RENRG 105 Course Outline as of Fall 2020

CATALOG INFORMATION

Dept and Nbr: RENRG 105 Title: GRID TIE RES PV DESIGN
Full Title: Grid Tie Residential Solar PV System Design & Sales
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 intermediate level, integrated lab-lecture course to provide skills and information on selling and designing residential solar photovoltaic systems. This course is intended for students who plan to enter into the sales, marketing, and design of solar photovoltaic systems.

Prerequisites/Corequisites:
Course Completion of RENRG 102 and RENRG 103

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: An intermediate level, integrated lab-lecture course to provide skills and information on selling and designing residential solar photovoltaic systems. This course is intended for students who plan to enter into the sales, marketing, and design of solar photovoltaic systems. (Grade Only)
Prerequisites/Corequisites: Course Completion of RENRG 102 and RENRG 103
Recommended:

Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	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. Define a customer-oriented approach to selling a solar photovoltaic (PV) system.
2. Identify the best location on a property to install a solar system.
3. Evaluate if a customer is a good candidate for a solar system.
4. Design a basic solar system matched to a customer's needs.

Objectives:
At the conclusion of this course, the student should be able to:
1. Locate a customer's property by street address and evaluate its suitability for a solar PV system.
2. Create an outline of questions to ask to evaluate a customer’s needs.
3. Demonstrate the process of active listening and note taking.
4. Identify the incentives and utility savings for installing a solar system.
5. Summarize the basic equipment needs for a specific solar PV system.
6. Identify the property's electric service, including voltage, main breaker, and space availability.

Topics and Scope:

I. Approaches to Sales and Design
   A. Personable sales styles
   B. Markets
   C. Financing availability
   D. Income levels
   E. Rural and urban issues
II. Obtaining Customer Leads
   A. Trade shows
   B. Reputation and referrals
   C. Broadcast advertising

D. Door to door
E. Flyers and door hangers
F. Local trade organizations

III. Customer Appointment Preparation
A. Interpretation of a utility bill
B. Market research and understanding
C. Utilization of internet tools for remote analysis
D. Physical equipment needed
E. Estimation of roof pitch and orientation
F. Customer's time frame to install

IV. Customer Appointment
A. Interviewing techniques
B. Active listening
C. Customer drivers
D. Determining a customer’s current needs
E. Determining customer’s future energy needs
F. Financing types
G. Backup systems
H. Aesthetic options
I. Solar incentives

V. Site Analysis
A. Electrical service type and ratings
B. Best electrical interconnect method
C. Identify location for array and inverter
D. Conduit run and length
E. Identify combiner box and disconnects if needed
F. Access mounting needs, roof material, attic space
G. Ground-mounted: soil type, septic system, wells, and other underground items
H. Area calculations for solar array and fire clearances
I. Shade analysis of the solar PV array
J. Customer review before leaving
K. Existing roofing assessment

VI. Designing a Solar Photovoltaic System
A. Module sizing
B. Module, voltage and inverter pairing
C. Equipment location
D. Layout optimization
E. String micro inverter sizing
F. Supply side connection
G. Mounting method and tilt angle
H. Conduit types and wire sizing

VII. Financial Benefit Analysis
A. Cash flow calculations
B. Financing options
C. Rates of return calculations
D. Non-financial benefits
E. Performance analysis of system
F. Recurring maintenance
G. Future utility cost projections

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

Assignment:

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

Lab-Related Assignments:
1. Weekly lab tasks

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 35 - 50%

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 35 - 50%

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

Participation	Other Category 0 - 20%

Representative Textbooks and Materials:
Photovoltaic Systems. 3rd ed. Dunlop, James. American Technical Publishers. 2012 (classic)
Instructor prepared materials