

Introduction to Renewable Energy Systems

Outline of Instruction

Course Information

Organization	Monroe County Community College, Applied Science and Engineering Technology
Development Date	March 3, 2011
Course Number	ELEC 156
Potential Hours of Instruction	60
Total Credits	3

Description

This course explores the basic principles of energy systems for both renewable and conventional energy. Topics include the technical nomenclature and critical analysis techniques for energy systems, as well as its generation, flow, conversion, storage, economics, consumption, sustainability, conservation, environmental impact, and regulatory concerns.

Major Units:

1. Introduction to Energy
2. Energy Mechanics
3. Heat and Work
4. Home Energy Conservation
5. Solar Heating
6. Fossil Fuel energy processes
7. Air pollution and Global warming
8. Electricity – Circuits, Superconductors, electromagnetism, power generation
9. Renewable energy sources – Solar, Wind, Hydro, Geothermal, Biomass
10. Nuclear Power – Fission – Effects and uses of radiation
11. Future Energy sources – Fusion

Types of Instruction:

Instruction Type	Contact Hours
Classroom Presentation	30
On-Campus Laboratory	30

Co-requisites

Math 119 or qualifying COMPASS score

Exit Learning Outcomes

General Education Outcomes

- A. Communicate information in writing using the rules of standard English
- B. Apply mathematical approaches to the interpretation of numerical information
- C. Apply mathematical approaches to the analysis of numerical information
- D. Demonstrate an understanding of social science concepts
- E. Demonstrate an understanding of the process of scientific inquiry
- F. Use computer technology to retrieve information
- G. Use computer technology to communicate information

Course Outcomes

- 1. Apply conversions between different units of energy and work
- 2. Apply *critical analysis* techniques various energy scenarios.
- 3. List and explain the main sources of energy and their primary applications from personal, national, and global perspectives.
- 4. Explain energy conversion cycles and machines, and understand the limits to efficient conversion of raw energy to useful work.
- 5. Visit conventional and renewable energy facilities to gain understanding of energy processes and potential careers.
- 6. Identify the environmental and societal impacts of current conventional energy policy.
- 7. Explain ethical issues relating to various energy technologies.
Explain sustainability issues related to current energy consumption along with possible solutions.
- 8. Analyze requirements, economics and environmental impact of various energy production methods. Calculate efficiency and estimate payback time.
- 9. Construct conversion scenarios for alternative and renewable energies
- 10. Conceptualize a renewable energy system, determine approximate size, select and layout components of an integrated system, and provide estimated cost of final product.
- 11. Conduct a home energy audit, design and execute an energy conservation plan, analyze and report the results.