

# GEOLOGY (GEOL)

## Course Descriptions

### GEOL 550 Glacial Geology 3 Credit Hours

The study of landforms and sediments created by glaciers both past and present. The glacial activities of the past 2 million years will be emphasized, particularly the evolution of landforms common to the upper Midwest. The influence of glacial deposits on development, construction methods, planning and environmental protection will also be discussed. (AY).

**Prerequisite(s):** GEOL 118 and GEOL 218

**Restriction(s):**

Can enroll if Class is Graduate

### GEOL 560 Structural and Engineering Geology 4 Credit Hours

GEOL 460/560 is the application of structural geology and stratigraphy to the practice of geology and civil engineering. Emphasis is placed on the application of geologic analysis to facilitate the understanding of dynamic Earth processes such as faulting and folding as well as the successful completion of engineering projects. Case histories will be used to evaluate how geologic knowledge has been used in both successful and unsuccessful engineering projects. (AY, W).

**Prerequisite(s):** GEOL 118

**Restriction(s):**

Cannot enroll if Class is Freshman or Sophomore or Junior

### GEOL 570 Geochemistry 3 Credit Hours

Application of the principles and techniques of geochemistry to the field of groundwater hydrology. Composition of natural water and the processes affecting the geochemical mobility of dissolved solids will be studied. Emphasis will be on the influence of the geochemical environment on water composition and water pollution. Course will include a review of analytical methods for the determination of water quality. Three hours lecture. (AY).

**Prerequisite(s):** GEOL 375 and CHEM 344

**Restriction(s):**

Can enroll if Level is Rackham or Graduate

Can enroll if College is Business

### GEOL 574 Urban Watersheds 3 Credit Hours

Study of the geology, contamination and sustainable development in urban watersheds with a focus on the fate and transport of contaminants in the soil and water. Students are expected to have a rudimentary background in physical geology.

### GEOL 575 Contaminant Hydrogeology 3 Credit Hours

Advanced lecture treatment of selected topics in subsurface hydrology including contaminant transport and fate of organic and inorganic constituents, aquifer test analysis, and the use of selected case histories. (AY)

**Prerequisite(s):** GEOL 375

**Restriction(s):**

Can enroll if Class is Graduate

### GEOL 577 Environmental Field Methods 1 to 4 Credit Hours

An intensive, off-campus field course that provides students an opportunity to observe and critically study different natural and human environments. Students learn how to collect data in a systematic way and formulate scientific inferences about environmental processes, products, and problems. Students also learn preparation techniques for conducting long days in the field under varying weather conditions and in challenging terrains. The course may be repeated for credit when destination varies. There is a mandatory pre-departure meeting; trip length varies depending on offered credits. (OC). (OC).

**Restriction(s):**

Can enroll if Class is Graduate

### GEOL 578 Field Geology 3 Credit Hours

Introduction to geological field methods; detailed rock descriptions, how 3-dimensional structures are visualized, described, and how maps and cross sections are constructed from field data. (F, AY).

**Restriction(s):**

Can enroll if Class is Graduate

### GEOL 587 Groundwater Modeling 3 Credit Hours

Lecture and computer laboratory applications of two- and three-dimensional groundwater flow and contaminant transport problems. Visual Modflow, Modpath (-PLOT and SUTRA), MT3D, and Surfer will be used to evaluate remedial alternatives (e.g., pump and treat, funnel and gate or trench and drain systems). EPA's Basin software combined with ESRI's GIS software ArcView will be used to evaluate and compare the Rouge River watershed with other small-scale watersheds in Michigan. (AY)

**Prerequisite(s):** GEOL 375 or GEOL 498\*

**Restriction(s):**

Can enroll if Class is Graduate

### GEOL 590 Topics in Earth Science 1 to 4 Credit Hours

Current topics in Earth Science. One to four graduate credit hours. (OC)

**Restriction(s):**

Can enroll if Class is Graduate

\*An asterisk denotes that a course may be taken concurrently.

### Frequency of Offering

The following abbreviations are used to denote the frequency of offering: (F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally