North Hennepin Community College

PHYS 1140: Energy Aspects of Our Physical Environment

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: *.*

Lab Hours/Week: *.*

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

This course is designed for people who desire to learn about the various sources of energy and the problems associated with its production and consumption on the local, state, national, and international levels. Topics to be covered include: energy principles, fossil fuels, electric energy, acid precipitation, energy conservation, infringements on the global atmosphere, the principles of sustainability, and the orderly translation from our current energy mix to a new mix utilizing nuclear, solar, wind, geothermal, and new emerging technologies. This course includes a lab-like experience. (3 hours lecture)

B. COURSE EFFECTIVE DATES: 09/10/1997 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Students will become aware of the long-term development of energy systems and the problems generated by each. They will also be challenged by the future demands of energy and alternative sources need to be exploited. Topics cover include: the principles of resource allocation, electrical power generation, environmental impacts and options of energy generation, automobiles, nuclear energy, solar energy, alternative energy systems, solid waste management, and energy conservation, and sustainability.

D. LEARNING OUTCOMES (General)

1. Demonstrate an understanding of the principles of sustainability. Four basic principles of sustainability will be re-enforced through many examples throughout the course.
2. Demonstrate ability to understand the basic laws of energy and matter. Kinetic and thermodynamic principles that govern the understanding of the formation and generation of energy.
3. Demonstrate knowledge of the physical systems of the Earth, including plate tectonics, atmospheric dynamics, and ocean dynamics.
4. Demonstrate familiarity with the flow of matter in the environment as it relates to the carbon sulfur cycles.
5. Demonstrate ability to understand the concept of Carrying Capacity as it relates t oa region and then extended to the global scale.
6. Demonstrate knowledge of the formation, exploration, and recovery of fossil fuels such as petroleum, natural gas, coal, and other forms of natural resources.
7. Demonstrate ability to understand the ramifications of burning fossil fuels and the potential problems that result in air, water, and other forms of pollution.
8. Demonstrate ability to discuss the promise of the successful reduction of Ozone depleting chemicals in the environment and how with worlds scientific and political communities came together to solve a global problem.
9. Demonstrate familiarity with the cause and effect relationship of fossil fuel utilization and Global Climate Change. Understanding of the components of Global Warming and assessment of outcomes that possible solutions may bring and how the example of global cooperation in solving the Ozone dilemma can be used as a model for future climate related problems.
10. Demonstrate knowledge of energy efficiencies and how they become limiting factors in the various uses of energy today.
11. Demonstrate familiarity with alternative and renewable sources of energy such as solar heating and electricity, wind power systems, geothermal energy, biomass systems, the rebirth of nuclear power, and other new systems of renewable (sustainable) energy systems.
12. Analyze, interpret, and make predictions regarding energy related systems by applying appropriate scientific theories, principles, and concepts. (MnTC Goal 3, Competencies a and b, MnTC Goal Area 2, Competencies a, b, and c.)
13. Demonstrate how the knowledge of energy related principles can be used to help evaluate current science related issues in society, such as Global Warming and Alternate forms of energy production. (MnTC Goal 3, competency d; MnTC Goal Area 2, Competencies a, b, and c.)

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted