

CATALOG INFORMATION

Dept and Nbr: RENRG 103      Title: GRID TIE RES PV BASICS  
Full Title: Basics of Grid Tie Residential Systems  
Last Reviewed: 11/25/2019

| Units   |      | Course Hours per Week |      | Nbr of Weeks | Course Hours Total |       |
|---------|------|-----------------------|------|--------------|--------------------|-------|
| Maximum | 3.00 | Lecture Scheduled     | 2.00 | 17.5         | Lecture Scheduled  | 35.00 |
| Minimum | 3.00 | Lab Scheduled         | 3.00 | 6            | Lab Scheduled      | 52.50 |
|         |      | Contact DHR           | 0    |              | Contact DHR        | 0     |
|         |      | Contact Total         | 5.00 |              | Contact Total      | 87.50 |
|         |      | Non-contact DHR       | 0    |              | Non-contact DHR    | 0     |

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable  
Grading: Grade Only  
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:

**Catalog Description:**  
An introductory level integrated lab-lecture course to provide knowledge and skills needed to understand the relationships between designing, installing, and selling a typical residential grid tie solar photovoltaic (PV) system.

**Prerequisites/Corequisites:**

**Recommended Preparation:**  
Eligibility for ENGL 100 OR EMLS 100 (formerly ESL 100) and completion of MATH 150 or equivalent

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: An introductory level integrated lab-lecture course to provide knowledge and skills needed to understand the relationships between designing, installing, and selling a typical residential grid tie solar photovoltaic (PV) system. (Grade Only)  
Prerequisites/Corequisites:  
Recommended: Eligibility for ENGL 100 OR EMLS 100 (formerly ESL 100) and completion of

MATH 150 or equivalent

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

|                      |                      |            |           |
|----------------------|----------------------|------------|-----------|
| <b>AS Degree:</b>    | <b>Area</b>          | Effective: | Inactive: |
| <b>CSU GE:</b>       | <b>Transfer Area</b> | Effective: | Inactive: |
| <b>IGETC:</b>        | <b>Transfer Area</b> | Effective: | Inactive: |
| <b>CSU Transfer:</b> |                      | Effective: | Inactive: |
| <b>UC Transfer:</b>  |                      | Effective: | Inactive: |

**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

**Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Determine appropriate solar technologies for a given site.
2. Utilize shade analysis and clearance requirements for optimal placement and orientation of solar arrays on roof or ground installations.

**Objectives:**

At the conclusion of this course, the student should be able to:

1. Describe phases of a solar PV project from initial customer contact to completion.
2. Analyze a site to determine the best location to install a system.
3. Describe mounting methods on different roofing materials and soil types.
4. Document how storage systems can benefit a solar project.

**Topics and Scope:**

- I. Utility Structures, Rate Schedules and Energy Savings
  - A. Overview of utility companies
  - B. Consumer utility rate schedules
  - C. Electric bill interpretation
  - D. Distributed-generation versus centralized-utility models
  - E. System sizing based on customer current and future use
- II. Fire Clearances and Permitting Issues
  - A. Relevant building and fire codes
  - B. The permitting process
- III. Electrical Storage System Design
  - A. Suitable applications and conditions
  - B. Battery types
- IV. Basic Electrical Components

- A. Conduit design
- B. Inverters and rapid shut-down devices
- C. Disconnects
- D. Monitoring components
- V. Roof-Mounted Systems
  - A. Modifications to existing roofs
  - B. Attachment components and methods
  - C. Installation for new roofs
- VI. Basics of Ground-Mounted Systems
  - A. Foundation systems
  - B. Racking systems
- VII. Electrical Loads
  - A. Determination of critical loads
  - B. Evaluation of future loads
  - C. Evaluating suitability of existing electrical system
- VIII. System Aesthetics
  - A. Ground-mounted versus roof-mounted systems
  - B. System visibility and aesthetics
- IX. Basic Site Safety and Staging
- X. Site Planning
  - A. Shade analysis
  - B. Roof tilt and orientation
  - C. Roof-mounting versus ground-mounting
- XI. Ethics and Customer Service
  - A. Responding to questions or requests from customers
  - B. Site preparation and use of tarps, furniture covers, and walkway linings
  - C. Service tips to leave a favorable, memorable impression with customers
  - D. Quality system installations
  - E. Preparation for the final departure of a project site
  - F. System monitoring

The above Topics and Scope apply to both lecture and lab course components in an integrated format.

### **Assignment:**

1. Assigned readings (10-30 pages per week)
2. Problem sets and tasks (6-20)
3. Quizzes (5-10)
4. Midterm exam
5. Final exam

### **Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem sets and tasks

Problem solving  
30 - 60%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes, midterm and final

Exams  
30 - 60%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Participation

Other Category  
0 - 10%

### **Representative Textbooks and Materials:**

Photovoltaic Systems. 3rd ed. Dunlop, James. American Technical Publishers. 2012 (classic)  
Instructor prepared materials