

CATALOG INFORMATION

Dept and Nbr: GEOL 11            Title: GEOLOGY OF CALIFORNIA  
Full Title: Geology of California  
Last Reviewed: 4/10/2023

| 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:**  
Students will be introduced to geologic principles and processes that formed and continue to influence California's geologic and tectonic environment. This course provides an overview of the formation and interpretation of rocks, volcanoes, earthquakes, plate tectonics, and the geologic history of California.

**Prerequisites/Corequisites:**

**Recommended Preparation:**  
Eligibility for ENGL 1A or equivalent

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: Students will be introduced to geologic principles and processes that formed and continue to influence California's geologic and tectonic environment. This course provides an overview of the formation and interpretation of rocks, volcanoes, earthquakes, plate tectonics, and the geologic history of California. (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>          |                   | <b>Effective:</b> | <b>Inactive:</b> |
|                      | C                    | Natural Sciences  | Fall 1981         |                  |
| <b>CSU GE:</b>       | <b>Transfer Area</b> |                   | <b>Effective:</b> | <b>Inactive:</b> |
|                      | B1                   | Physical Science  | Fall 2007         |                  |
| <b>IGETC:</b>        | <b>Transfer Area</b> |                   | <b>Effective:</b> | <b>Inactive:</b> |
|                      | 5A                   | Physical Sciences | Fall 2007         |                  |
| <b>CSU Transfer:</b> | Transferable         | <b>Effective:</b> | Fall 1981         | <b>Inactive:</b> |
| <b>UC Transfer:</b>  | Transferable         | <b>Effective:</b> | Fall 1981         | <b>Inactive:</b> |

**CID:**  
CID Descriptor:GEOL 200      Geology of California  
SRJC Equivalent Course(s):      GEOL11

**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 to answer scientific questions.
2. Evaluate and classify earth materials.
3. Identify, locate, and interpret significant geologic and geomorphic features of California.
4. Identify and explain processes that have formed and continue to shape the landscape of California.
5. 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, volcanism and earthquake activity, and provide examples illustrating these relationships.
3. Describe the lithologies and formation of igneous, sedimentary, and metamorphic rocks.
4. Use classification charts to identify major rock types and sub-types.
5. Classify and illustrate several types of volcanic features and locate volcanic features within California.
6. Explain the causes, effects, and measurement scales of earthquakes.
7. Summarize the history of the San Andreas Fault system.
8. Evaluate geologic hazards common to California and their effect on humans.
9. Reconstruct the geologic evolution of California in relation to the geologic time scale.
10. Describe surface processes and identify the features associated with each process; provide specific examples of locations in California exhibiting these landforms.

11. Give examples of geological resources currently tapped in California, identify their location, geological formation, and interpret future resource exploration opportunities in California (optional).

## **Topics and Scope:**

### **I. Introduction**

- A. Scientific method
- B. Plate tectonic theory
- C. Structure of the Earth
- D. Geomorphic provinces of California

### **II. Earth Materials**

- A. Minerals and rocks
- B. The rock cycle and formation of rocks
- C. Igneous rocks
  - 1. Processes, textures, and mineralogy
  - 2. Classification
  - 3. Plutonic rocks in California; the Sierra Nevada, Klamath, and Peninsular Ranges
  - 4. Volcanoes, volcanic processes, and hazards in California; the Cascades and Modoc

### **Plateau**

- D. Sedimentary rocks
  - 1. Weathering and erosion
  - 2. Processes, textures, and compositions
  - 3. Classification
  - 4. The Great Valley Sequence and sedimentary rocks in California
- E. Metamorphic rocks
  - 1. Processes, textures, and mineralogy
  - 2. Classification
  - 3. The Coast Ranges and metamorphic rocks in California

### **III. Faults**

- A. Fault types
- B. Plate movements and plate tectonic theory
- C. San Andreas Fault system

### **IV. Earthquakes**

- A. Elastic rebound theory
- B. Seismic waves
- C. Intensity and magnitude measurement scales
- D. Seismic data interpretation for earthquake forecasting and hazards/risk assessment
- E. Epicentral location
- F. Historically significant earthquakes in California

### **V. Geologic Time**

- A. Relative vs. absolute dating methods
- B. Development of the geologic time scale
- C. Paleontology and dating using fossils
- D. Introduction to common fossils of California

### **VI. Geologic Evolution and Formation of California**

- A. Precambrian history
  - 1. Precambrian rock units and fossils in California: Basin and Range and Mojave Desert
  - 2. Changing continental margin
- B. Paleozoic history
  - 1. Paleozoic rock units and fossils in California: Basin and Range, Mojave Desert, Sierra Nevada, and Klamath Mountains

2. Changing continental margin
- C. Mesozoic history
  1. Mesozoic rock units and fossils in California: Sierra Nevada, Great Valley, and Coast Ranges
  2. Orogenic events
  3. California's major growth spurt
- D. Cenozoic history
  1. Cenozoic rock units and fossils in California
  2. Extension in the Basin and Range
  3. Rotation in the Transverse Ranges
  4. Formation of the San Andreas Fault system
- VII. Surface Processes and Landforms
  - A. Coastal processes and California's coastline
  - B. Glacial processes and the glacial history and features of California
  - C. Desert processes and desert landforms in California
- VIII. Geologic Resources Located in California (at least 2 of the following topics)
  - A. Water
    1. Water rights
    2. Groundwater
    3. Surface water
  - B. Rocks and minerals
  - C. Petroleum
  - D. Geothermal

### Assignment:

1. Weekly readings (20-30 pages or online equivalent)
2. Research, reaction, or summary paper(s) (0-4)
3. Homework (written and problem-solving exercises) (weekly or per unit)
4. Oral presentation(s) (0-2)
3. Exam(s) (0-4)
4. Quiz(zes) (0-15)
5. Class participation, including: activities, discussions, group work

### 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.

|                                                   |
|---------------------------------------------------|
| Research, reaction, or summary paper(s); homework |
|---------------------------------------------------|

|                     |
|---------------------|
| Writing<br>10 - 60% |
|---------------------|

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

|          |
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| Homework |
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|                            |
|----------------------------|
| Problem solving<br>5 - 30% |
|----------------------------|

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

|                                                                                                  |                                |
|--------------------------------------------------------------------------------------------------|--------------------------------|
| None                                                                                             | Skill Demonstrations<br>0 - 0% |
| <b>Exams:</b> All forms of formal testing, other than skill performance exams.                   |                                |
| Exam(s); quiz(zes)                                                                               | Exams<br>0 - 50%               |
| <b>Other:</b> Includes any assessment tools that do not logically fit into the above categories. |                                |
| Oral presentation(s); class participation                                                        | Other Category<br>0 - 40%      |

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

California's Amazing Geology. Prothero, Donald. CRC Press. 2017 (classic).

Introduction To Water in California. 2nd ed. Carle, David. University of California Press. 2015 (classic).

Geology Of The San Francisco Bay Region. Sloan, Doris and Karachewski, John. University of California Press. 2006 (classic).

California Geology. 2nd ed. Harden, Deborah. Pearson. 2004 (classic).

A Dangerous Place: California's Unsettling Fate. Reisner, Marc. Penguin Books. 2004 (classic).

Assembling California. McPhee, John. The Noonday Press. 1995 (classic).

Cadillac Desert: The American West and Its Disappearing Water. Reisner, Marc. Penguin Books. 1993 (classic).

Instructor prepared materials