



ANTELOPE VALLEY COLLEGE

Academic Affairs
Course Outline of Record

Academic Affairs Only

<input type="checkbox"/>	New Course
<input type="checkbox"/>	Effective Date (for articulation)
<input checked="" type="checkbox"/>	COR Revision 10/22/2009
<input type="checkbox"/>	Pre Req/Advisories
<input type="checkbox"/>	Other Changes
<input checked="" type="checkbox"/>	SLOs 4/10/2008

COURSE SUBJECT & NUMBER: GEOL 101

COURSE NAME: *Physical Geology

COURSE UNITS: 3 **COURSE HOURS:** 3 hours weekly

COURSE REQUISITES: *(Follow format of similar courses found in the college catalog.)*

Advisory: Eligibility for College Level Reading and ENGL 101 and Eligibility for MATH 102

COURSE DESCRIPTION: *(Write a short paragraph providing an overview of topics covered. Be sure to identify target audience--transfer, major, GE, degree/certificate, etc. If repeatable, state the number of times at end of description as (R#).*

Introduction to the Earth's geologic features and processes responsible for their formation. Students will learn about the internal and external processes involved with the formation of the Earth. Topics include the formation of minerals and rocks, tectonic processes, volcanoes, earthquakes, faults and folding, the development of continents and ocean basins, mineral and energy resources, and surface processes and features including weathering, streams, groundwater, glaciers and shorelines. (CSU, UC, AVC)

COURSE OBJECTIVES: *(Title 5 requires that courses show evidence of critical thinking skills. Use Bloom's taxonomy to formulate concise, performance-based measurable objectives common to all students. Objectives must be closely aligned with course content, assignments, and methods of evaluation)*

Upon completion of course, the successful student will be able to

1. Define geology and explain how the scientific method has been used to answer questions and expand our knowledge and understanding of how the Earth formed.
2. Define the basic geologic principles and explain how they are used to understand and interpret geologic processes and the geologic past.
3. Analyze the current model of the Earth's interior and how internal processes influence observed surface geologic features.
4. Compare and contrast relationships between tectonic processes and earthquakes, volcanism, and mountain building.
5. Evaluate surface weathering features associated with soil development and mass wasting, and how the lack of or presence and movement of water affects those processes.
6. Discuss the development of the ocean floor and its features relative to plate tectonic processes.
7. Discuss the formation and characteristics of ocean waves, and the influence of ocean waves on erosional and depositional features associated with shorelines.
8. Explain how mineral properties reflect their atomic structure, and be able to identify common minerals and rocks based on their composition and physical properties.
9. Analyze the rock cycle and the interrelationship of the development of igneous, sedimentary and metamorphic rocks.
10. Compare and contrast the formation of mineral and energy deposits relative to plate tectonics and igneous, metamorphic, and sedimentary processes.
11. Explain the difference between relative and absolute age, and evaluate the methods used to determine the age of the earth and rocks by their fossil content and/or analysis of radioactive elements.
12. Recognize, analyze, and interpret major geological structural features in the context of the processes that led to their development.
13. Discuss how seismic energy waves are affected as they pass through the Earth, and how they are used to interpret the structure of the interior of the Earth.
14. Evaluate seismic energy waves, their impact on the Earth's surface, how they are measured, and how they are used to locate earthquake epicenters.

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COURSE CONTENT: (Enter course content in terms of specific topics or a specific body of knowledge that each instructor must cover. Put topics in outline form with major and minor headings. Each instructor must cover all material listed below.)**Development of Earth and the theory of plate tectonics:**

I. Development of Earth and the theory of plate tectonics:

- A. Scientific method applied to interpreting the Earth's past.
- B. Past and current ideas on the development of the Earth and Solar System.
- C. History of and evidence supporting continental drift.
- D. Development of and evidence for the theory of sea-floor spreading.
- E. Basic concept of the theory of plate tectonics, and the main types of plate boundaries.
- F. Driving mechanisms for plate tectonic processes.
- G. Plate tectonics' impact on the distribution of rocks and natural resources.

II. Occurrence of rocks and minerals:

- A. Atomic structure and bonding related to the formation of minerals.
- B. Mineral's structure, chemistry, and physical properties.
- C. Rock cycle and Earth's internal and surface processes.
- D. Processes involved in the development of igneous, sedimentary, and metamorphic rocks.
- E. Characteristics, properties and classification of igneous, sedimentary, and metamorphic rocks.
- F. Occurrence of igneous, sedimentary, and metamorphic rock types in the context of plate tectonics.

III. Effects of tectonic activity on the surface and within the Earth:

- A. Occurrence and type of volcanic activity in relation to tectonic settings and boundaries.
- B. Relationship between tectonic settings and seismic (earthquake) activity.
- C. Measurement and use of seismic energy waves to interpret the interior structure of the Earth.
- D. Appearance and occurrence of geologic structures and their relationship to stresses associated with tectonic forces.
- E. Crustal deformation and mountain building processes related to tectonic activity.
- F. Occurrence and development of plutonic rocks and their association with tectonic activity.

