PHYS 107 : Energy and the Environment

A. Course Description

Credits: 4

Prerequisites:
MATH 098 Introduction to Mathematical Thinking
OR
MATH 102 Mathematics of Sustainability or placement at or above College Algebra level on the University's assessment.

Lab Hours/ Weeks: Corequisites: None

Lecture Hours/ Week :

MnTC Goals: Goal 03 - Natural Science , Goal 10 - People/Environment

This course explores the physics principles (such as force and energy, electricity and magnetism, thermodynamics, chemical physics, and nuclear power generation) related to the use of energy and its effects on the environment. Topics such as power production, acid rain, fuel resources are studied. The consequences of fundamental physics on public policy are also discussed in this context. Include lab. Intended for general education students.

B. Course Effective Dates: 01/11/2010 - 05/04/2011 05/05/2011 - Present

C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Apply the vocabulary, concepts and methods of physics to current and historical cases, including electrical power generation, home heating and insulation, transportation, etc.
2. Articulate and defend the actions they would take on various environmental issues.
3. Communicate their experiential findings, analyses, and interpretations both orally and in writing.
4. Critically evaluate environmental and natural resource issues related to energy usage and conservation in light of understandings about interrelationships, ecosystems, and institutions.
5. Demonstrate quantitative reasoning skills and the ability to use arithmetic and elementary statistics at a level appropriate for graduates of bachelors degree programs.
6. Describe the basic institutional arrangements (social, legal, political, economic etc.) that are evolving to deal with environmental and natural resource challenges.
7. Evaluate environmental issues from a natural science perspective, asking questions about the evidence presented, and making informed judgments about science-related topics and policies.
8. Formulate and test hypotheses by performing a field experiment in physics, including the collection of data, statistical and graphical analysis of results, and an interpretation of its sources of error and uncertainty.
10. Understand and explain the physics principles, including force and energy, electricity and magnetism, thermodynamics, and chemical physics that relate to the use of energy and its effects on the environment.

E. Learning Outcomes (MN Transfer Curriculum)
Goal 03 - Natural Science

1. 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.
2. Demonstrate understanding of scientific theories.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

Goal 10 - People/Environment

1. Propose and assess alternative solutions to environmental problems.
2. Discern patterns and interrelationships of bio-physical and socio-cultural systems.
3. Describe the basic institutional arrangements (social, legal, political, economic, religious) that are evolving to deal with environmental and natural resource challenges.
4. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions.
5. Articulate and defend the actions they would take on various environmental issues.

G. Special Information

Note: First day attendance required except by instructor permission.