

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

COMMON COURSE OUTLINE: Course discipline/number Earth Science 1114

A. CATALOG DESCRIPTION (include prerequisites)

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

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

This is an introduction to the fundamental processes that shape planet earth. Emphasis is placed on plate tectonics as a framework for understanding these processes. Major content areas include the rock cycle (minerals, rocks, volcanoes, weathering), and natural resources (energy and mineral). This course also includes laboratory study of rocks, minerals, and maps. Field trips to significant geological localities are an important 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. The solid earth
 - a. origin of the earth
 - b. minerals
 - c. igneous rocks
 - d. volcanoes
 - e. weathering and erosion
 - f. sedimentary rocks
 - g. metamorphic rocks
 - h. geologic time scale

2. Surface processes
 - a. ground water
 - b. rivers
 - c. deserts
 - d. glaciers
 - e. oceans and coastal processes

D. OUTLINE OF MAJOR CONTENT AREAS: (continued)

3. Internal processes
 - a. earthquakes
 - hazards
 - prediction
 - b. seismic waves
 - c. plate tectonics

4. Earth's resources
 - a. energy resources
 - b. mineral resources

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. Field trips are intended to allow for students to analyze geologic phenomena by using the methods and tools of a geologist.

Laboratory/field exercises:

1. minerals
2. igneous rocks
3. sedimentary rocks
4. metamorphic rocks
5. topographic maps
6. rivers
7. ground water
8. glaciers
9. oceans
10. earthquakes
11. geologic time
12. fossils
13. deserts
14. geologic structures

E. LEARNING OUTCOMES (GENERAL):

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

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 manual, field exercises and/or written reports
2. Three major exams
3. Weekly homework assignments
4. Two lab practical exams

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

Included in the initial lab session is a discussion on general safety hazards and safety equipment. During the pre-lab instruction of labs involving hazardous materials or equipment, students are given information pertaining to the use, safety precautions, and disposal of these materials or equipment. The instructor directs all students to wear the necessary protective equipment while working with any hazardous chemicals. A copy of Material Safety Data Sheets for chemicals used is available in the lab.