

**Course discipline/number/title: ESCI 1101: Principles of Geoscience****A. CATALOG DESCRIPTION**

1. **Credits:** 3
2. **Hours/Week:** 2 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 course explores our planet and how it works. It surveys basic concepts of shifting tectonic plates, deep geologic time, earthquakes, volcanic eruptions and the nature of rocks and minerals. Laboratory exercises will introduce students to the methods of geoscience and will supplement the lectures. Non-science majors will benefit from this course.

**C. DATE LAST REVISED (Month, year):** February, 2025

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

1. Formation of the Earth
  - a) Nebular hypothesis
  - b) Structure and composition of the Earth
2. Plate Tectonics
  - a) Development of the theory
  - b) Plate dynamics
3. Earthquakes
  - a) Causes of earthquakes
  - b) Effects of earthquakes
4. Volcanoes
  - a) Causes of volcanism
  - b) Types of volcanoes
  - c) Effects of eruptions
5. Geologic Time
  - a) Relative dating principles
  - b) Radiometric dating techniques
6. Minerals and mineral resources
  - a) Mineral chemistry
  - b) Mineral properties
  - c) Mineral resource development
7. Rocks
  - a) Igneous rocks
  - b) Sedimentary rocks
  - c) Metamorphic rocks
  - d) The rock cycle

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

1. Demonstrate correct understanding of tectonics, geologic time, and other geologic concepts.
2. Diagram plate boundaries showing positions and directions of movement of tectonic plates.
3. Identify common rocks and minerals.
4. Determine the ages of rocks and minerals given information about the isotope abundances.
5. Create a geologic history of a region by applying relative dating principles based on field information.
6. Determine earthquake epicenters using seismograph records.
7. Collect and analyze geologic data and identify sources of error.
8. Describe the effect of geologic phenomena on society and themselves.
9. Realize and examine societal impacts on the earth system.

**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.
4. Communicate their experimental findings, analyses and interpretations both orally and in writing

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

1. Discern patterns and interrelationships of bio-physical and socio-cultural systems.
2. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems and institutions.
3. Propose and assess alternative solutions to environmental problems.
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
2. Lab exercises
3. Lecture quizzes

**H. RCTC CORE OUTCOME(S).** This course contributes to meeting the following RCTC Core Outcomes(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.