



I. GENERAL COURSE INFORMATION

Subject and Number: Geology 32
Descriptive Title: Geology Laboratory of Owens Valley and Sierra Nevada
Course Disciplines: Earth Science
Division: Natural Sciences

Catalog Description:

This course is a field and laboratory study of the geologic history, rock types, and structural and geomorphic features of the Sierra Nevada and Owens Valley with special emphasis on volcanic and glacial processes. Note: Credit may be earned in Geology 30, Geology 32, Geology 34, and Geology 36; however, only one course (one unit) will be transferable.

Note: Some labs will be held in the field on weekends at arranged times.

Note: UC does not accept Geology 30, 32, 34, or 36 for the Physical Science laboratory requirement.

Conditions of Enrollment:

Prerequisite: Geology 1 with a minimum grade of C or Concurrent Enrollment

Recommended Preparation: English 84

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

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:

CSU GE:

B1 - Physical Science

Term: Other:

B3 - Laboratory Sciences

Term: Other:

IGETC:

5A - Physical Science, Lab only

Term: 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)

SLO #1 Basic Knowledge - 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.)

SLO #2 Relationship with Their Environment - Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth

SLO #3 Nature of Science - Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.

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 most common rock-forming minerals, igneous rocks, sedimentary rocks, and metamorphic rocks in the laboratory and in their natural setting in eastern California.

Multiple Choice

2. Compare and contrast different types of volcanic features and identify them in Owens Valley and Mono area.

Laboratory reports

3. Determine geologic age relationships of different rocks using principles of relative dating, in order to evaluate the geologic history of eastern California

Essay exams

4. Discuss the complex geologic history of the Owens Valley, Sierra Nevada, Long Valley Caldera, and Mono Lake by constructing geologic cross sections and columns.

Laboratory reports

5. List various geomorphic features seen in the Sierra Nevada area, including several fluvial and glacial erosional features.

Laboratory reports

6. Identify and draw several geomorphic features on contour maps and photographs, including different types of faults, volcanoes, and desert stages before seeing them in the field.

Essay exams

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	3	I	Introduction A. Minerals 1. Physical properties 2. Identification B. Geologic Time 1. Geologic cross sections 2. Geologic columns
Lab	1.5	II	Igneous Rocks (Sierra Nevada) A. Composition & texture B. Formation C. Identification
Lab	1.5	III	Volcanism (Mono and Mammoth areas) A. Types of volcanoes B. Erupted materials and styles C. Field relations
Lab	1.5	IV	Sediments & Sedimentary rocks (Inyo Mountains) A. Composition & texture B. Formation C. Identification
Lab	1.5	V	Contour Maps A. Identify features B. Construct maps
Lab	1.5	VI	Metamorphic Rocks (Inyo Mountains) A. Composition & texture
Lab	1.5	VII	Seismic Geology (Owens Valley) A. Types of faulting B. Identification of fault
Lab	2	VIII	Running water (Owens River) A. Streams & stream properties (meandering) B. Erosional features (potholes, canyons)
Lab	2	IX	Desert Features (Mojave Desert) A. Erosional features (canyons, caprock, inselbergs) B. Depositional features (alluvial fans, playa)
Lab	2	X	Glacial Geology (Sierra Nevada) A. U-shaped valleys, hanging valleys B. Moraines C. Pluvial lakes
Lab	3	XI	Examination and discussion of field area
Lab	33	XII	Field trip Most of the instructional lab time will be in the field during a 4-day weekend. The Sierra Nevada, Owens Valley, Mono Lake,

		<p>and Long Valley Caldera will be examined at approximately thirty locations</p> <p>A. Volcanic features</p> <ol style="list-style-type: none"> 1. Cinder craters 2. Welded tuff 3. Tuff 4. Basalt flows 5. Columnar jointing 6. Pumice and rhyolite domes 7. Caldera eruptions (Long Valley Caldera) <p>B. Geomorphic features & processes</p> <ol style="list-style-type: none"> 1. Different desert stages 2. Playas 3. Inselbergs 4. Alluvial fans 5. Rivers and streams (meandering) 6. Weathering & erosion features (canyons, potholes, caprocks) <p>C. Determine geologic history using relative age dating methods and field relationships.</p> <p>D. Structures</p> <ol style="list-style-type: none"> 1. Tilted fault blocks 2. Normal faults 3. Horst & graben 4. Faulting (springs, scarps) <p>E. Glacial geology</p> <ol style="list-style-type: none"> 1. U-shaped valleys 2. Moraines 3. Hanging valleys 4. Striations 5. Tufa columns 6. Ancient shorelines of pluvial lakes <p>F. Mining geology and technology</p> <ol style="list-style-type: none"> 1. Underground mining 2. Modern open pit method
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 the rock samples from Owens Valley and provide the following information on your lab report.

a. Name the igneous rock. b. Indicate whether the igneous rock is volcanic (V) or plutonic (P). c. Indicate the crystal size and name the texture - aphanitic, phaneritic, porphyritic. d. Name any visible minerals or phenocrysts.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Construct a detailed cross-section and geologic column across the Sierra Nevada, Owens Valley, and Inyo Mountains. This should include, but not be limited to, Paleozoic metamorphic rocks, Mesozoic granite, Pleistocene volcanic rocks, and Quaternary alluvial fans. Interpret the geologic history of the rocks that are present in each of these areas in your lab manual.
2. In a one-page essay on a test, compare the five major types of volcano eruptions by drawing a typical cross-section, and discussing typical rocks and eruptive styles of each.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Laboratory reports

Field work

Multiple Choice

Other (specify):

Short essay questions

Identify rocks in the laboratory

V. INSTRUCTIONAL METHODS

Demonstration

Field trips

Laboratory

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, et al. Geology Lab Manual. El Camino College, 2017.

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

B. Requisite Skills

Requisite Skills
<p>Knowledge of how various rocks are formed by igneous, sedimentary, and metamorphic processes, with emphasis on rocks that exist in the Sierra Nevada and Owens Valley. GEOL 1 - Relate the characteristics and nature of the common rock-forming minerals and rocks to the processes that formed them. GEOL 1 - Describe the processes, hazards, and results of igneous activity.</p>
<p>Understand the processes and importance of plate tectonics and seismicity GEOL 1 - Correlate the formation of earthquake waves with faults and plate tectonic forces. GEOL 1 - Relate the theory of plate tectonics to volcanism, earthquakes, mountain building, and other geologic processes. 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.</p>
<p>Knowledge of the processes of mountain building, particularly volcanoes and faulting. GEOL 1 - Describe the processes, hazards, and results of igneous activity. GEOL 1 - Relate the theory of plate tectonics to volcanism, earthquakes, mountain building, and other geologic processes. 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.</p>
<p>Understand processes of erosion by rivers, glaciers, and desert. 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.</p>

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Course Recommended Preparation English-84	

D. Recommended Skills

Recommended Skills
<p>Requisite Skill: Read lab manual in order to identify igneous rocks using a flow chart. ENGL 84 - Utilize comprehension and vocabulary strategies to improve reading rate.</p>

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by W. Hirt & E.J. Baldwin on 11/01/1977.

BOARD APPROVAL DATE:

LAST BOARD APPROVAL DATE: 12/17/2018

Last Reviewed and/or Revised by: Joseph Holliday

Date: 09/21/2018