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

This course examines the causes and effects of earthquakes and volcanic activity. It also covers the impacts of earthquakes and volcanic eruptions, including secondary effects such as landslides, mudflows, and tsunamis; climatic effects; energy/mineral resources; and social disruption. Additionally, the mitigation of effects of natural disasters will be included.

B. DATE LAST REVISED (Month, year): January, 2005

C. OUTLINE OF MAJOR CONTENT AREAS:

Lecture
1. Introduction to plate tectonics
   a) Historical development of the theory
   b) Plate dynamics
   c) Plate boundaries
2. Earthquakes
   a) Basic definitions
   b) Earthquake damage
   c) Locating epicenters
   d) Seismographs
   e) Reading seismograms
   f) The richter scale
   g) Mercalli index
   h) Mitigating earthquake damage
   i) Earthquake prediction
   j) Historic earthquakes
3. Volcanoes
   a) Types of volcanoes
   b) Types of eruptions
   c) Lava types
   d) Causes of damage
   e) Predicting eruptions
   f) Magma formation and movement
   g) Historic eruptions

Laboratory:
Lab exercises will cover the theory of plate tectonics, reading seismograms, locating epicenters, evaluating hazards etc.

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Demonstrate an understanding of scientific theories.
2. Discuss and question theories relating to plate tectonics, earthquakes and volcanoes.
3. Perform field investigations and laboratory experiments to develop in greater depth the student’s experience in the collection and analysis of data and the sources of error.
4. Evaluate societal issues from a natural science perspective and make informed judgments about environmental issues and policies regarding earthquakes and volcanoes.
5. Become a more environmentally conscious and informed citizen of the world.
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:
1. Written exams
2. Papers
3. Lab exercises
4. Journals
5. Homework exercises

G. SPECIAL INFORMATION (if any): None