

Effective Implementation date: Spring 2018, 201830

Required Syllabus Information – all must be included in the course syllabus

**GEY 111**

**Course Title:** Physical Geology w/Lab: SC1

**Course Credits:** 4

**Course Description:** Introduces the major topics of geology. Course content encompasses Earth's materials, structure, and surface landforms. Geologic time and the geologic processes responsible for Earth's internal and external features are covered. This course includes laboratory experience.

**GT Pathways Requirements:**

**Guaranteed Transfer (GT) Pathways Course Statement:**

The Colorado Commission on Higher Education has approved GEY 111 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT- SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to <http://higherred.colorado.gov/academics/transfers/gtpathways/curriculum.html>.

**NATURAL & PHYSICAL SCIENCES (N&PS) CONTENT CRITERIA – GT-SC1**

1. The lecture content of a GT Pathways science course (GT-SC1)
  - a. Develop foundational knowledge in specific field(s) of science.
  - b. Develop an understanding of the nature and process of science.
  - c. Demonstrate the ability to use scientific methodologies.
  - d. Examine quantitative approaches to study natural phenomena.
2. The laboratory (either a combined lecture and laboratory, or a separate laboratory tied to a science lecture course) content of a GT Pathways science course (GT-SC1)
  - a. Perform hands-on activities with demonstration and simulation components playing a secondary role.
  - b. Engage in inquiry-based activities.
  - c. Demonstrate the ability to use the scientific method.
  - d. Obtain and interpret data, and communicate the results of inquiry.
  - e. Demonstrate proper technique and safe practices.

**COMPETENCIES & STUDENT LEARNING OUTCOMES FOR GT-SC1**

**Inquiry & Analysis:**

4. **Select or Develop a Design Process**
  - a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
5. **Analyze and Interpret Evidence**

- a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
  - b. Utilize multiple representations to interpret the data.
- 6. Draw Conclusions**
- a. State a conclusion based on findings.

**Quantitative Literacy:**

1. Interpret Information
  - a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. Represent Information
  - a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

**SYSTEM REQUIREMENTS:**

**REQUIRED COURSE LEARNING OUTCOMES**

1. Explain how geologists use the scientific method.
2. Recognize the vastness of geologic time and apply the techniques of relative and absolute dating.
3. Identify common minerals and rocks based on their observable characteristics.
4. Describe the characteristics of minerals and their basic chemistry.
5. Explain the origin of intrusive and extrusive igneous rocks and recognize features associated with each.
6. Demonstrate an understanding of the weathering processes involved in the transition from bedrock to sediment and soil.
7. Discuss the processes involved in the formation of sedimentary rocks and relate them to modern and ancient depositional environments.
8. Demonstrate an understanding of the agents and processes of metamorphism and relate these to the main types of metamorphic rocks.
9. Analyze the causes and effects of earthquakes and relate seismology to the structure of the earth.
10. Classify folds and faults, and discuss their origin.
11. Describe the hydrologic cycle and relate this concept to both surface and subsurface waters.
12. Discuss the mechanisms by which mass wasting, streams, ground water, glaciers, wind, and waves contribute to landscape evolution, and relate these mechanisms and agents to the origin of landforms.
13. Describe the geologic characteristics of deserts and coasts.
14. Locate and identify geologic features using topographic and/or geologic maps.
15. Discuss the basic lines of evidence for Plate Tectonics.
16. Identify the characteristics of plate boundaries and mantle plumes and their relationship to earthquakes, volcanoes, and mountain building.

**RECOMMENDED COURSE LEARNING OUTCOMES**

1. Describe the geologic processes responsible for the formation of fossil fuel and ore mineral resources.
2. Explain basic planetary geology and how Earth relates to other features in space.
3. Demonstrate an understanding of the evidence for climate change and how climate has changed throughout Earth's history.

## REQUIRED TOPICAL OUTLINE

The required topical outline information **MUST** be included in the syllabi. It may be incorporated using one of the following variations: copying the topical outline as written below, integrating the topics within the assignment schedule, or listing the topics to be covered.

- I. Introduction to Geology
  - a. Scientific method
  - b. Geologic applications
- II. Geologic time
  - a. Deep time
  - b. Relative age dating
  - c. Absolute age dating
- III. Matter and minerals
  - a. Basic chemistry concepts
  - b. Chemical characteristics of minerals
  - c. Physical properties of minerals
- IV. Igneous rock
  - a. Intrusive rocks and processes
  - b. Extrusive rocks and processes
  - c. Generation of magma
- V. Weathering and soils
  - a. Physical weathering
  - b. Chemical weathering
  - c. Soils
- VI. Sedimentary rock
  - a. Detrital/Clastic
  - b. Chemical and biochemical
  - c. Interpreting Earth history
- VII. Metamorphic rocks
  - a. Foliated and Non-foliated rocks
  - b. Metamorphic processes and settings
- VIII. Earthquakes and Earth's interior
  - a. Causes and effects of earthquakes
  - b. Seismology
  - c. Characteristics of Earth's interior
- IX. Structural geology
  - a. Folds
  - b. Faults
- X. Mass wasting
  - a. Types of down-slope movement

- b. Causes of down-slope movement
- XI. Streams
  - a. Hydrologic cycle
  - b. Erosion, transportation, and deposition
  - c. Drainage patterns and systems
  - d. Landscape evolution
- XII. Groundwater
  - a. Hydrologic cycle
  - b. Porosity, permeability, water table
  - c. Groundwater features
- XIII. Glaciers
  - a. Origin, classification, and characteristics of glaciers
  - b. Glacial erosional landforms
  - c. Glacial depositional landforms
- XIV. Deserts and wind
  - a. Causes and locations of deserts
  - b. Desert landforms
  - c. Erosional and depositional work of wind
- XV. Coastal geology
  - a. Ocean processes (e.g. waves)
  - b. Coastal geologic features
- XVI. Plate tectonics
  - a. Continental drift
  - b. Seafloor spreading
  - c. Plate boundaries
  - d. Mantle plumes

#### **RECOMMENDED TOPICAL OUTLINE**

- I. Natural resources
  - a. Fossil fuels
  - b. Ore minerals
- II. The Earth in Space
- III. Climate and climate change

Syllabi requirements, including legal compliance information must be included. Individual College syllabi guidelines may include additional information. Please contact your VPI/CAO for specific College requirements.