



# ILLINOIS VALLEY COMMUNITY COLLEGE

## COURSE OUTLINE

**DIVISION: Natural Sciences & Business**

**COURSE: GEL 1008 Physical Geology**

Date: Spring 2022

Credit Hours: 4

*Complete all that apply or mark "None" where appropriate:*

Prerequisite(s): None

Enrollment by assessment or other measure?  Yes  No

If yes, please describe:

Corequisite(s): None

Pre- or Corequisite(s): None

Consent of Instructor:  Yes  No

Delivery Method:  **Lecture**                      **3 Contact Hours** (1 contact = 1 credit hour)  
 **Seminar**                              **0 Contact Hours** (1 contact = 1 credit hour)  
 **Lab**    **2 Contact Hours** (2-3 contact = 1 credit hour)  
 **Clinical**                                      **0 Contact Hours** (3 contact = 1 credit hour)  
 **Online**  
 **Blended**  
 **Virtual Class Meeting (VCM)**

Offered:  **Fall**     **Spring**     **Summer**

**CATALOG DESCRIPTION and IAI NUMBER (if applicable):**

An introduction to the study of the earth as it is carried on by geologists. Geological principles and processes dealing with mineral and rock identifications, plate tectonics, crustal deformation by folding, faulting, and volcanism, and landforms produced by erosional agents are some of the topics covered. Experience in aerial photo and topographic map interpretation is provided in laboratory exercises.

IAI Equivalent: P1 907L

## ACCREDITATION STATEMENTS AND COURSE NOTES:

None

## COURSE TOPICS AND CONTENT REQUIREMENTS:

1. Foundations of Geology  
Provides a description of the basic concepts of geology including scientific analysis, plate tectonics, the rock cycle, and the hydrologic cycle. Provides a discussion on the features and use of maps and remote sensing.
  - A. Introduction to Geology
  - B. Introduction to Scientific Investigation
  - C. The Rock Cycle
  - D. Maps
  - E. Remote Sensing Imagery
  
2. Minerals and Rocks  
Provides a discussion of the minerals including their formation and identification. Describes the three rock types, the rock forming processes (placed in the context of the rock cycle), and the identification of rocks.
  - A. Matter and Minerals
  - B. Igneous Rocks and Processes
  - C. Sedimentary Rocks and Processes
  - D. Metamorphic Rocks and Processes
  
3. External Geologic Processes  
Provides a discussion of external geologic processes and the landforms they produce. Includes a discussion of the importance of water as a geologic agent and its distribution as a resource.
  - A. Weathering and Soils
  - B. Rivers
  - C. The Ocean and Coast
  - D. Deserts and the Wind
  - E. Mass Wasting and Slopes
  - F. Groundwater
  - G. Glaciers
  
4. Internal Geologic Processes  
Provides a description of the structure of the earth's interior and geologic structures. Includes a discussion of the internal processes including stress and strain and plate tectonics.
  - A. Structural Geology
  - B. Earthquakes
  - C. The Earth's Interior
  - D. Plate Tectonics
  
5. The Earth's History  
Provides a brief description of the methods used to interpret the Earth's history and a discussion of the age of the Earth.
  - A. Relative Dating
  - B. Absolute (Actual) Dating

## **INSTRUCTIONAL METHODS:**

1. Lectures
  - A. In class
  - B. On-line videos with slides
2. Labs
3. Discussions
  - A. In-class
  - B. Asynchronous, web-based discussion
  - C. May include individual oral presentations on specified topics
4. Audio-visual Aids - videos, podcasts, slides, charts, and maps
5. Supplemental Reading
  - A. Internet sites
  - B. Journals and periodicals
  - C. Newspapers
  - D. Books
  - E. Pamphlets and brochures

## **EVALUATION OF STUDENT ACHIEVEMENT:**

1. Regular attendance and participation in discussion
2. Written assignments
  - A. Labs
  - B. Homework
  - C. In class
3. Exams
4. Quizzes
5. Classroom Assessment (non grade-based)

## **INSTRUCTIONAL MATERIALS:**

### **Textbooks**

- *Exploring Geology*, Reynolds, Stephen, et.al. McGraw Hill (current edition)
- *Laboratory Manual for Physical Geology*, Jones, N.W., McGraw Hill (current edition).

### **Resources**

- Links to appropriate internet sites provided in on-line course materials provided on course web site.

## **LEARNING OUTCOMES AND GOALS:**

### **Institutional Learning Outcomes**

- 1) Communication – to communicate effectively;
- 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion;
- 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally;
- 4) Responsibility – to recognize how personal choices affect self and society.

