

Basic Course Information

Semester:	Spring 2018	Instructor Name:	Jose (Joe) Roman
Course Title & #:	Solar Electrical Systems PV2-RNEW 151	Email:	jose.roman@imperial.edu.
CRN #:	20871	Webpage (optional):	
Classroom:	3119	Office #:	3121
Class Dates:	February 17-June 2	Office Hours:	TBA
Class Days:	Tuesday & Thursday	Office Phone #:	760-355-5719
Class Times:	8:00 - 9:05 a.m.(Lec) 9:15 - 11:10 a.m. (Lab)	Emergency Contact:	Tisha Nelson 355-6361 or cell 760-960-1782
Units:	3		

Course Description

This course focuses on Photovoltaic (PV) systems design and meets NSF Renewable Energy Program and NABCEP guidelines, and qualifies the student to take the NABCEP Solar PV Entry Level Test, including grid and stand-alone calculations, grounding considerations and wiring sizing based on the National Electrical Code (NEC). Evaluate systems performance under various operating conditions. residential, commercial and industrial systems design elements, including inter-row shading, controllers, battery and inverters selection, sizing and data monitoring solutions, including system design and installation exercises.

Course Prerequisite(s) and/or Corequisite(s)

Recommended preparation– RNEW 118 (Alternative Energies) or RNEW 150 (Solar Energy Systems PV1).
Note: Student can take the course if he/she have taken EWIR 110-Electrical Principle or ELTR 120-Electronic Devices. **This course is only offer every spring semester by the Career Pathway- Please see CTE Counselor: Roxanne Nunez for specific details.**

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skill, knowledge and or attitudes a demonstrated by being able to:

1. Understand photovoltaic system wiring, size wire, protection & grounding to NEC standards. (IL02, IL03)
2. Understand grid-tied photovoltaic system, with and without battery. (IL02, IL03)
3. Install photovoltaic system, mounting & trackers. ((IL02, IL03)
4. Demonstrate installation safety, maintenance and troubleshooting. (IL02, IL03)

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. Identify appropriate system designs & array configurations based on user loads, customer expectation & site conditions.
2. Determine the PV panel layout, orientation & mounting method for optimum system production & integrity.
3. Select the appropriate conductor types & size, rating & location of required overcurrent protection & power disconnect devices.
4. Perform a job safety analysis (JSA) & deploy safety system as needed.

5. Review the site assessment report, system design documents, permits & inspect the installation site.
6. Inspect photovoltaic (PV) system components prior to installation.
7. Install, label & terminate parts of the PV modules (panels) & balance-of-system components.
8. Identify the tools & equipment required for maintaining & troubleshooting PV systems.
9. Perform system maintenance as recommended by the PV equipment manufacturer.
10. Perform diagnostic procedures, interpret the results, & implement corrective measures on a malfunctioning system.

Textbooks & Other Resources or Links

NCCER Contren Learning Series Prentice Hall: Solar Photovoltaic Systems Installer
NABCEP-Download Handouts through Canvas
Other Handouts will be distributed by Instructor.

Course Requirements and Instructional Methods

Core Content:

A. OSHA safety.	10%
B. Prepare for projects	12%
C. Evaluate the site	12%
D. Plan system installation	15%
E. Laboratory, Presentation, and Testing the PV solar system	31%
F. Commission the system	10%
G. Service and maintain the system	10%
Total	100%

Teaching Methods: Discussion of assignments and instructional methods will be a combination of all methods of instruction, which can be classified as telling, lecturing, or discussing; showing or demonstrating.

Out of Class Assignments: The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

Course Grading Based on Course Objectives

Grading criteria and procedure:

Exams	500 points
Assignments	250 points
Lab activities	250 points
Participation	*200 points
Total Points	1200

Homework will be turned in (same day test date &/or Lab projects due) at the beginning of class to ensure maximum credit. Late work will be accepted with a “one-letter grade deduction” for each classroom day that it is late.

Midterm and final exams will be given at the pre-arranged times as discussed by your instructor. Make up exams will be given only with prior approval of the instructor.

