

**CEM162SP Solar Photovoltaic Design and Installation**

**3 units**  
**2 hours Lecture**  
**3 hours Laboratory**

Introduces solar photovoltaic system requirements, design and configurations, installation techniques, and their application in residential and commercial construction. Entry-level Certification Exam from NABCEP is an option.

**Requisites** *Prerequisites:* N/A

*Co-requisites:* N/A

*Recommended Preparation:* Eligibility for ENGL 100, READ 100, and MATH 154.

- Core Cabrillo Competencies**
- Critical Thinking and Information Competency
  - Global Awareness
  - Personal Responsibility and Professional Development

- Learning Outcomes**
1. Analyze solar photovoltaic system energy and building resources.
  2. Critically assess solar photovoltaic system applications, site evaluation, design analysis, codes and materials, and methods of installation.
  3. Investigate solar photovoltaic systems and their relationship with energy conservation, scarce resources and the environment.
  4. Compare and contrast solar photovoltaic system energy sources and applications.

- Objectives**
1. Analyze solar photovoltaic system applications.
  2. Identify various energy technologies, codes, certifications and their relationship with solar photovoltaic systems.
  3. Apply contemporary energy products and technologies to solar photovoltaic systems and energy conservation.
  4. Explain the layout and design requirements for solar photovoltaic systems in residential and commercial construction.
  5. Compare and contrast solar photovoltaic system materials and methods.

- Content**
1. Overview of Photovoltaics.
  2. Photovoltaic Electric Principles.
  3. The Solar Resource.
  4. Electric Load Analysis.
  5. Photovoltaic Modules.
  6. Batteries.
  7. PV Controls.
  8. Inverters.
  9. Photovoltaic System Wiring.

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- Content** 10. Sizing Photovoltaic Systems.  
(cont'd) 11. Utility-Interactive Systems.  
12. Integrating Photovoltaics into Buildings.  
13. Photovoltaic System Applications.  
14. Photovoltaic Installation.  
15. Maintenance and Troubleshooting.  
16. Safety and PV Installation.

**Assignments** In-class assignments:

1. Analyze photovoltaic system principles, applications, codes and theories.
2. Compare and contrast the various photovoltaic system options.
3. Develop alternative solutions.
4. Critically evaluate photovoltaic systems and their social-economic relationship to the environment.

Out-of-class assignments:

1. Reading assignments.
2. Written questions from reading assignments and handouts.
3. Site visits and field trips.

Students are expected to spend 5 hours in class and 5 hours outside of class.

- Evaluation**
- Substantial writing requirements are not appropriate for this course.
  - Alternately, students are assessed through demonstrations of problem solving ability.
  - Demonstrations of writing skills: written homework and essay exams.
  - Problem solving demonstrations: quizzes.
  - Practical skill demonstration: class performances.
  - Objective exams: multiple choice, true/false, and completion.

**Grading** Letter Grade or CR/NC.

- Representative Texts**
- American Technical Publishers, Inc.. *Photovoltaic Systems*. Homewood: American Technical Publishers, Inc., 2007. (ISBN: 978-0-8269-1287-9)
  - Handouts.
  - Notes from field trips.

**History** Approved by