

Effective Implementation date: Spring 2018, 201830

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

GEY 108

Course Title: Geology of National Parks: SC2

Course Credits: 3

Course Description: Explores significant geologic features and the processes that create them using examples and case studies from the U.S. National Park System. Weathering and erosional landforms, caves and reefs, coasts, glaciers, volcanoes, and complex mountains are discussed. Fundamental geologic concepts including plate tectonics, deep time, and rock classification are introduced and incorporated throughout the course.

GT Pathways Requirements:

Guaranteed Transfer (GT) Pathways Course Statement:

The Colorado Commission on Higher Education has approved GEY 108 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://highered.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. Define and use the scientific method.
- 2. Link geology to other components of the Earth system, including human society.
- 3. Relate rocks, landscapes, and geologic events to Plate Tectonics Theory.
- 4. Differentiate minerals from rocks.
- 5. Describe the origin and distinguishing characteristics of igneous, sedimentary, and metamorphic rocks.
- 6. Apply the principles of relative and absolute dating.
- 7. Classify geologic features in well-known National Park Service areas and describe how they formed.
- 8. Identify common features found in the rocks of the Colorado Plateau.
- 9. Characterize the landforms resulting from weathering, erosion, and deposition in arid environments.
- 10. Describe how carbonate rocks form and dissolve in groundwater and oceans.
- 11. Compare and contrast the typical features and processes prevalent in different coastal seashore and lakeshore settings.
- 12. Describe the impact glaciers have on landscapes, the reasons for glacial advance and retreat, and the ways in which glaciation is linked to the hydrosphere.
- 13. Identify volcanic rocks and landforms found in different plate tectonic settings.
- 14. Explain how complex mountains form and how geologic structures are clues to their formation.

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
 - a. Interactions between geology and other Earth systems
 - b. Geology and society

- c. The U.S. National Park System
- II. Plate tectonics overview
 - a. Scientific method and theory development
 - b. Boundary types and characteristics
 - c. Hot spots
 - d. National Park System (NPS) examples
- III. Mineral and Rock Basics
 - a. Mineral definition and identifying characteristics
 - b. Igneous rocks – formation and classification
 - c. Sedimentary rocks – formation and classification
 - d. Metamorphic rocks – formation and classification
 - e. Well-known examples from parks
- IV. Geologic time
 - a. Relative dating
 - b. Absolute dating
 - c. Geologic time scale
- V. Weathering and erosional features
 - a. Mechanical and chemical weathering
 - b. Erosional features and processes
 - c. Depositional environments and rock formations
 - d. The Colorado Plateau (e.g. Grand Canyon National Park (NP))
 - e. Desert characteristics and erosional landforms (e.g. Bryce NP)
 - f. Stream erosion (e.g. Zion NP)
 - g. Badlands (e.g. Badlands NP)
 - h. Wind erosion and deposition (e.g. Great Sand Dunes NP and Preserve)
- VI. Caves and reefs
 - a. Carbonate formation and dissolution (e.g. Guadalupe Mountains NP)
 - b. Groundwater features
 - i. Cave formation (e.g. Mammoth Cave NP)
 - ii. Cave features (e.g. Carlsbad Caverns NP)
 - c. Ocean carbonates
 - i. Coral reef formation (e.g. Virgin Islands NP)
 - ii. Threats to coral reefs (e.g. Biscayne NP)
- VII. Coasts
 - a. Continental beach features (e.g. Point Reyes National Seashore)
 - b. Barrier island systems (e.g. Cape Hatteras National Seashore)
 - c. Wetlands (e.g. Everglades NP)
- VIII. Glaciers and glaciation
 - a. Glacier types, formation, and movement (e.g. Glacier Bay NP and Preserve)
 - b. Glacial erosion features (e.g. Yosemite NP)
 - c. Glacial deposition features (e.g. Cape Cod National Seashore)
 - d. Glacial advances and retreats – evidence, causes, effects (e.g. Rocky Mountain NP)
 - e. Glacial rebound (e.g. Voyageurs NP)
- IX. Volcanic activity
 - a. Characteristics and classification of lava and volcanic rocks
 - b. Types of volcanoes and volcanic belts
 - i. Stratovolcanoes: Cascades (e.g. Mount Rainier NP)
 - ii. Stratovolcanoes: Alaska (e.g. Katmai NP)

- iii. Volcanic domes (e.g. Lassen Volcanic NP)
 - iv. Cinder cones (e.g. Sunset Crater National Monument)
 - v. Shield volcano: oceanic hot spot (e.g. Hawaii Volcanoes NP)
 - vi. Supervolcano: continental hot spot (e.g. Yellowstone NP)
- X. Geologic structures and complex mountains
- a. Faults and fault blocks (e.g. Grand Teton NP)
 - b. Basin and range (e.g. Death Valley NP)
 - c. Appalachians (e.g. Shenandoah NP)

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.