Grading Scale:

Advanced	1200-1080	=	A
Proficient	1079-960	=	B
Basic	959-840	=	C

Below Basic	839-720	=	D
Far Below Basic	719	=	F

Attendance

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See [General Catalog](#) for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.

Classroom Etiquette

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the [General Catalog](#).
- Children in the classroom: Due to college rules and state laws, only students enrolled in the class may attend; children are not allowed.

Online Netiquette

- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.
- Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

Academic Honesty

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property.

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

- Plagiarism is taking and presenting as one’s own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to “cite a source” correctly, you must ask for help.
- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the [General Catalog](#) for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

Additional Student Services

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.

- **CANVAS LMS.** Canvas is Imperial Valley College’s main Learning Management System. To log onto Canvas, use this link: [Canvas Student Login](#). The [Canvas Student Guides Site](#) provides a variety of support available to students 24 hours per day. Additionally, a 24/7 Canvas Support Hotline is available for students to use: 877-893-9853.
- **Learning Services.** There are several learning labs on campus to assist students through the use of computers and tutors. Please consult your [Campus Map](#) for the [Math Lab](#); [Reading, Writing & Language Labs](#); and the [Study Skills Center](#).
- **Library Services.** There is more to our library than just books. You have access to tutors in the [Study Skills Center](#), study rooms for small groups, and online access to a wealth of resources.

Disabled Student Programs and Services (DSPS)

Any student with a documented disability who may need educational accommodations should notify the instructor or the [Disabled Student Programs and Services \(DSP&S\)](#) office as soon as possible. The DSP&S office is located in Building 2100, telephone 760-355-6313. Please contact them if you feel you need to be evaluated for educational accommodations.

Student Counseling and Health Services

Students have counseling and health services available, provided by the pre-paid Student Health Fee.

- **Student Health Center.** A Student Health Nurse is available on campus. In addition, Pioneers Memorial Healthcare District provide basic health services for students, such as first aid and care for minor illnesses. Contact the IVC [Student Health Center](#) at 760-355-6128 in Room 1536 for more information.
- **Mental Health Counseling Services.** Short-term individual, couples, family and group counseling services are available for currently enrolled students. Services are provided in a confidential,

supportive, and culturally sensitive environment. Please contact the IVC Mental Health Counseling Services at 760-355-6310 or in the building 1536 for appointments or more information..

Veteran's Center

The mission of the [IVC Military and Veteran Success Center](#) is to provide a holistic approach to serving military/veteran students on three key areas: 1) Academics, 2) Health and Wellness, and 3) Camaraderie; to serve as a central hub that connects military/veteran students, as well as their families, to campus and community resources. Their goal is to ensure a seamless transition from military to civilian life. The Center is located in Building 600 (Office 624), telephone 760-355-6141.

Extended Opportunity Program and Services (EOPS)

The Extended Opportunity Program and Services (EOPS) offers services such as priority registration, personal/academic counseling, tutoring, book vouchers, and community referrals to qualifying low-income students. EOPS is composed of a group of professionals ready to assist you with the resolution of both academic and personal issues. Our staff is set up to understand the problems of our culturally diverse population and strives to meet student needs that are as diverse as our student population. Also under the umbrella of EOPS our CARE (Cooperative Agency Resources for Education) Program for single parents is specifically designed to provide support services and assist with the resolution of issues that are particular to this population. Students that are single parents receiving TANF/Cash Aid assistance may qualify for our CARE program, for additional information on CARE please contact Lourdes Mercado, 760-355- 6448, lourdes.mercado@imperial.edu.

EOPS provides additional support and services that may identify with one of the following experiences:

- Current and former foster youth students that were in the foster care system at any point in their lives
- Students experiencing homelessness
- Formerly incarcerated students

To apply for EOPS and for additional information on EOPS services, please contact Alexis Ayala, 760-355-5713, alexis.ayala@imperial.edu.

