

# Introduction to Solar Energy Systems

## Outline of Instruction

### Course Information

<b>Organization</b>	Monroe County Community College, Applied Science and Engineering Technology
<b>Development Date</b>	March 3, 2011
<b>Course Number</b>	ELEC 157
<b>Potential Hours of Instruction</b>	60
<b>Total Credits</b>	3

### Description

This course introduces the basics of solar energy systems - collection, conversion, transmission, and storage for both thermal and photovoltaic systems. Topics include history, terminology, solar radiation, domestic hot water systems, passive solar house heating, and Photovoltaic power systems.

### Major Units

- Introduction to solar energy systems
- Nature of solar radiation
- System components and configurations
- System demand and sizing
- Mechanical Integration
- Electrical Integration
- Economic, environmental, and political issues
- Site planning and surveys
- Commissioning, maintenance, and troubleshooting
- PV special considerations and equipment

### Types of Instruction:

<b>Instruction Type</b>	<b>Contact Hours</b>
Classroom Presentation	30
On-Campus Laboratory	30

### Co-requisites

ELEC 125 (Fundamentals),  
ELEC 156 (Intro to Renewable Energy Systems)  
MATH 119 (Elementary Tech Math) or qualifying COMPASS score

## Exit Learning Outcomes

### General Education Outcomes

- A. Communicate ideas in writing using the rules of standard English
- B. Communicate information in writing using the rules of standard English
- C. Apply mathematical approaches to the interpretation of numerical information
- D. Apply mathematical approaches to the analysis of numerical information
- 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. Define key aspects of the current solar energy industry, including different locations, markets, scale, technologies, and trends.
- 2. Identify and define solar energy fundamentals concepts
- 3. Identify and define safety aspects for solar energy systems
- 4. Accurately explain the benefits, limitations, and tradeoffs of solar energy systems
- 5. Identify the various types of solar energy systems, including components
- 6. Practice system sizing for both domestic hot water and simple PV systems
- 7. Practice electrical design of solar PV systems
- 8. Conduct a solar energy site assessment and quantify the amount of solar energy available at a particular site.
- 9. Design a simple residential scale photovoltaic system.
- 10. Conduct an economic and environmental assessment of proposed photovoltaic systems.
- 11. Conduct a basic home energy audit and make energy efficiency and conservation recommendations.
- 12. Obtain preparation for NABCEP PV Entry Level Test.