**COURSE INFORMATION FORM**

**DISCIPLINE**
INTE

**COURSE TITLE**
Solar/Photovoltaic Systems

**CR.HR.** 3  **LECT HR.** 3  **LAB HR.** 0  **CLIN/INTERN HR.** 0  **CLOCK HR.** 0

**CATALOG DESCRIPTION**
Solar radiation as applied to photovoltaic technology, photovoltaic system component section, and introduction to safe design and installation of photovoltaic systems.

**PREREQUISITES**
None

**EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)**

Upon completion of this course, the student will be able to:

1. Critique various types of photovoltaic (PV) systems according to their key features and benefits.
2. Apply correct practices and equipment for safe installation and maintenance of PV systems.
3. Use basic solar terminology correctly.
4. Predict solar position using path diagrams and a knowledge of solar movement and effects of earth tilt.
5. Measure average irradiation on a surface and convert into a variety of units.
6. Analyze angular effects and other factors impacting irradiance and irradiation.
7. Analyze how a solar cell converts sunlight into electric power.
8. Evaluate key output values of solar modules using manufacturer literature.
9. Compare measurement conditions for solar cells and modules.
10. Compare the construction, performance and characteristics of various cell technologies.
11. Specify purpose and operation of bypass diode, and components of a typical flat plate solar module.
12. Compare features and benefits of different solar mounting techniques.
13. Classify purpose and operation of main electrical balance of system (BOS) components (inverter, charge controller, combiner, ground fault protection, battery, generator) and compare their key specs.

**GENERAL EDUCATION OUTCOMES (ESO)**

Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

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<th>Outcomes</th>
<th>ESO</th>
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Revised 10/21/11
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

The student will demonstrate:

1. The ability to apply foundational skills in an industrial setting, safely and to industry guidelines.
2. Competence in the entry-level skills of technical profession in Industrial Technology.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Written assignments (1 – 13)
2. Homework assignments (1 – 13)
3. Quizzes and exams (1 – 13)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. PV History and Applications
   A. History of PV technology
   B. Common applications of PV
   C. Configurations of PV (direct motor, grid-backup, standalone, etc.) and their benefits

II. Solar Radiation Basics
   A. Solar terminology
   B. Sun-Earth relationships and solar position
   C. Irradiation and Irradiance
   D. Basics of site evaluation and array sizing

III. Major System Components
    A. Modules
    B. Inverters
    C. Batteries
    D. Charge Controllers

IV. Balance of System
    A. Mechanical balance of system
    B. Electrical balance of system

V. Grid Connection

VI. Safety and Code Compliance
    A. Mechanical
    B. Electrical

VII. Careers in PV