

**GEOL 11 Course Outline as of Fall 2007****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	17.5	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:**

Introduction to the geologic principles and processes that formed and continue to influence California's geologic and tectonic environment. Overview of the origin and interpretation of rocks, minerals and fossils, volcanoes, earthquakes, plate tectonics, and the geologic history of California.

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

Eligibility for ENGL 100 or ESL 100.

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

Description: Introduction to the geologic principles and processes that formed and continue to influence California's geologic and tectonic environment. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100.

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 1981	
<b>CSU GE:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	B1	Physical Science	Fall 2007	
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	5A	Physical Sciences	Fall 2007	
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:
<b>UC Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:

### **CID:**

CID Descriptor: GEOL 200      Geology of California

SRJC Equivalent Course(s):      GEOL11

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

Not Certificate/Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Upon completion of this course, the student will be able to:

1. Critically analyze scientific arguments using the scientific method; define the nature of geology as a science.
2. Identify and locate significant geologic and geomorphic features of California.
3. Utilize Plate Tectonic Theory to summarize the relationships among the rock cycle, tectonic setting, volcanism and earthquake activity, and provide examples illustrating these relationships.
4. Describe the lithologies and formation of igneous, sedimentary, and metamorphic rocks.
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. Review the history of the San Andreas Fault system.
8. Evaluate geologic hazards 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; give specific examples of locations in California exhibiting these landforms. (optional)
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:**

1. Introduction
  - A. Scientific Method
  - B. Plate Tectonic Theory
  - C. Structure of the Earth
  - D. Geomorphic provinces of California
2. Earth Materials
  - A. Minerals and rocks
  - B. The rock cycle and formation of rocks
  - C. Igneous Rocks
    - i. Processes, textures, and mineralogy
    - ii. Classification
    - iii. The Sierra Nevada and plutonic rocks in California
    - iv. Volcanoes, volcanic processes and hazards in California
  - D. Sedimentary Rocks
    - i. Weathering and erosion
    - ii. Processes, textures, and compositions
    - iii. Classification
    - iv. The Great Valley Sequence and sedimentary rocks in California
  - E. Metamorphic Rocks
    - i. Processes, textures, and mineralogy
    - ii. Classification
    - iii. The Coast Range and metamorphic rocks in California
3. Faults
  - A. Fault types
  - B. Plate movements and Plate Tectonic Theory
  - C. San Andreas Fault system
4. 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
5. 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
6. Geologic evolution and formation of California
  - A. Precambrian history
    - i. Precambrian rock units and fossils in California
    - ii. Changing continental margin
  - B. Paleozoic history
    - i. Paleozoic rock units and fossils in California
    - ii. Changing continental margin
  - C. Mesozoic history
    - i. Mesozoic rock units and fossils in California
    - ii. Orogenic events
    - iii. California's major growth spurt
  - D. Cenozoic history

- i. Cenozoic rock units and fossils in California
  - ii. Tectonic evolution of the western margin of the North American plate
  - iii. Formation of the San Andreas Fault system
7. Optional topics include:
- A. Surface Processes and landforms
    - i. Coastal processes and California's coastline
    - ii. Glacial processes and the glacial history and features of California
    - iii. Desert processes and desert landforms in California
  - B. Geologic Resources located in California
    - i. Water
      - a. Water rights
      - b. Groundwater
      - c. Surface water
    - ii. Rocks and minerals
    - iii. Petroleum
    - iv. Geothermal

### **Assignment:**

1. In-class activities, in which participation is mandatory. Examples of activities include discussions/debates on topics covered in lecture, identification of minerals and/or rocks, assessing earthquake hazards for a given area based on seismic data, and locating an earthquake epicenter.
2. Reading of text and/or instructor generated material as related to topics covered. Amount will vary depending upon topic, but will average 20-30 pages per week.
3. Quizzes based on reading and lecture material. Quizzes will include a combination of objective and written responses.
4. Two to five examinations based on reading and lecture material. Exams may be cumulative or unit exams, and will include a combination of objective and written responses.
5. An original research paper (5-10 pages) and/or oral presentation covering a topic relevant to California's geology or geologic history.
6. Homework assignments based on the topics covered. Homework may include written or problem solving exercises, and may cover map reading and location of major geologic or geomorphic features of California, identification of seismic hazards and features, and assessing earthquake hazards for a given area based on seismic data.

### **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, Term papers
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Writing 10 - 30%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, In-class activities

Problem solving  
5 - 10%

**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.

Multiple choice, True/false, Matching items, Essay or short answer written responses

Exams  
50 - 80%

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

Participation, oral presentation

Other Category  
0 - 15%

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

CALIFORNIA GEOLOGY. Harden, Deborah R. Pearson Prentice Hall: 2004.

ROADSIDE GEOLOGY OF NORTHERN AND CENTRAL CALIFORNIA. Alt, David and Hyndman, Donald. Mountain Press Publishing Company: 2000.

ESSENTIALS OF GEOLOGY. Lutgens, Frederick and Tarbuck, Edward. Pearson Prentice Hall: 2006.

ESSENTIALS OF GEOLOGY. Wicander, Reed and Monroe, James. Thomson/Brooks Cole: 2006.

ASSEMBLING CALIFORNIA. McPhee, John. The Noonday Press: 1995.

CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER. Reisner,

Marc. Penguin Books Ltd.: 1993.

A DANGEROUS PLACE: CALIFORNIA'S UNSETTLING FATE. Reisner, Marc. Pantheon Books: 2003.

Instructor Prepared Materials.