COMMON COURSE OUTLINE: Course discipline/number/title: ESCI 1101: Principles of Geoscience

A. CATALOG DESCRIPTION
1. Credits: 3
2. Hours/Week: 2 hours lecture, 2 hours lab
3. Prerequisites (Course discipline/number): None
4. Co-requisites (Course discipline/number): None
5. MnTC Goals (if any): Goal 2/Critical Thinking, Goal 3/Natural Sciences, Goal 10/People and the Environment

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.

B. DATE LAST REVISED (Month, year): February, 2010

C. 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

Instructors may also introduce topics such as: Oceans, the atmosphere, rivers, groundwater, radon, etc.

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Demonstrate correct understanding of tectonics, geologic time, and other geologic concepts and phenomena.
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.
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.
E. LEARNING OUTCOMES (MNTC):
Goal 2/Critical Thinking: The student will be able to:
1. 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.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meaning to a given problem.
3. Analyze the logical connections between facts, goals and assumptions relevant to a problem; evaluate claims, which may be said to follow from them.
4. Describe and improve one’s own critical thinking and problem solving procedures.

Goal 3/Natural Sciences: The student will be able to:
1. Demonstrate understanding of scientific theories and the ways, in which scientists develop, express and question theories in the areas of the earth sciences.
2. Formulate and test hypothesis by performing laboratory experiments, requiring collection of data, its statistical and/or graphical analysis and an appreciation of uncertainty and sources of error.
3. Communicate their findings, analysis and interpretations with other students and/or instructor orally and in writing.

Goal 10/People and the Environment: The student will be able to:
1. Discern patterns and interrelationships of geo-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.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:
Instructors have wide latitude in evaluating student progress. This may include:
1. Written tests
2. Lab exercises
3. Projects
4. Writing assignments
5. Or other methods deemed appropriate

G. 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. A copy of Material Safety Data Sheets for chemicals used is available in the lab.

This course aligns with the following RCTC Core Outcomes:
1. Critical Thinking
2. Global Awareness/Diversity