

## Physical Geology I

### GEOL 1040

**Major competencies:** Students will demonstrate proficiency on a broad range of geological topics. These proficiencies include the following:

(1.) Identification of minerals and rocks; (2.) The application of concepts in plate tectonics to the rock cycle, volcanism, seismology, geomorphology, and continental movement; (3.) Integration of the general processes of weathering, mass movement, erosion, and deposition to explain the origin of specific landforms and landscapes; (4.) Integration of geologic features with the hydrologic cycle in order to characterize the geohydrology of an area; (5.) The ability to use geologic “tools” such as topographic maps, compasses, and remote sensing in interpreting geologic concepts and problems.

**Teaching methods used:** The teaching strategies employed in any given semester will likely vary from instructor to instructor. The strategies will include, but not be limited to, lecture, audio-visual/computer supplements, discussions, small-group problem solving, and field trips. Specific emphasis will be given to Power Point, “hands-on” analysis of rocks, and minerals, topographic maps, and practice with analyzing geologic data.

**Administrative instructions:** Attendance policies will vary by instructor. However, in all cases laboratory experience will be viewed as an integral part of the course. As such, lab attendance is mandatory and unapproved absences of more than 25% of lab meetings will result in a failing grade for the complete course. Regular class (lecture) attendance policy is left to the individual instructor.

**Evaluation plan:** The “target” grading percentages are shown below. However, these may vary according to the individual instructor.

<u>Instrument</u>	<u>% of Final Grade</u>
(1) Three written exams	65%
(2) Lab work with attendance	25%
(3) Two lab exams (or 2-4 quizzes)	10%
(4) Extra credit projects at discretion of instructor	0-25%
(5) Subjective evaluation of participation in class activities/discussions	0-25%

## **Major Course Competencies:**

### **I. Demonstrate plate tectonics as a unifying theme in physical geology.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Describe the dynamics of plate processes, origins, and activities.	Exam, class discussion	Lecture, video, Power Point, transparencies
2. Describe the characteristics of different types of plate boundaries and relate these types.	Exam, class discussion	Lecture, transparencies, small-group discussion

### **II. Demonstrate an understanding of the principles by which minerals and rocks are classified and grouped.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method (s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Identify, classify, and group various common minerals and rocks.	Lab exercises, lab exam	Lecture, lab experiments, field trips, microscopes
2. Learn to associate mineral and rock properties with larger geologic events/ processes occurring at time of origin.	Lab exercises, lab exam, lecture exam	Lecture, lab exercises
3. Describe the economic significance geologic and occurrence of important minerals and rocks.	Exam, lab exercises	Lecture, assigned reading

### **III. Demonstrate a knowledge of volcanic terminology, processes, and types.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Identify the different types of volcanoes and related features.	Exam	Lecture, transparencies, Videos, Power Point
2. Describe relationships between plate boundaries (tectonics) and volcanic events.	Exam, class discussion, lab exercises	Lecture, transparencies, Power Point
3. Relate volcanic processes to formation of igneous rocks.	Exam, lab exercises	Lecture, lab experiments, small group discussion
4. Define hazard zones for human populations.	Exam	Lecture, assigned reading

#### **IV. Relate structural geology to processes of formation and to landscape development.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Define the processes which create different types of folding and faulting.	Exam, class discussions	Lecture, assigned readings, field trip, transparencies, Power Point
2. Demonstrate the relationship between specific types of folding and faulting to particular landforms.	Exam, class discussions	Lecture, assigned readings, field trip, transparencies, Power Point

#### **V. Demonstrate a knowledge of principles of seismology.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Describe the relationship between seismic activity and plate boundaries, as well as exceptions to general principle.	Exam, class discussion	Lecture, videos, transparencies, assigned reading, Power Point
2. Describe the various types of seismic waves and their significance to understanding both earthquakes and the earth.	Exam, class discussion	Lecture, assigned reading, Power Point
3. Describe methods of measurement and prediction of earthquakes.	Exam	Lecture, assigned reading, videos, Power Point
4. Define hazard zones for human populations.	Exam, class discussion	Lecture, assigned reading,

#### **VI. Relate the significance of the erosion cycle to geomorphology and the development of landscapes.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Demonstrate the dynamic character of landscapes as influenced by the erosion cycle.	Exam, lab exercises	Lecture, lab exercises, transparencies, assigned Reading, Power Point
2. Demonstrate the roles of weathering, mass movement, erosion (wind and water), and deposition in the evolution of landscapes.	Exam, class discussion	Lecture, field trip, transparencies, small group discussion, field trip
3. Recognize major processes at work through specific landforms that are present.	Exam, class discussion	Lecture, field trips, assigned reading, transparencies, field trip

**VII. Demonstrate a knowledge of glacial processes, principles, and landforms.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Relate glacial episodes to natural climatic fluctuation and processes.	Exam	Lecture, assigned reading, Power Point
2. Place glacial episodes in an historical perspective.	Exam	Lecture, assigned reading
3. Demonstrate relationships between glacial processes and resultant glacial landforms.	Exam, lab exercise	Lecture, lab exercises, assigned reading, topographic maps
4. Use glacial landforms as indication of past events and processes.	Exam	Lecture, assigned reading

**VIII. Describe relationships between ocean processes and coastal landforms.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Identify various processes of coastal erosion and deposition.	Exam, lab exercises	Lecture, lab exercises, assigned reading, topographic maps Power Point
2. Define the significance of coastal landforms.	Exam	Lecture, assigned reading, Power Point
3. Analyze coastal environments as sites for human habitation.	Exam, class discussion	Lecture, assigned readings, group discussions, videos

**IX. Demonstrate a knowledge of the basic principles of geohydrology.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Define the concept of groundwater and its behavior.	Exam, class discussion	Lecture, assigned reading, class discussion, Power Point
2. Describe different types of aquifers.	Exam, class discussion	Lecture, assigned reading
3. Explain principle and conditions affecting underground movement of water.	Exam, class discussion	Lecture, assigned reading
4. Describe problems of groundwater contamination and cleanup, and excessive use of groundwater.	Exam, class discussion	Lecture, assigned reading, class discussion

**X. Demonstrate a knowledge of the Geologic Time Scale.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Describe the origin and significance of the Geologic Time Scale	Exam	Lecture, assigned reading
2. Use the Geologic Time Scale as an aid to interpreting past geologic events.	Exam, class discussion	Lecture, assigned reading, class discussion, field trip

**XI. Apply the “tools” of geology to analyses of geologic problems.**

<b><u>Related Skills</u></b>	<b><u>Evaluation Method(s)</u></b>	<b><u>Teaching Strategy</u></b>
1. Demonstrate the use of topographic maps.	Map exam, field exercise, lab exercises	Lecture, lab and field demonstrations and exercises
2. Demonstrate the use of a compass.	Field exercise	Field demonstration / exercises
3. Demonstrate the use of stereoscopes in interpreting aerial photographs.	Lab exercise, lab exam	Lab demonstration / exercises