

Course discipline/number/title: ESCI 1114: Minnesota Rocks and Waters with Lab

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 lecture, 2 lab
3. Prerequisites (Course discipline/number): None
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences, Goal 10/People and the Environment

B. COURSE DESCRIPTION: This is a physical geology lab course with an emphasis on Minnesota. The focus is on the processes that shaped our state and our world. The course explores the connections between the rocks and waters and the people and the economy. We explore the rock cycle (minerals, rocks, volcanic activity, weathering and soils) using local examples. We also examine the geologic history and fossils of Minnesota as we investigate deep time. Students will strive to understand the forces that shaped our state such as glaciers, rivers, lakes, groundwater, mass movement and earthquakes. Both science and non-science majors will benefit from this course.

C. DATE LAST REVISED (Month, year): November, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Science and Critical Thinking
2. Plate Tectonics
3. The solid Earth
 - a) Minerals of Minnesota
 - b) Igneous rocks and volcanoes in Minnesota
 - c) Weathering, Soils and erosion in Minnesota
 - d) Sedimentary Rocks in Minnesota
 - e) Metamorphic Rocks in Minnesota
 - f) Mineral resources and Mining in Minnesota
4. Geologic Time
 - a) Geologic history of Minnesota
 - b) Isotopic Dating of Minnesota Rocks
 - c) Using relative dating principles to determine the geologic history of Minnesota
 - d) Fossils of Minnesota
5. Geologic processes in Minnesota
 - a) Earthquakes in Minnesota
 - b) Mass wasting in Minnesota
 - c) Minnesota Rivers and Flooding
 - d) Groundwater in Minnesota and how we use it.
 - e) Lakes and coastal processes in Minnesota
 - f) Minnesota's glacial past
 - g) Climate Change in Minnesota

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Defend the Theory of Plate Tectonics using scientific evidence.
2. Perform geology lab work such as using topographic maps, making measurements and identifying and classifying rocks and minerals.
3. Evaluate societal issues from a geological perspective and make informed judgments about geology-related topics and policies.
4. Assess the hazards associated with geological phenomena in Minnesota (e.g. flooding, landslides, etc.) and propose strategies for mitigating them.
5. Measure the ages of rocks, fossils and the Earth.
6. Interpret Minnesota Geology and the forces that shape the landscape.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.
3. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.

Goal 10/People and the Environment: The student will be able to:

1. Explain the basic structure and function of various natural ecosystems and of human adaptive strategies within those systems.
2. Describe the basic institutional arrangements (social, legal, political, economic, religious) that are evolving to deal with environmental and natural resource challenges.
3. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions.
4. Articulate and defend the actions they would take on various environmental issues.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Exams and quizzes
2. Essays
3. Written tests
4. Term papers
5. Lab exercises

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):

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. Safety Data Sheets for chemicals used are available online.