



ANTELOPEVALLEY COLLEGE

**Academic Affairs  
Course Outline of Record**

**Academic Affairs Only**

- New Course
- COR Revision 11/8/2007
- COR Update
- Pre Req/Advisories
- Other Changes
- Effective Date

**COURSE SUBJECT & NUMBER:** GEOL 102

**COURSE NAME:** \*Historical Geology

**COURSE UNITS:** 3 **COURSE HOURS:** 3

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

Advisory: Eligibility for College Level Reading and ENGL 099 and Eligibility for MATH 070.

**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.)*

Historical Geology is an overview of the history and development of the Earth and life on Earth. The course will examine the geologic processes that have shaped the Earth, the development of the Earth and life on Earth, and how it has changed over time according to the geologic record. [CAN GEOL 8] (CSU, UC, AVC)

**COURSE OBJECTIVES:** *(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 the scientific method and explain how it has been used to interpret the Earth's geologic history.
2. Describe fundamental geologic principles and explain how they have been used to develop the concept of geologic time.
3. Compare and contrast early geologic theories and evaluate how and why those theories changed over time.
4. Distinguish the difference between relative and absolute geologic age, and evaluate the methods used to determine each.
5. Explain how relative and absolute geologic ages were used in the development of the geologic time scale.
6. Describe how minerals and rocks can form and the factors that affect their characteristics.
7. Compare and contrast the processes that result in the formation of igneous, metamorphic and sedimentary rocks.
8. Assess the appearance and formation of folds, faults, and unconformities, and relate them to Earth's internal processes and structure.
9. Compare observed geologic features and structures with plate tectonics and tectonic processes.
10. Evaluate the theory of organic evolution with respect to evidence for the development of life found in the fossil record.
11. Compare and contrast the variability of fossils in the geologic record, and how that variability may be explained by different theories of extinctions.
12. Compare the major geologic time periods (Archean, Proterozoic, Paleozoic, Mesozoic, and Cenezoic) based on the significant tectonic and paleontological events that characterize or distinguish each era.

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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. Title 5 requires that each instructor must cover all material listed below.)*

- 1) **Development of historical geology:**
  - a) Scientific method applied to interpreting the earth's past.
  - b) Principles of catastrophism and uniformitarianism.
  - c) Geologic principles of superposition, original horizontality, lateral continuity, and cross-cutting relationships.
  - d) Early theories of Earth's development and their change over time.
- 2) **Development of the geologic time scale:**
  - a) Concept of relative geologic time.
  - b) Concept of absolute geologic time.
  - c) Methods used to determine relative and absolute geologic time.
  - d) Relationships between relative and absolute geologic time, and the current geologic time scale.
- 3) **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 the Earth's internal and surface processes.
  - d) Development of igneous, sedimentary, and metamorphic rocks.
  - e) Characteristics of igneous, sedimentary, and metamorphic rocks.
  - f) Occurrence of various rock types in the context of plate tectonics.
- 4) **Theory of plate tectonics and the development of the Earth:**
  - a) Theory of continental drift.
  - b) Theory of sea-floor spreading.
  - c) Theory of plate tectonics, and the main types of plate boundaries.
  - d) Driving mechanisms for plate tectonics.
  - e) Plate tectonics' impact on the distribution of life and natural resources.
- 5) **Theory of organic evolution and the study of the fossil record:**
  - a) Evidence for the theory of evolution.
  - b) Process of natural selection in the evolution of organisms.
  - c) Biological evidence for the theory of evolution.
  - d) Fossil record and the theory of evolution.
  - e) Fossil record and the development of life on Earth.
- f) Theories of extinction, the development of life, and the variability of fossils in the geologic record.
- 6) **Development of Earth over time:**
  - a) Geologic record of events or conditions in the Archean Eon.
  - b) Fossil and rock record of events or conditions in the Proterozoic Eon.
  - c) Fossil and rock record of events or conditions in the Paleozoic Era.
  - d) Fossil and rock record of events or conditions in the Mesozoic Era.
  - e) Fossil and rock record of events or conditions in the Cenozoic Era.

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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.

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

Answering review questions at end of text book chapters including short essay questions.

Extra credit term paper focusing on an analysis and evaluation of some specific historical geology topic based on the course objectives.

**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 (required).

**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:**

Optional oral presentation of term paper to class.

**5. Describe those critical thinking skills that are derived from assignments listed above; be sure that they reflect course objectives.**

The homework reading assignments will require students to examine and analyze geologic and evolutionary principles in relation to the development of historical geology and life on Earth, as described in the course objectives.

The term paper will require students to independently collect and analyze data related to some aspect of the development of the Earth and/or life on Earth, organize and evaluate that data, and prepare a report with their conclusions.

**6. For categories 1-4 above, describe the estimated time per week it would take a student to complete homework assignments. Title 5 uses the Carnegie formula for establishing units using a 2:1 ratio as follows: 1 hr. lecture = 2 hrs. homework; 2 hrs. lecture = 4 hrs. homework; etc. For example: reading textbook—2 hours; writing reports—3 hours.**

**Reading Assignments:** 3 – 4, more during preparation of term paper

**Writing Assignments:** 1.5 – 2, more during preparation of term paper

**Computational Assignments:** 0.5 - 1.0

**Other Assignments:** 1-2, more during preparation of term paper

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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, evaluation of homework assignments and term paper content and/or presentation, and tests will be used to evaluate:

Student understanding of how the scientific method has been used to interpret the Earth's history (Objective 1).

Student understanding of the concepts of relative and absolute geologic time, and how fundamental geologic principles were used to develop the geologic time scale (Objectives 2, 4 - 6).

Student understanding of how various theories on the development of the Earth were formulated and how they changed over time (Objective 3).

Student understanding of how common minerals and rocks form based on their characteristics, and how they relate to geologic processes (Objectives 7 and 8).

Student understanding of Earth's geologic features and the relationship between those features and plate tectonic processes (Objectives 7 - 9).

Student understanding of the theory of organic evolution and the development of life on Earth, and how it is reflected in the fossil record (Objectives 10 and 11).

Student understanding of different theories of extinction, how extinctions are represented in the fossil record, and how they influenced the development of life on Earth and the variability of fossils in the geologic record (Objectives 11 and 12).

Student ability to recognize the significant tectonic and paleontological events that characterize or distinguish the major geologic time periods (Objective 12).

**Suggested Texts or other Instructional Materials** *(list several when possible; include title, author, publisher, date, and latest edition.)*

Historical Geology – Evolution of Earth and Life Through Time, Reed Wicander & James Monroe, Thomson Brooks/Cole, 2007, 5<sup>th</sup> edition.

The Earth Through Time, Harold Levin, John Wiley & Sons, 2005, 8<sup>th</sup> edition.

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