

**GEOL 1 Course Outline as of Summer 2021****CATALOG INFORMATION**

Dept and Nbr: GEOL 1 Title: THE EARTH

Full Title: The Earth

Last Reviewed: 1/27/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

An introduction to rocks, minerals, landforms and the dynamic processes that shape the Earth. Course includes the study of plate tectonics, volcanoes, earthquakes, and surface processes such as streams, shorelines and glaciers.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for ENGL 1A or equivalent

**Limits on Enrollment:****Schedule of Classes Information:**

Description: An introduction to rocks, minerals, landforms and the dynamic processes that shape the Earth. Course includes the study of plate tectonics, volcanoes, earthquakes, and surface processes such as streams, shorelines and glaciers. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		Effective:	Inactive:
	C	Natural Sciences	Fall 1984	
<b>CSU GE:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	B1	Physical Science	Fall 1984	
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	5A	Physical Sciences	Fall 1981	
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1984	Inactive:
<b>UC Transfer:</b>	Transferable	Effective:	Fall 1984	Inactive:

### **CID:**

CID Descriptor: GEOL 100      Physical Geology

SRJC Equivalent Course(s):      GEOL1

### **Certificate/Major Applicable:**

Major Applicable Course

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Apply scientific methodologies and principles to answer scientific questions.
2. Describe and identify Earth materials and landforms.
3. Identify and explain processes that formed and continue to shape the landscape.
4. Recognize the complex interplay between humans and the environment.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Define the nature of geology as a science.
2. Utilize plate tectonic theory to summarize the relationships among the rock cycle, tectonic setting, geologic structures, volcanism and earthquake activity, and provide examples illustrating these relationships.
3. Differentiate various layers of Earth's interior.
4. Distinguish between rocks and minerals, and classify common minerals.
5. Describe the lithology and formation of igneous, sedimentary, and metamorphic rocks.
6. Use classification charts to identify major rock types and sub-types.
7. Quantify geologic time and use relative and radiometric dating data to interpret Earth's history and describe the use of fossils in constructing the geologic time scale.
8. Classify and illustrate volcanic landforms, and locate significant volcanic features on Earth.
9. Explain the causes, effects, and measurement scales of earthquakes.
10. Describe surface processes and identify the landforms associated with each process.
11. Evaluate the effects of geologic hazards on humans, and the human impact on these phenomena.

### **Topics and Scope:**

## I. Introduction to Science and Geology

- A. The scientific method
- B. The history of geology
- C. Major spheres of Earth
- D. Earth's internal structure

## II. Plate Tectonic Theory

- A. Development of the theory
  - 1. Continental drift
  - 2. Seafloor spreading
  - 3. Paleomagnetism
  - 4. Supporting evidence
  - 5. Mantle convection
- B. Plate boundaries: formation and evolution of associated structures
- C. Intraplate activity

## III. Earth Materials

- A. Matter and minerals
  - 1. Elements and the periodic table
  - 2. Atoms, atomic structure, and bonding
  - 3. Silicate and non-silicate minerals
  - 4. Physical properties of minerals
- B. Igneous rocks
  - 1. Definition
  - 2. Common textures and compositions
  - 3. Formation of magma
  - 4. Magmatic differentiation and Bowen's Reaction Series
  - 5. Tectonics and igneous processes
- C. Sedimentary rocks
  - 1. Definition
  - 2. Formation of sediment: weathering and erosion
  - 3. Common textures and compositions
  - 4. Sedimentary (depositional) environments and structures
  - 5. Tectonics and sedimentary processes
- D. Metamorphic rocks
  - 1. Definition
  - 2. Causes of metamorphism
  - 3. Common textures and compositions
  - 4. Metamorphic environments
  - 5. Tectonics and metamorphic processes

## IV. Geologic Time

- A. Relative and absolute dating methods
- B. The fossil record
- C. The geologic time scale

## V. Volcanic Processes

- A. Properties and composition of magma/lava
- B. Eruptive styles
- C. Volcanic landforms
- D. Volcanic hazards

## VI. Structural Geology

- A. Deformation
- B. Geologic structures

## VII. Earthquakes and Seismology

- A. Seismic waves
- B. Earthquake measurement scales
- C. Epicentral location and triangulation
- D. Seismic hazards
- VIII. Geologic Resources
  - A. Renewable and non-renewable resources
  - B. Ore deposits
- IX. Surface Processes (at least 2 of the following topics):
  - A. Mass wasting
    - 1. Causes/triggers
    - 2. Classification
    - 3. Mitigation of landslide hazards
  - B. Stream processes
    - 1. The hydrologic cycle
    - 2. Stream channels and flow
    - 3. Erosional and depositional landforms
    - 4. Flooding and surface water management
  - C. Groundwater
    - 1. The hydrologic cycle
    - 2. Storage and flow
    - 3. Extraction and human impact on groundwater
  - D. Glacial processes
    - 1. Types of glaciers
    - 2. Formation and movement
    - 3. Erosional and depositional landforms
  - E. Desert processes
    - 1. Characteristics
    - 2. Formation and location of deserts
    - 3. Erosional and depositional landforms
      - i. Water
      - ii. Wind
  - F. Coastal processes
    - 1. Wave formation and characteristics
    - 2. Erosional and depositional landforms
    - 3. Emergent and submergent coastlines
    - 4. Longshore processes
    - 5. Mitigation of coastal change

**Assignment:**

- 1. Assigned readings (20-30 pages per week)
- 2. Assignments (0-20): research papers, essays, written homework, problem solving exercises, online activities
- 3. Exam(s) (1-5)
- 4. Quiz(zes) (0-20)
- 5. Class participation: in-class activities, discussions, group work, attendance

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Written homework, research papers, essays, in-class activities, online activities

Writing  
10 - 40%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem solving exercises, in-class activities, group work, discussions

Problem solving  
10 - 40%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Exam(s) and quiz(zes)

Exams  
20 - 60%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Class participation and attendance

Other Category  
0 - 10%

### **Representative Textbooks and Materials:**

Essentials of Geology. 5th ed. Marshak, Stephen. WW Norton and Co. 2016

Understanding Earth. 7th ed. Grotzinger, John and Jordan, Thomas. MacMillan Press. 2014 (classic)

Earth: An Introduction to Physical Geology. 11th ed. Tarbuck, Edward and Lutgens, Frederick and Tasa, Dennis. Pearson/Prentice Hall. 2014 (classic)

The Essential Earth. 2nd ed. Jordan, Thomas and Grotzinger, John. W.H. MacMillan Press. 2012 (classic)

Essentials of Geology. 13th ed. Lutgens, Frederick and Tarbuck, Edward and Tasa, Dennis. Pearson/Prentice Hall. 2018