

ESCI 0001 - PHYSICAL GEOLOGY

Catalog Description

Formerly known as GEOL 1

Prerequisite: Eligibility for ENGL 1A

Advisory: Concurrent enrollment in ESCI 11L

Hours: 54 lecture

Description: Dynamic nature of earth's geologic processes. Earthquakes, volcanoes, mountain building, landslides, rocks, minerals, fossils, erosion, glaciation, deserts, shorelines, groundwater, and plate tectonics. (C-ID GEOL 100) (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Describe the processes and features of the plate tectonic system.
- CSLO #2: Explain the origin and organization of earth materials.
- CSLO #3: Describe the processes of weathering and erosion that result in landscape features of the earth.

Effective Term

Fall 2018

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

108

Total Student Learning Hours

162

Course Objectives

1. Describe the development of the solar system according to the Nebular Theory;
2. discuss the relationships between the different systems that constitute planet Earth;
3. apply the scientific method to analyze historical and current research questions;
4. evaluate the significance of discoveries and events that led to the formation of Geology as a scientific discipline;
5. assess the mineral nature of Earth materials by applying the definition of the term 'mineral';
6. distinguish between atoms, ions, and isotopes;
7. explain how atoms join to produce compounds through bonding;
8. compare and contrast silicon, silica, and silicates;
9. distinguish between minerals within and between mineral groups;
10. relate the three different rock groups (igneous, sedimentary, and metamorphic) to each other through the transformative processes that afford it and the 'raw materials' required, such as 'Magma to igneous rock through crystallization', using the concept map known as 'the rock cycle';

11. compare and contrast igneous, sedimentary, and metamorphic rocks based on composition and texture;
12. relate the genetic process of any given rock to its name and classification;
13. assess the hypothesis of Continental Drift through the lens of the scientific method;
14. discuss the role of studies of paleomagnetism and the seafloor in the development of the theory of Plate Tectonics;
15. compare and contrast Continental Drift and Plate Tectonics;
16. compare and contrast processes and features at the different types of plate tectonic boundaries;
17. explain Reid's mechanism of earthquake generation;
18. distinguish between fault creep and strike-slip motion;
19. assess earthquake frequency and distribution in terms of tectonic setting;
20. compare and contrast the different scales used for measurement of earthquake energy;
21. compare and contrast seismic waves;
22. discuss the role of seismic waves in determining Earth's internal structure;
23. distinguish between plastic and elastic deformation of crustal materials;
24. relate deformation to structures: faults and folds;
25. distinguish between plutonic bodies and between volcanic structures;
26. assess eruptive violence in volcanoes in terms of magma composition;
27. compare and contrast the different types of weathering processes;
28. discuss the formation of soils;
29. analyze the hydrologic cycle;
30. describe the processes (and their respective agents) that affect the landscape, analyzing the features they produce through both erosion and deposition;
31. discuss the role of correlation and relative and absolute dating methods in determining the geologic history of an area;
32. analyze the nature of the fossil record and describe the major events of Earth's life history; and
33. describe the Geologic Time Scale.

General Education Information

- Approved College Associate Degree GE Applicability
 - AA/AS - Physical Sciences
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B1 Physical Science
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
 - IGETC - 5A Physical Science

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Classroom Discussions
 - Example: Example: Discuss the evidence presented by Wegener to support his hypothesis and the reaction of the scientific community.
- Essay Examinations
 - Example: Example: Explain the Nebular Theory.
- Objective Examinations

- Example: Example: Compare and contrast dissolution and hydrolysis.
- Problem Solving Examinations
 - Example: Example: Assess the earthquake hazard for several sites based on information on ground type, history of earthquake events, and distance to epicenter.
- Reports
 - Example: Example: Read a journal or periodical article and summarize in two pages. Summary will be graded based upon accuracy, level of analysis, and presentation of writing.

- Publication Date: 2016
- Text Edition: 12th
- Classic Textbook?:
- OER Link:
- OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. During lecture students receive information (including visuals) on types of glacial deposits (moraines) and are then given a plan view of a valley glacier and its tributaries. They are asked to sketch the location of medial moraines and count how many there are in total.
2. During lecture students receive information on volcano eruptive style and resulting hazards, and work on an analysis of the volcanic hazards of an area, ranking each given site in terms of high, medium, or low hazard.

Distance Learning

1. Faculty record lecture videos (such as relating volcanic dangers to mineral composition, viscosity and temperature of lava) and create assignments that assess the materials covered in the recorded lecture videos.
2. Faculty record lecture videos (such as silicate minerals and igneous rocks) and create student discussions where student link silicate mineral composition to igneous rock formation.

Typical Out of Class Assignments

Reading Assignments

1. Read assigned textbook pages on evidence for continental drift and be prepared to evaluate the lines of evidence in discussion groups.
2. Read information provided in textbook on factors influencing the severity of earthquakes and be prepared to analyze the earthquake hazards of an area in a class exercise.

Writing, Problem Solving or Performance

1. Write a report on a recent earthquake following guidelines provided.
2. Classify a set of given rocks based on the information provided in lecture.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Earth: An Introduction to Physical Geology
 - Author: Tarbuck and Lutgens
 - Publisher: Prentice Hall