



**El Camino College**  
**COURSE OUTLINE OF RECORD – Approved**

**I. GENERAL COURSE INFORMATION**

**Subject and Number:** Geology 3  
**Descriptive Title:** Physical Geology Laboratory  
**Course Disciplines:** Earth Science  
**Division:** Natural Sciences

**Catalog Description:**

This course is a laboratory study of geologic exercises and the use of topographic maps. Laboratory exercises will include identification of rocks and minerals, map exercises, structure problems, field studies and recognition of landforms created by various processes working on and in the earth.

**Conditions of Enrollment:**

**Prerequisite:** Geology 1 with a minimum grade of C or concurrent enrollment

<b>Course Length:</b>	<b>X Full Term</b>	<b>Other (Specify number of weeks):</b>
<b>Hours Lecture:</b>	<b>0 hours per week</b>	<b>TBA</b>
<b>Hours Laboratory:</b>	<b>3.00 hours per week</b>	<b>TBA</b>
<b>Course Units:</b>	<b>1.00</b>	

**Grading Method:** Letter  
**Credit Status:** Associate Degree Credit

**Transfer CSU:** X Effective Date: Prior to July 1992  
**Transfer UC:** X Effective Date: Prior to July 1992

**General Education:**

**El Camino College:**

**1 – Natural Sciences**

Term: Other: Approved

**CSU GE:**

**B1 - Physical Science**

Term: Other: Approved

**B3 - Laboratory Sciences**

Term: Other: Approved

**IGETC:**

**5A - Physical Science, Lab only**

Term: Fall 1991 Other:

## II. OUTCOMES AND OBJECTIVES

### A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. SLO#1 - Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)
2. SLO#2 - Students recognize and can accurately articulate how the earth affects humans' lives and how human activities affect the earth.
3. SLO#3 - Student can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretations of observations) in popular accounts of scientific research in magazines, newspapers, etc.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <http://www.elcamino.edu/academics/slo/>.

### B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Identify the major rock-forming minerals and commonly occurring igneous, sedimentary and metamorphic rocks.
  - Performance exams
2. Recognize and identify structural features such as folds, faults and unconformities; interpret structural problems.
  - Homework Problems
3. Determine age relationships from relative and absolute dating methods.
  - Laboratory reports
4. Recognize the name and origin of geomorphic features using topographic maps and aerial photos.
  - Class Performance

## III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lab	6	I	Plate Tectonics A. Identify different plates B. Three major plate boundaries C. Earthquake and volcanoes D. California tectonics
Lab	3	II	Seismicity A. Cause of earthquakes B. Types of seismic waves C. Locating epicenters D. Southern California faults and quakes

Lab	3	III	<p>Structural Geology</p> <p>A. Distribution and orientation of rock units</p> <p>B. Folds</p> <ol style="list-style-type: none"> <li>1. Types</li> <li>2. Nomenclature</li> <li>3. Outcrop patterns</li> </ol> <p>C. Faults</p> <ol style="list-style-type: none"> <li>1. Types</li> <li>2. Nomenclature</li> <li>3. Outcrop patterns</li> </ol>
Lab	3	IV	<p>Geologic Time</p> <p>A. Unconformities</p> <ol style="list-style-type: none"> <li>1. Origin</li> <li>2. Types</li> <li>3. Outcrop patterns</li> </ol> <p>B. Recognition and interpretation of geologic structures:</p> <ol style="list-style-type: none"> <li>1. Topographic expression</li> <li>2. Interpretation</li> </ol>
Lab	3	V	<p>Minerals</p> <ol style="list-style-type: none"> <li>A. Mineral chemistry</li> <li>B. Crystalline structures</li> <li>C. Chemical composition</li> <li>D. Physical properties</li> <li>E. Mineral identification</li> </ol>
Lab	3	VI	<p>Igneous Rocks</p> <ol style="list-style-type: none"> <li>A. Texture</li> <li>B. Mineralogic composition</li> <li>C. Crystallization of magmas</li> <li>D. Classification</li> <li>E. Intrusive and extrusive</li> <li>F. Identification</li> </ol>
Lab	3	VII	<p>Sedimentary Rocks</p> <ol style="list-style-type: none"> <li>A. Environments of sedimentation</li> <li>B. Classification of clastic sedimentary rocks</li> <li>C. Chemical sedimentary rocks</li> <li>D. Bioclastic and biochemical sedimentary rocks</li> <li>E. Identification</li> </ol>
Lab	3	VIII	<p>Metamorphic</p> <ol style="list-style-type: none"> <li>A. Metamorphic process</li> <li>B. Types of metamorphism</li> <li>C. Mineralogy and chemical composition</li> <li>D. Conditions of metamorphism</li> <li>E. Classification (foliated and non-foliated)</li> <li>F. Identification</li> </ol>
Lab	3	IX	<p>Field Study</p> <ol style="list-style-type: none"> <li>A. Local area to observe different rock types</li> </ol>
Lab	3	X	<p>Topographic Maps and Aerial Photographs</p> <ol style="list-style-type: none"> <li>A. Scale</li> <li>B. Location</li> </ol>

