



# ILLINOIS VALLEY COMMUNITY COLLEGE

## COURSE OUTLINE

**DIVISION: Natural Sciences & Business**

**COURSE: GEL 1009 Historical 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):**

This course is an introductory study into the origin and structure of the earth. Emphasis will be placed on North America, dealing with the growth of continents, and mountain building. The course includes a study of evolutionary changes occurring in plant and animal life as documented by fossil remains and the interpretation of geologic forces by means of topographic and geologic maps. Field trips are an integral part of the course. 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 information on the basic types of earth materials including minerals, rocks, sediments, and soils.
  - A. Introduction to Geology
  - B. Earth Materials
  
2. The Historical Significance of Sedimentary Rocks  
Provides a discussion of sedimentary rocks, their formation and occurrence, and their use in the interpretation of geologic history.
  - A. Lithology
  - B. Color, texture and sorting
  - C. Sedimentary structures
  - D. Time, time-rock, and rock stratigraphic units
  - E. Geologic mapping
  
3. The Fossil Record  
Provides a description of life, fossilization, evolution, and the use of fossils to interpret geologic history
  - A. Definition of a fossil and methods of fossilization
  - B. Classification of fossils
  - C. Fossils and stratigraphy
  - D. Evolution
  
4. Plate Tectonics  
Provides a description of the process of plate tectonics, the evidence that supports plate tectonics, and the geologic features produced by the interactions of the plates.
  - A. The structure of the inner earth
  - B. Crustal structures
  - C. Evidence for plate tectonics
  - D. Plate tectonic features
  
5. Time and Geology  
Provides a description of the methods used to interpret geologic history and a description of the geologic time scale.
  - A. The standard geologic time scale
  - B. Methods of relative dating
  - C. Methods of absolute dating
  
6. The Early History of the Earth  
Provides a description of the Archeozoic & Proterozoic rocks and structures found worldwide and the interpretation of those rocks and structures.
  - A. The formation of the solar system and the Earth

- B. Development of the early Earth
  - C. Development of life
7. The Recent History of the Earth  
 Provides a description of the Phanerozoic rocks and structures found worldwide and the interpretation of those rocks and structures.
- A. Paleozoic rocks & tectonics
  - B. Paleozoic life
  - C. Mesozoic & Cenozoic rocks & tectonics
  - D. Mesozoic & Cenozoic life

### **INSTRUCTIONAL METHODS:**

1. Lectures
  - A. In class
  - B. On-line videos with slides
2. Labs
3. Field trips
4. Discussions
  - A. In class
  - B. Asynchronous, web-based discussion
  - C. May include individual oral presentations on specified topics
5. Audio-visual Aids - videos, podcasts, slides, charts, and maps
6. 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. Oral Presentations
4. Exams
5. Quizzes
6. Classroom Assessment (non-grade based)

### **INSTRUCTIONAL MATERIALS:**

#### **Textbooks**

- Text: *Historical Geology*. Wicander, R, and Monroe, J.S., (current edition)
- Lab text: *Historical Geology: Interpretations and Applications*. Poort, J.M. and Carlson, R.J., (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 historical 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.
  - Competency 1.4: Recognize historical geology as an application of the sciences of geology, biology, anthropology, and astronomy to the interpretation of the Earth's history.
2. Understand geologic processes and the impact of those processes on the geologic record.
  - Competency 2.1: Identify and differentiate the three rock types (igneous, metamorphic, and sedimentary) and the processes that form them.
  - Competency 2.2: Identify, analyze, and evaluate individual rocks and rock formations and describe their origin and significance in the context of the Earth's history
  - Competency 2.3: Describe the process of plate tectonics and the evidence that supports it.
  - Competency 2.4: Identify, analyze, and evaluate the features produced by tectonic activity, and describe their origin and significance in the context of the Earth's history.
3. Understand fossils and their impact on the geologic record.
  - Competency 3.1: Define fossils and be able to differentiate fossils from the rocks in which they occur.
  - Competency 3.2: Describe the various methods of fossilization and analyze fossils to determine the type of fossilization.
  - Competency 3.3: Identify the classification system used to biologically differentiate fossils and describe individual fossils and place them within the classification system.
  - Competency 3.4: Analyze and evaluate fossils to describe the environment in which they may have lived.
  - Competency 3.5: Describe, analyze, and evaluate the fossil record for evidence of the development of life through time including organic evolution and mass extinction.
4. Understand the structure, development, and use of the geologic time scale.
  - Competency 4.1: Describe the difference between rock units, time units, and time-rock units, and identify the methods used to describe each type of unit.
  - Competency 4.2: Identify the methods used to delineate the time units of the geologic time scale.

- Competency 4.3: Identify the names and time spans of the eons, eras, and periods of the entire geologic time scale and the epochs of the Cenozoic Era.
5. Understand the methods used to interpret geologic history.
- Competency 5.1: Describe, analyze, and evaluate the rock record using the principles of uniformitarianism, superposition, original horizontality, and cross-cutting relationships.
  - Competency 5.2: Identify unconformities and describe their significance.
  - Competency 5.3: Identify the methods used in correlation of rock units including sequence stratigraphy and fossil correlation. Describe, analyze, and correlate sequences of rocks.
  - Competency 5.4: Describe, analyze, and evaluate sedimentary rocks and fossils to determine the environment of deposition and the relative movement of sea level.
  - Competency 5.5: Describe the methods of radiometric dating, include the rock types in which the method is most useful, and the isotopes which are most commonly used.
6. Understand the evolution of the Earth's surface over time.
- Competency 6.1: Describe the rocks of the Archeozoic, Proterozoic, and Phanerozoic, including the nature of the rocks and where they are found.
  - Competency 6.2: Describe the major global geologic events of the Archeozoic, Proterozoic, and Phanerozoic and explain how those events have been interpreted.
  - Competency 6.3: Describe the major North American geologic events of the Archeozoic, Proterozoic, and Phanerozoic and explain how those events have been interpreted.
  - Competency 6.4: Examine and analyze local geologic features and interpret their geologic significance and history.