### **Course Outcomes and Competencies**

1. Understand how science works and the characteristics of physical geology.

- Competency 1.1: Identify the methodology of science.
- Competency 1.2: Critically evaluate datasets and infer valid conclusions from those datasets.
- Competency 1.3: Identify the basic concepts of geology as a method for the scientific study of the Earth.
2. Understand the formation, distribution, and classification of rocks and minerals.
- Competency 2.1: Describe the physical characteristics of minerals and identify minerals based on an analysis of those characteristics.
- Competency 2.2: Describe the three rock types and their origins.
- Competency 2.3: Describe the physical characteristics of rocks, and use those characteristics to identify rocks and evaluate their origin.
3. Understand the external physical processes that shape the surface of the earth.
- Competency 3.1: Identify the processes of physical and chemical weathering and describe their effect on rocks and minerals.
- Competency 3.2: Identify the properties of soils, describe the processes that contribute to the formation of soil.
- Competency 3.3: Describe the geological processes associated with slopes and mass wasting and the landforms produced by those processes; analyze slope failures and describe the processes that created them.
- Competency 3.4: Describe the geological processes associated with rivers and streams and the landforms produced by those processes; analyze fluvial landforms and describe the processes that created them.
- Competency 3.5: Describe the geological processes associated with waves and the coast and the landforms produced by those processes; analyze coastal landforms and describe the processes that created them.
- Competency 3.6: Describe the geologic processes associated with the deep ocean and the landforms produced by those processes; analyze the ocean floor and describe the processes that shaped it.
- Competency 3.7: Describe the geological processes associated with deserts and the wind and the landforms produced by those processes; analyze desert and eolian landforms and describe the processes that created them.
- Competency 3.8: Describe the geological processes associated groundwater and the landforms produced by those processes; analyze karst landforms and describe the processes that created them.
- Competency 3.9: Describe the geological processes associated with glaciers and the landforms produced by those processes; analyze glacial landforms and describe the processes that created them.
4. Understand the internal physical processes that shape the surface of the earth.
- Competency 4.1: Describe the types of stress to which rocks are subjected and describe the response of rocks to stress in terms of strain and structures.
- Competency 4.2: Describe the geological processes associated with folding and faulting and the landforms produced by those processes; analyze folds and faults and describe the processes (and stresses and strains) that created them.
- Competency 4.3: Describe the geological processes associated with earthquakes and the landforms produced by those processes; analyze seismic data, evaluate the earthquake that produced it and the geologic factors that influenced its effects.

- Competency 4.4: Describe the geological processes associated with igneous activity and the landforms produced by those processes; analyze igneous landforms (extrusive and intrusive) and describe the processes that created them
- Competency 4.5: Describe the process of plate tectonics and the evidence that supports it.
- Competency 4.6: Identify, analyze, and evaluate the features produced by tectonic activity, and describe their origin and significance.
5. Understand the importance of water as a resource and as a geologic agent.
- Competency 5.1: Describe the distribution of water and fresh water on the Earth's surface.
- Competency 5.2: Describe the hydrologic cycle and analyze and evaluate its impact on the distribution of water resources.
- Competency 5.3: Describe the distribution of surface water resources; analyze a drainage basin and evaluate the surface water resource.
- Competency 5.4: Describe the distribution of groundwater water resources; analyze groundwater characteristics and evaluate the groundwater resource.
6. Understand the internal structure of the earth.
- Competency 6.1: Describe the methods used to study the internal structure of the Earth.
- Competency 6.2: Describe the layers that form the internal structure of the earth.
- Competency 6.3: Describe the principle of isostasy and analyze and evaluate its effects on the shape of the Earth's surface.
7. Understand the methods used to interpret geologic history.
- Competency 7.1: Describe, analyze, and evaluate the rock record using the principles of uniformitarianism, superposition, original horizontality, and cross-cutting relationships.
- Competency 7.2: Identify unconformities and describe their significance.
- Competency 7.3: Describe the methods of radiometric dating, and analyze and interpret a radiometric sample data.
8. Understand the resources available for the study of geologic processes.
- Competency 8.1: Identify the features common to all maps, and use maps to identify human and geologic phenomena.
- Competency 8.2: Identify features common to topographic maps, and use maps to identify and analyze geologic phenomena.
- Competency 8.3: Identify features common to remote sensing imagery, and use remote sensing imagery to identify and analyze geologic phenomena.
- Competency 8.4: Identify publications useful in geologic research, and use those publications to study geologic features.