

Course Outline of Record

1. Course Code: ESYS-311A
2. a. Long Course Title: Module 1 Residential Solar Surveying and Planning  
 b. Short Course Title: MOD 1 RES-SOLAR-PLAN
3. a. Catalog Course Description:  
 This course is Module 1 of 3 for students engaged in a solar related field that have a need for knowledge and skills of solar function and design of solar photovoltaics. The coordination between trades, design limitations, and workflow processes will be explained. The fundamental principles and functions of the photovoltaic industry will be introduced. Students will be prepared to work as site planning technicians or solar sales advisors.  
 b. Class Schedule Course Description:  
 This course is Module 1 of 3 for students interested in a career in the solar industry. Each Module is a stand alone course. The coordination between trades, design limitations, and workflow processes will be explained.  
 c. Semester Cycle (if applicable): N/A  
 d. Name of Approved Program(s):  
 • NEW CERTIFICATE IN PROGRESS Certificate of Completion
4. Total Units: 0      Total Semester Hrs: 18.00  
 Lecture Units: 0      Semester Lecture Hrs: 18.00  
 Lab Units: 0      Semester Lab Hrs: 0  
 Class Size Maximum: 36      Allow Audit: No  
 Repeatability Noncredit - Unlimited  
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:  
*Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm I-A)*  
N/A
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)  
 a. Dunlop, J., P. (2012). Photovoltaic Systems (3rd/e). American Tech Publishers. ISBN: 9781935941057  
 College Level: Yes  
 Flesch-Kincaid reading level: 11.0
7. Entrance Skills: *Before entering the course students must be able:*  
a.  
None.

8. Course Content and Scope:

Lecture:

- 1. PV Markets and Applications**
  - 1.1. Describe history of PV technology and industry
  - 1.2. Describe markets and applications for PV (grid-tie, remote homes, telecom, ev charging.)
  - 1.3. Identify types of PV systems (utility-interactive, standalone, direct-coupled, etc.)
  - 1.4. Grid connection, utility-interactive, net metering
  - 1.5. Be aware of current trends
- 2. Safety Basics**
  - 2.1. Identify safety hazards of PV systems
  - 2.2. Identify safety hazards, practices, and protective equipment during PV system installation and maintenance (electricity, batteries, roof work)
- 3. Solar Energy Fundamentals**

- 3.1. Define basic solar terms (e.g., irradiation, azimuth)
- 3.2. Explain magnetic declination
- 3.3. Understand basic celestial movements and their effects on photovoltaics
- 3.4. Recognize solar path diagrams & their usefulness
- 3.5. Identify factors that reduce/enhance solar irradiation
- 3.6. Understand the effects of shading
- 3.7. Have basic knowledge of average solar irradiation
- 3.8. Understand the effects of environmental conditions
- 3.9. Be cognizant of solar tools such as the Solar Pathfinder, Solmetric Sun-Eye, and sun charts

Lab: (if the "Lab Hours" is greater than zero this is required)

9. Course Student Learning Outcomes:

1.  
Explain the design clearances required for maintenance access for a PV array and other components including inverter and batteries of a stand-alone system.
2.  
Describe the coordination process between trades involve to properly design a residential solar system.
3.  
Define and use solar terminology appropriately when discussing photostatic with industry and solar clients.
4.  
Assist solar designers by providing site location clearances available in existing buildings.
5.  
Produce installation schedules for future and current clients.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Describe history of PV technology and industry
- b. Describe markets, applications and coordination between disciplines for PV (grid-tie, remote homes, telecom, etc.) SLO (2)
- c. Identify types of PV systems (utility-interactive, standalone, direct-coupled, etc.)
- d. Identify safety hazards of PV systems and state code equipment requirement. SLO (1)
- e. Define basic electrical units and terminology SLO (3)

11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*

- a. Activity
- b. Collaborative/Team
- c. Demonstration, Repetition/Practice
- d. Lecture
- e. Participation

12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*

In Class Hours: 18.00

Outside Class Hours: 36.00

a. In-class Assignments

1. Draw control diagrams, equipment clearance, battery systems for solar systems. \*SLO(1)
2. Class discussion on the process, flow and coordinations in solar design. \*SLO(2)
3. Role play a customers and technician interactions to introduce solar terminology. \*SLO(3)

b. Out-of-class Assignments

1. Reading assigned chapters.

13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- True/false/multiple choice examinations
- Student preparation

14. Methods of Evaluating: Additional Assessment Information:

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

PO - Career and Technical Education

Fulfill the requirements for an entry- level position in their field.

Display the skills and aptitude necessary to pass certification exams in their field.

IO - Scientific Inquiry

Recognize the utility of the scientific method and its application to real life situations and natural phenomena.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
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17. Special Materials and/or Equipment Required of Students:

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18. Materials Fees:  Required Material?

Material or Item	Cost Per Unit	Total Cost
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19. Provide Reasons for the Substantial Modifications or New Course:

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This course is developed to meet the goals of the California Energy Efficiency Strategic Plan (CEESP) which mandates that 100 percent of all new homes in California will be Zero Net Energy starting in 2020 and 50 percent of commercial buildings by 2030. Solar technology is the leading technology used to offset electrical demand from the power grid. California has acknowledged the shortage of qualified and available work force to meet these new mandates. Residential solar 1, the course is designed to develop the highly trained technical workforce necessary to meet the goals of the California Energy Efficiency Strategic Plan (CEESP).

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*  
 b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Pass/No Pass Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000581664
- b. T.O.P. Code [CB03]: 94610.00 - Energy Systems Technology
- c. Credit Status [CB04]: N - Noncredit
- d. Course Transfer Status [CB05]: C = Non-Transferable
- e. Basic Skills Status [CB08]: 2N = Not basic skills course
- f. Vocational Status [CB09]: Possibly Occupational
- g. Course Classification [CB11]: J - Workforce Preparation Enhanced Funding
- h. Special Class Status [CB13]: N - Not Special
- i. Course CAN Code [CB14]: *N/A*
- j. Course Prior to College Level [CB21]: Y = Not Applicable

# ESYS 311A-Module 1 Residential Solar Surveying and Planning

k. Course Noncredit Category [CB22]: J - Workforce Preparation

l. Funding Agency Category [CB23]: Y = Not Applicable

m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (if program-applicable): NEW CERTIFICATE IN PROGRESS

*Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)*

## 23. Enrollment - Estimate Enrollment

First Year: 20

Third Year: 40

## 24. Resources - Faculty - Discipline and Other Qualifications:

a. Sufficient Faculty Resources: Yes

b. If No, list number of FTE needed to offer this course: N/A

## 25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

## 26. Additional Construction or Modification of Existing Classroom Space Needed. (Explain:)

N/A

## 27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: No

28. Originator Ramiro Galicia Origination Date 09/17/16