IV. Surficial processes and associated landforms:

- A. Surface weathering and mass wasting processes.
- B. Influences of the hydrologic cycle on surficial processes.
- C. Conditions associated with the development of deserts.
- D. Erosional and depositional desert landforms and the impact of water and wind.
- E. Stream processes, drainage patterns, erosional and depositional features, and flooding.
- F. Glacier formation and characteristics, and associated erosional and depositional landforms.
- G. Groundwater storage and movement, and landforms associated with groundwater.

V. Occurrence of mineral and energy resources:

- A. Conditions necessary for development of fossil-fuel (petroleum) based energy resources.
- B. Development of coal resources from initial accumulation of organic matter to final coal deposits.
- C. Occurrence and geologic conditions required for development of radioactive ore deposits.
- D. Utilization and development of alternative natural energy resources.
- E. Development and uses of non-energy mineral resources.

VI. Geologic time and geologic history:

- A. Difference between relative and absolute geologic time
- B. Use of fossils in the development of geologic time scale.
- C. Methods and assumptions for determining radiometric ages of rocks and the Earth.
- D. Interpreting geologic histories using basic geologic principles of uniformitarianism, superposition, original horizontality, lateral continuity, and cross-cutting relationships

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TYPICAL HOMEWORK ASSIGNMENTS: (Do not include in-class work, quizzes, or tests)

This information is necessary for all credit courses. Assignments should be closely related to course objectives, content, and methods of evaluation. (See sample of a “Model Outline” in the AP&P Standards & Practices Handbook.) Include a range of assignments (minimum of three) from which faculty may choose when designing their syllabus.

1. Describe nature and frequency of typical reading assignments if applicable; note if any are required:

Weekly reading assignments from text book and/or supplementary material in preparation for in-class work is required. Additional reading from supplemental sources such as Internet sites or other reference books will be optional.

2. Describe nature and frequency of typical writing assignments if applicable; note if any are required:

Students will complete review questions at end of textbook chapters, including short essay questions. Supplemental writing assignments associated with Internet-based study guides may also apply. Extra credit term paper focusing on an analysis and evaluation of some specific Geology topic based on the course objectives may be offered but is not required.

3. Describe nature and frequency of typical computational assignments if applicable; note if any are required:

Simple arithmetic and fraction problem solving during sections on geologic time and age dating, and calculating displacement associated with faulting and/or tectonic movement as part of homework assignments.

4. Describe other types of homework assignments that students may be asked to complete (oral presentations; special projects; visual/performing arts; etc); note if any are required:

Completion of Internet-based workbook assignments associated with select course textbooks may be required depending on whether they are offered as part of textbook bundle. Students undertaking extra credit term papers may also present their findings in an oral presentation.

*For categories 1-4 above, list the estimated hours per week it would take a student to complete assignments. Title 5 (section 55002) requires that each unit must be shown to require three hours of work per week by the student either in or out of class. Homework formula: 3 hours of class work *times* each unit of credit *minus* classroom hours *equals* required homework hours.*

Reading Assignments: 3 - 4

Writing Assignments: 1.5 – 2.0

Computational Assignments: 1.0 - 1.5

Other Assignments: 1 - 2

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METHODS OF INSTRUCTION: *(Methods must be consistent with content and appropriate to objectives; state in terms of what instructor will be doing in order to present course content to students: for example, lecture, demonstration, present audio/visual materials; facilitate group work, etc. Do not list specific instructional equipment.*

Basic course content will be presented by instructor via lectures supplemented with audio/visual presentations. Instructor-mediated in-class discussion groups may be utilized for specific topics of interest.

METHODS OF EVALUATION: *(These must be clearly related to course objectives and reflect course content and assignments in order to comply with Title 5 requirements. Describe what instructor will be looking for when evaluating various assignments and tests in order to determine whether students have met course objectives. Grades must be based on demonstrated proficiency in subject matter and determined, where appropriate, by essays, objective and essay tests, research papers or projects, problem solving exercises, or skills' demonstrations.)*

Observation of student performance during in-class discussions will be used to evaluate Objectives 1 through 14. Homework assignments may be used to assess student comprehension of any one or more of the Objectives depending on the assignment. Tests will be used to evaluate student comprehension and understanding of Objectives 1 through 14

Suggested Texts or Other Instructional Materials

(List several when possible; include title, author, publisher, date, and latest edition. If older than five years, provide brief rationale.)

Earth, Portrait of a Planet, Stephen Marshak, W.W. Norton & Company, 2008, 3rd edition or later.

Geotours Workbook, M. Scott Wilkerson & Stephen Marshak, W.W. Norton, 2008 or later.

Essentials of Physical Geology, Reed Wicander & James Monroe, Brooks/Cole Cengage Learning, 2009, 5th edition or later

Other appropriate textbook may be substituted at the discretion of the instructor.