Student Equity Program

- The Student Equity Program strives to improve Imperial Valley College's success outcomes, particularly for students who have been historically underrepresented and underserved. The college identifies strategies to monitor and address equity issues, making efforts to mitigate any disproportionate impact on student success and achievement. Our institutional data provides insight surrounding student populations who historically, are not fully represented. Student Equity addresses disparities and/or disproportionate impact in student success across disaggregated student equity groups including gender, ethnicity, disability status, financial need, Veterans, foster youth, homelessness, and formerly incarcerated students. The Student Equity Program provides direct supportive services to empower students experiencing insecurities related to food, housing, transportation, textbooks, and shower access. We recognize that students who struggle meeting their basic needs are also at an academic and economic disadvantage, creating barriers to academic success and wellness. We strive to remove barriers that affect IVC students' access to education, degree and certificate completion, successful completion of developmental math and English courses, and the ability to transfer to a university. Contact: 760.355.5736 or 760.355.5733 Building 100.
- The Student Equity Program also houses IVC's Homeless Liaison, who provides direct services, campus, and community referrals to students experiencing homelessness as defined by the McKinney-Vento Act. Contact: 760.355.5736 Building 100.

Student Rights and Responsibilities

Students have the right to experience a positive learning environment and to due process of law. For more information regarding student rights and responsibilities, please refer to the IVC [General Catalog](#).

Information Literacy

Imperial Valley College is dedicated to helping students skillfully discover, evaluate, and use information from all sources. The IVC [Library Department](#) provides numerous [Information Literacy Tutorials](#) to assist students in this endeavor.

Anticipated Class Schedule/Calendar

Instructor will provide a tentative, provisional overview of the readings, assignments, tests, and/or other activities for the duration of the course. A table format may be useful for this purpose.

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 February 13-15	Syllabus & Introduction to PV2 NCCER; NCCER registration; Download Canvas; Module#57105-11-Maintenance & Troubleshooting	Review Lab assignment
Week 2 February 20-22	Cont. Module#57105-11-Maintenance & Troubleshooting; GRID Alternative orientation & registration-TBA	Lab- Review PV1-Solar rooftop installation
Week 3 February 27-March 1	Review Test#1; New Module#57103-11-System Design	Lab- Review PV1-Solar rooftop installation
Week 4 March 6-8	Test#1 & Assign Due; Cont. Module#57103-11-System Design	Lab- Review PV1-Solar rooftop installation
Week 5 March 13-15	Review Test#2; Review Midterm referral; GRID Alternative field trip to job site-TBA	Lab- Review PV1-Solar rooftop installation
Week 6 March 20-22	Test#2 & Assign Due; Cont. Review Midterm referral	
Week 7 March 27-29	MIDTERM	NO LAB
Week 8 April 2-6	CLASS CLOSED SPRING BREAK	
Week 9 April 10-12	Midterm results, New Module#57103-11-System Design (60 hours); GRID Alternative field trip to job site-TBA	NO LAB
Week 10 April 17-19	Cont. Module#57103-11-System Design; Lab Review: Understanding AC Disconnect/ DC Disconnect, Residential Service Panel	Lab-Installing Inverter & Residential Service panel "Live" power
Week 11 April 24-26	Cont. Module#57103-11-System Design; Lab Review: Understanding AC Disconnect/ DC Disconnect, Residential Service Panel	Cont. Lab-Installing Inverter & Residential Service panel "Live" power

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 12 May 1-3	GRID Alternative field trip to job site-TBA; Review Test#3 ; LAB-Solar group project installation	NO LAB-Tues 5/1 ; Lab- Solar group project installation
Week 13 May 8-10	Test#2 & Assign Due ; Cont. LAB-Solar group project installation	Lab- Solar group project installation
Week 13 May 15-17	Wrap-up Solar Group Projects	
Week 13 May 22-24	Turn-in all assignments & Make-up & REVIEW FINAL	Final Project Due
Week 14 May 29-31	REVIEW FINAL	
Week 15 June 5-7	FINAL EXAM	

*****Tentative, subject to change without prior notice*****