

**ROCHESTER COMMUNITY AND TECHNICAL COLLEGE**

**COMMON COURSE OUTLINE: Course discipline/number** Earth Science 1144

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**A. CATALOG DESCRIPTION (include prerequisites)**

**Course Title:** Environmental Geology  
**Credits:** 4  
**Hours/Week:** 3 hours lecture and 2 hours lab per week  
**Semesters Offered:** Spring  
**Prerequisites:** None

This course will meet the requirements for the Minnesota Transfer Curriculum in CT (Critical Thinking), NS (Natural Science) and PE (People and the Environment).

This course examines the relationship between geology and short-term human concerns (periods of no more than a few hundred years). Topics include earthquake hazards, volcanoes, flooding, mass wasting, groundwater and surface water problems, radioactive waste disposal, energy and mineral resources, and radon. Laboratory and field experiences are an integral part of the course.

**B. DATE LAST REVISED:** August 1997

**C. RECOMMENDED ENTRY SKILLS/KNOWLEDGE:**

12th grade reading and writing skills. An understanding of elementary algebra is helpful.

**D. OUTLINE OF MAJOR CONTENT AREAS:**

Lecture:

1. Overview of Environmental Geology
2. Rocks and Minerals
3. Plate tectonics
4. Earthquakes: Hazards and Prediction
5. Volcanoes
6. Streams and Floods
7. Coastal Erosion
8. Mass Wasting; Slumps and Landslides
9. Global Change
10. Water Resources
11. Mineral Resources
12. Energy Resources
13. Waste Disposal, Air and Water Pollution
14. Environmental Law
15. Land-Use Planning
16. Medical Geology

**D. OUTLINE OF MAJOR CONTENT AREAS: (continued)**

The laboratory exercises are intended to correlate with and reinforce the lecture topics. The labs also demonstrate the methods used by professionals in the earth sciences. Error analysis is used when it is appropriate.

Laboratory/field exercises:

1. rocks and minerals
2. maps
3. floods
4. slope stability and mass movement
5. ground water contamination
6. construction stone
7. surface water pollution
8. radioactive waste disposal
9. acid rain
10. radon
11. coal
12. earthquakes
13. ground water use
14. petroleum and natural gas

**E. LEARNING OUTCOMES (GENERAL):**

1. Demonstrate an understanding of scientific theories.
2. Discuss and question theories in environmental geology.
3. Perform laboratory experiments in environmental geology to develop in greater depth the students' experience in the collection and analysis of data and the source of error.
4. Evaluate societal issues from a natural science perspective and make informed judgments about science related topics and policies.
5. Become a more scientifically concerned informed citizen.

**F. LEARNING OUTCOMES (MNTC):**

Critical Thinking

- a. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive and conscious of bias in the information selected.
- b. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives which can give alternative meaning to a given problem.
- c. Analyze the logical connections between facts, goals, and assumptions relevant to a problem; evaluate claims which may be said to follow from them.
- d. Describe and improve one's own critical thinking and problem solving procedures.

Natural Sciences

- a. Demonstrate understanding of scientific theories and the ways in which scientists develop, express and question theories about the atmosphere.
- b. Formulate and test hypothesis by performing laboratory experiments, requiring collection of data, its statistical and/or graphical analysis and an appreciation of uncertainty of sources of error
- c. Communicate their findings, analysis and interpretations with other students and/or instructor orally and in writing.

**F. LEARNING OUTCOMES (MNTC): (continued)**

People and the Environment

- a. Discern patterns and interrelationships of geo-physical and socio-cultural systems.
- b. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems and institutions.
- c. Propose and assess alternative solutions to environmental problems.
- d. Articulate and defend the actions that would take on various environmental issues.

**G. METHODS FOR EVALUATION OF STUDENT LEARNING:**

1. Laboratory reports and/or quizzes
2. Three major tests including final exams
3. Field trips with reports

**H. SPECIAL INFORMATION (fees, directives on hazardous materials, etc.):**

The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of the chemicals used during the lab are discussed. The students will be instructed on the proper disposal of any hazardous products. The instructor insures that all students wear necessary protective equipment while working with the chemicals. A copy of Material Safety Data Sheets for each chemical used is available in the lab.