COMMON COURSE OUTLINE: Course discipline/number/title: ESCI 1114: Physical Geology

A. CATALOG DESCRIPTION
1. Credits: 4
2. Hours/Week: 3 lecture/2 lab
3. Prerequisites (Course discipline/number): Appropriate score on RCTC Placement test with needed score into developmental reading.
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 is an introduction to the fundamental processes that shape Planet Earth. We examine the influence of geological processes on humankind. Emphasis is placed on plate tectonics as a framework for understanding these processes. In this course we explore the rock cycle (minerals, rocks, volcanoes and weathering) and investigate deep geologic time. Students will strive to understand the forces that shape our world such as glaciers, rivers, groundwater, earthquakes and tsunamis. We experience the beauty of places like deserts, coasts and mountains. Laboratory exercises introduce the methods of geology and reinforce lecture material. Field trips to significant geological localities are an important part of the course.

B. DATE LAST REVISED (Month, year): March, 2011

C. OUTLINE OF MAJOR CONTENT AREAS:
Topics may include:
1. The Solid Earth
   a) Origin and Structure of the Earth
   b) Minerals and mineral resources
   c) Igneous rocks
   d) Volcanoes and volcanic hazards
   e) Weathering and erosion
   f) Sedimentary rocks
   g) Metamorphic rocks
   h) Geologic time scale
2. Surface processes
   a) Ground water resources
   b) Rivers and flooding
   c) Deserts
   d) Glaciers
   e) Oceans and coastal processes and their effects on coastal communities
3. Internal Processes
   a) Earthquakes and their effects on society
   b) Seismic waves
   c) Plate tectonics

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Defend the Theory of Plate Tectonics using scientific evidence.
2. Identify and classify 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 geologic phenomena such as river flooding, earthquakes, volcanoes and landslides and propose strategies for mitigating them.
5. Measure the ages of rocks, fossils and the Earth.
6. Recognize the aesthetic value of the Earth’s natural treasures.
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 possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.
4. Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.

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. Critically evaluate 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.

E. METHODS FOR EVALUATION OF STUDENT LEARNING:
Methods of evaluation may include:
1. Lab exercises
2. Written tests
3. Lab practical exams
4. Quizzes
5. Homework assignments
6. Research papers
7. Students will also be assessed on core outcomes of critical thinking and aesthetic response.
8. Additional assessment will be done using the Geoscience Concept Inventory or similar test.

F. RCTC CORE OUTCOME(S) ADDRESSED:
☐ Communication  ☑ Critical Thinking  ☐ Personal/Professional Accountability
☐ Global Awareness/Diversity  ☑ Aesthetic Response

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.