

**I. CATALOG DESCRIPTION:**

- A. Division: Science  
Department: Geology  
Course ID: GEOL 122  
Course Title: Environmental Geology  
Units: 3  
Lecture: 3 hours  
Prerequisite: None.  
Departmental Advisory: ENGL 015 or eligibility for ENGL 101 as determined through the SBVC assessment process.

**B. Course Description:**

A survey of the relationships between geologic processes, natural resources, and the needs of society. Topics include natural hazards such as earthquakes, landslides, and mudflows; mineral and energy resources; and the particular problems of geologic nature associated with massive urbanization.

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**II. Number Of Times Course May Be Taken For Credit: One**

**III. EXPECTED OUTCOMES FOR STUDENTS:**

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

- A. describe the major geologic processes that pose a potential hazard,
- B. understand the origin and significance of past geologic events affecting the population of California,
- C. identify the dominant geologic processes affecting significant regions of California,
- D. understand the geologic basis for the origin of significant natural resources,
- E. identify the major economic mineral resources in California and their distribution throughout the state,
- F. understand the significance of the San Andreas Fault system in respect to California's increasing urbanization,
- G. understand the geologic basis for water resources, above and below ground, and
- H. understand the geologic factors involved in the growing issue of contamination and pollution.

**ADVISORY ENTRANCE SKILLS**

This course is a beginning geology class at the collegiate level. There is no prerequisite but students are expected to:

- A. read actively, annotating and paraphrasing the text,
- B. summarize accurately,
- C. evaluate evidence for relevance to one's purpose,
- D. distinguish between facts, opinions, assumptions, and inferences,
- E. understand a common English vocabulary equivalent to a High School Education,
- F. be able to assimilate a new technical vocabulary appropriate to the subject matter,
- G. organize information around a central idea,
- H. select and present relevant evidence to support a proposition,
- I. create a focused thesis statement, and
- J. write sentences free of gross grammatical errors.

**Writing:** Before attempting this class students should be able to:

- A. Organize information around a central idea,
- B. select and present relevant evidence to support a proposition,
- C. create a focused thesis statement, and
- D. write sentences free of gross grammatical errors.

IV: CONTENT:

- A. Background:
  - 1. Origin of the earth:
  - 2. Population growth and the rules imposed by the environment
  - 3. Rocks and Minerals
- B. The Internal Processes:
  - 1. Plate Boundaries, past and present
  - 2. Earthquakes
  - 3. Volcanic activity and Igneous Rocks
- D. Surficial Processes:
  - 1. Stream Erosion and Flooding
  - 2. Shorelines and Coastal Processes
  - 3. Landslides and Mudflows
  - 4. Ice, Wind, and Climate Change
- E. Resources:
  - 1. Surface and Ground Water
  - 2. Soil
  - 3. Mineral Resources
  - 4. Energy Resources: Fossil Fuels
  - 5. Energy Resources: Alternative Sources
- F. Waste Disposal and Pollution
  - 1. Waste Disposal
  - 2. Water Pollution: ground water and surface water
  - 3. Air Pollution
  - 4. Health and Geology
  - 5. Environmental Law
  - 6. Land Use Planning

V. METHODS OF INSTRUCTION:

- A. Methods of instruction will vary from instructor to instructor, but may include lecture, directed discussions, research papers, small-group projects, discussion groups, audio-visual aids including computer-generated lecture outlines, lecture demonstrations, and field trips. Student assignments outside of class will be equivalent to 6 hours per week and may include reading, computer assisted instruction, writing assignments, short research assignments, special tutorial sessions, group study sessions, and/or individual preparation for objective exams.

VI. TYPICAL ASSIGNMENTS:

- A. Reading Assignments
  - 1. Selected assignments from the textbook
  - 2. Articles covering current events in geology (landslides, earthquakes, volcanic eruptions, floods) as well as long-term events (for example, natural resource depletion, environmental effects of mining and processing ores).
- B. Writing Assignments
  - 1. Selected chapter exercises from the textbook.
  - 2. Instructor-prepared exercises, especially those involving illustrations (maps, charts, diagrams, cross-sections) and their analysis.
  - 3. A written term project, either a research paper or a group project, showing synthesis of the concepts and processes covered in the course.

- C. Example  
Choose one of the magazine or newspaper articles on the reading list and analyze the following:
1. Scientific accuracy
  2. Topic of study in this course
  3. What was reinforced as learned in this course
  4. What was new information for you
  5. Prepare a written summary and 3-5 minute class presentation.

VII. EVALUATION:

Methods of evaluation will vary from instructor to instructor, but may include true-false tests, multiple choice tests, fill-in tests, sentence completions, short essay questions, or term projects; or combinations of the above. Grading may be either comparative within a class or may be based on an absolute scale to fairly and accurately represent student effort and comprehension, according to the best judgment of the instructor. All of the students in each class will be graded by the same standard.

- A. Methods of evaluation:
1. Written quizzes and/or tests of a variety of types of questions from among true-false, multiple choice, fill-in, sentence completion, and short essay.
  2. Written exercises.
  3. Written summaries of magazine or newspaper articles.
  4. Laboratory assignments.
  5. Performance in the field, including the journal.
  6. Performance on the term project.
- B. Frequency of evaluation:
1. Quizzes are given in lecture at weekly or bi-weekly intervals.
  2. Exams are given on at the conclusion of each 1/3 of the course basis and culminate with a comprehensive final exam.
  3. Exercises are assigned on a frequency to support comprehension of material, as deemed appropriate by the instructor.
  4. Typically, the class will take two field trips each semester.
- C. Typical exam questions
1. Draw the trace of the San Andreas Rift on the geomorphic map provided. Identify each major branch by name. Draw arrows on the map to indicate the sense of relative movement for each of the major segments.
  2. In the list below, identify the minerals that are major Igneous Rock-Forming Minerals.

a. Plagioclase	f. Corundum
b. Kaolinite	g. Chlorite
c. Chalcedony	h. Garnet
d. Calcite	i. Gypsum
e. Hornblende	j. Fluorite
  3. Identify the minerals in the display set by name and cite one or more locations in California where each of the minerals is extracted on an economic basis. What is the principal economic use of each mineral?
  4. Given the indicated area on the geological map and the accompanying cross-section at your table, identify any geologic hazard with potential to affect the area. Discuss the risk posed by this potential and suggest one or more mitigation strategies.

**VIII: TYPICAL TEXTS:**

Montgomery, Carla, *Environmental Geology*, 5th ed., William C. Brown., 2000

Bennett, Matthew and Peter Doyle, *Environmental Geology: Geology and the Human Environment*; 1<sup>st</sup> ed., John Wiley and sons, Inc., 1998

Merritts, DeWet, and Menking, *Environmental Geology; (An Earth System Science Approach)* Freeman Press, 1998

**IX. OTHER SUPPLIES REQUIRED OF STUDENTS:**

None.