			<ul style="list-style-type: none"> <li>C. Contour lines</li> <li>D. Elevation, relief, height</li> <li>E. Gradients</li> <li>F. Profiles</li> </ul>
Lab	3	XI	<p>Streams</p> <ul style="list-style-type: none"> <li>A. Stream patterns and differential erosion <ul style="list-style-type: none"> <li>1. Drainage density and patterns</li> <li>2. Differential erosion</li> <li>3. Superposition</li> </ul> </li> <li>B. Erosion and deposition by streams <ul style="list-style-type: none"> <li>1. Stages of river development</li> <li>2. Depositional features</li> <li>3. Stream capture</li> </ul> </li> <li>C. Evolution of landscape in humid climates <ul style="list-style-type: none"> <li>1. External drainage</li> <li>2. Erosional processes</li> <li>3. Evolution of landscape</li> </ul> </li> </ul>
Lab	3	XII	<p>Field Study</p> <ul style="list-style-type: none"> <li>A. Local area to observe geologic hazards and structural geology</li> </ul>
Lab	3	XIII	<p>Ground Water</p> <ul style="list-style-type: none"> <li>A. Aquifers</li> <li>B. Ground water erosion</li> <li>C. Water table</li> <li>D. Karst topography</li> </ul>
Lab	3	XIV	<p>Desert Geomorphology</p> <ul style="list-style-type: none"> <li>A. Features <ul style="list-style-type: none"> <li>1. Alluvial fans</li> <li>2. Pediments</li> <li>3. Canyons</li> <li>4. Playas</li> </ul> </li> <li>B. Wind Landforms <ul style="list-style-type: none"> <li>1. Mechanism of sand transport</li> <li>2. Deposition of sand</li> <li>3. Types of dunes</li> </ul> </li> </ul>
Lab	3	XV	<p>Glacial Landforms</p> <ul style="list-style-type: none"> <li>A. Alpine glaciation, erosional landforms, and depositional landforms</li> <li>B. Continental glaciers, erosional, depositional</li> </ul>
Lab	3	XVI	<p>Shoreline Processes and Landforms</p> <p>Shoreline processes</p> <ul style="list-style-type: none"> <li>A. Waves</li> <li>B. Erosion</li> <li>C. Sediment transport</li> <li>D. Deposition</li> </ul> <p>Geomorphologic evolution of coastal areas</p> <ul style="list-style-type: none"> <li>A. Submergent coasts</li> <li>B. Emergent coasts</li> </ul>
Lab	3	XVII	Field Study

			<b>A. Local area to observe coastal landforms and processes</b>
Total Lecture Hours	0		
Total Laboratory Hours	54		
Total Hours	54		

#### IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

##### A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

##### B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

Examine each rock in the box and indicate the type of igneous rock, [volcanic (V) or plutonic (P)], and the texture (grain size), using the guide in the lab manual. Sort each category for further differentiation into mafic, intermediate, and felsic rocks.

- a. Which rocks will weather the fastest?
- b. Which rocks were formed by lava flows?
- c. Which rocks are not crystalline?

##### C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Using the contour map of Death Valley (Figure 1), identify the following features: alluvial fans, playas, pediment, mountains. Outline each feature with a different color pencil.
  - a. What are the prominent features extending from the mountain front and how did they form?
  - b. What happens to a single stream channel as it leaves the canyon? Form a hypothesis to explain your observation.
2. In a one-page essay, compare and contrast the two different types of volcanic eruptions described on the following pages (Figure 2). How are the Kilauea eruptions similar to and different from Mt. St. Helens' eruptions? Make a chart comparing the lava types, volcano shapes, speed and types of volcanic hazards, and resulting volcanic rock.

##### D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Other exams  
 Quizzes  
 Laboratory reports  
 Field work  
 Multiple Choice  
 Completion  
 Matching Items  
 True/False  
 Other (specify):  
 Identifying rocks, map problems

**V. INSTRUCTIONAL METHODS**

Demonstration

Discussion

Field trips

Lecture

Other (please specify)

Identifying rock and mineral specimens. Map and photograph analysis; computer-based and Internet exercises, and collection and analysis of other geologic data.

**Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.**

**VI. WORK OUTSIDE OF CLASS**

Course is lab only - minimum required hours satisfied by scheduled lab time and estimated student hours outside of class per week is zero.

**Estimated Independent Study Hours per Week: 0**

**VII. TEXTS AND MATERIALS**

**A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS**

Herzig. Geology Laboratory Manual. El Camino College, 2019.

**B. ALTERNATIVE TEXTBOOKS**

**C. REQUIRED SUPPLEMENTARY READINGS**

**D. OTHER REQUIRED MATERIALS**

**VIII. CONDITIONS OF ENROLLMENT**

**A. Requisites (Course and Non-Course Prerequisites and Corequisites)**

Requisites	Category and Justification
Course Prerequisite Geology-1	Sequential Requisite

**B. Requisite Skills**

Requisite Skills
Knowledge of how various rocks are formed by igneous, sedimentary, and metamorphic processes. GEOL 1 - Relate the characteristics and nature of the common rock-forming minerals and rocks to the processes that formed them.
Understanding of how folding and faulting occur in the earth's crust as related to plate tectonics theory. GEOL 1 - Summarize the different kinds of folds, faults, and unconformities and assess the forces that led to their formation in the context of plate tectonics theory.

Knowledge of surface geomorphology processes, including how and where they occur.  
GEOL 1 - Describe the processes of weathering and erosion of rocks, including methods by which streams, groundwater, glaciers, wind, and ocean waves shape the surface.

Comprehension of the concepts of geologic time, geologic columns, and geologic maps.  
GEOL 1 - Compare and contrast the methods used to determine the age of the earth, the geologic time scale, and methods of dating rocks.

**C. Recommended Preparations (Course and Non-Course)**

Recommended Preparation	Category and Justification
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**D. Recommended Skills**

Recommended Skills
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**E. Enrollment Limitations**

Enrollment Limitations and Category	Enrollment Limitations Impact
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Course created by Wallace Ford on 09/01/1950.

**BOARD APPROVAL DATE:**

**LAST BOARD APPROVAL DATE: 01/21/2020**

**Last Reviewed and/or Revised by:** Sara DiFiori

**Date:** 10/31/2019

18481