camping field trip required, and local mini-field trip reports. Prerequisite: Credit or registration in GEOL 3307, or permission of instructor. Field trip fee required.

Fee: \$40.00

GEOL 3170 Intro to Geophysics Laboratory **1 SCH (0-3)**

Structure of the earth, plate tectonics, and sea-floor spreading. Principles of seismology, gravity, heat flow, geomagnetism, and rock magnetism. Prerequisite: registration or credit in GEOL 3370.

GEOL 3307 Field Geology **3 SCH (3-0)**

Geologic mapping on topographic maps and aerial photographs. Interpretation of field relationships. Basic topographic surveying methods and measurements using the Global Positioning System (GPS). Prerequisite: GEOL 1304/GEOL 1104. Concurrent enrollment in GEOL 3107 recommended.

GEOL 3370 Introduction to Geophysics **3 SCH (3-0)**

Application of classical physics to the study of the Earth and the solution of problems in Earth sciences. Geomagnetism, the Earth's gravitational field, seismic analysis, sequence stratigraphy, well log interpretation, and applications to petroleum exploration. Prerequisites: GEOL 1303/ GEOL 1103, PHYS 2325/ PHYS 2125, PHYS 2326.

GEOL 3409 Mineralogy 4 SCH (3-3)

Morphological crystallography and symmetry concepts. Methods of identification of minerals by their physical and chemical properties. Origin of economic minerals and ore deposits. Geological significance of common rock-forming minerals. One weekend field trip required. Prerequisites: GEOL 1303/GEOL 1103 and 3 hours of chemistry. Field Trip Fee will be required.

Fee: \$5.00

Fee: \$40.00

GEOL 3411 Petrology 4 SCH (3-3)

Classification and origin of igneous, sedimentary and metamorphic rocks. Laboratory emphasis on identification and interpretation of hand specimens. One weekend field trip required. Field trip fee required. Prerequisite: GEOL 3409. Field Trip Fee will be required.

Fee: \$5.00

Fee: \$40.00

GEOL 3431 Stratigraphy and Sedimentology 4 SCH (3-3)

Study of the composition, environment, sequence and correlation of stratified rocks. Prerequisites: GEOL 1303/GEOL 1103 and GEOL 1304/GEOL 1104. Field Trip Fee will be required.

Fee: \$5.00

Fee: \$40.00

GEOL 3445 Oceanography 4 SCH (3-3)

Methods and principles of oceanography. The physical and chemical properties of the seas, life in the sea and a comprehensive treatment of marine geology. Saturday field trips will be arranged. Prerequisites: GEOG 1301/GEOL 1101 or GEOL 1303/GEOL 1103 or GEOL 1301/GEOL 1101. May be used for geography credit.

Fee: \$5.00

GEOL 3446 Computational Methods in Geosciences 4 SCH (3-3)

Time series analysis, autocorrelation, cross-correlation, Fourier transform, Z transform, filtering, deconvolution, wave equation migration, forward and inverse problems, finite difference methods, and tomography. Prerequisites: GEOL 3370 / GEOL 3170.

GEOL 3481 Structural Geology 4 SCH (3-3)

The inherent and imposed structures in rocks and their modes of formation. Mechanical principles of rock deformation, petrofabrics, regional structural interpretation, theories of mountain building and geotectonics. Prerequisites: GEOL 1303/GEOL 1103 and GEOL 1304/GEOL 1104. Field Trip Fee will be required.

Fee: \$5.00

Fee: \$40.00

GEOL 4107 Applied Geology Lab 1 SCH (0-3)

Laboratory course to accompany GEOL 4307. Field and laboratory applications of geological concepts in solving geological engineering problems. Study of engineering principles and properties of earth materials. Exploration of engineering design and methods of site investigations. Prerequisite: registration or credit in GEOL 4307.

Fee: \$20.00

GEOL 4175 Seismology Laboratory 1 SCH (0-3)

Interpretation of the spatial component of three-dimensional seismic data. Identification of faults and horizons within real-world volumes. Data loading, preparation, and examination, along with correlation of interpretation to geologic well control. Emphasis on the application of seismic interpretation to hydrocarbon exploration. Prerequisite: registration or credit in GEOL 4375.

GEOL 4307 Applied Geology 3 SCH (3-0)

Applications of geological concepts in solving geological engineering problems. Study of engineering principles and properties of earth materials. Exploration of engineering design and methods of site investigations. Prerequisites: GEOL 1303, MATH 1316, CHEM 1311/CHEM 1111.

GEOL 4313 Industry Geotech Training 3 SCH (1-7)

Application of technology/software, field work, laboratory analysis or other geologic technique(s) during internship experience. Foundation of the course is on the application of theory/practice to develop an internship project that is due at the end of the term with emphasis on career and communication skills. The course may be taken after the completion of a formal internship, or during the practice of one. The writing component for the course is a formal technical report of skills, equipment, and applications of the science that were utilized during the internship. Prerequisites: GEOL 3107, GEOL 3307, GEOL 3411, GEOL 3431, and GEOL 3481 recommended. Field trip may be required. Students not meeting all prerequisites may be recommended by instructor.

GEOL 4375 Seismology (WI) 3 SCH (3-0)

Basics of seismology, starting with wave propagation, seismic reflection and refraction. The physics of determining the seismic velocity and anisotropy structure of the Earth. Earthquake generation, post-seismic deformation and creep events, and their relation to faulting and plate tectonics. Prerequisites: GEOL 1303/ GEOL1103, PHYS 2325/ PHYS 2125, PHYS 2326, GEOL 3370.

GEOL 4395 Special Problems 1-3 SCH (1-3)

Supervised individual research of a geological problem that meets the needs and interest of the student. May be repeated for a maximum of 3 semester hours credit. Prerequisite: 18 semester hours of geology prior to registration.

GEOL 4405 Senior Research Project 4 SCH (3-3)

Collaborative research project involving the student and a geology faculty member, focused on a topic that requires mastery of geologic knowledge appropriate to the student's plans for a professional career or advanced study in the field. Prerequisite: senior standing in geology.

Fee: \$10.00

GEOL 4425 Hydrogeology 4 SCH (3-3)

Principles of fluid, mass and energy transport in geologic formations are emphasized to handle human affair problems such as water supply, contamination and energy resources. Prerequisite: GEOL 1303/GEOL 1103 and GEOL 1304/GEOL 1104.

GEOL 4441 Non-Seismic Geophys. Explor. 4 SCH (3-3)

Overview of gravity, magnetism, and other geophysical properties applied to exploration. Focus in on acquiring, processing, and interpreting non-seismic geophysical data and on integration of raw data with other geophysical and geologic data. Prerequisites: GEOL 3370/ GEOL 3371; GEOL 3446.

GEOL 4615 Geology Field Camp (WI) 6 SCH (1-15)

Geologic field methods and techniques. Includes the use and maintenance of field equipment; measurement, description and interpretation of stratigraphic sections; identification and interpretation of field relationships of various rocks; preparation of geological field reports. Typically scheduled in summer with daily day-long activities; special travel charges may apply. Prerequisites: GEOL 3431 and approval of instructor; GEOL 3307/GEOL 3107; GEOL 3411 and GEOL 3481 recommended.

Fee: \$80.00