Basic Course Information

Semester	**Spring 2020**	Instructor's Name	
Course Title & #	**Solar Electrical Systems PV2 RNEW 151**	**Jose (Joe) Roman**	
CRN #	**20871**	Webpage (optional)	**jose.roman@imperial.edu**
Room	**3119**	Office (PT Faculty:809)	3121
Class Dates	**Feb. 18, 2020- June 12, 2020**	Office Hours (n/a for PT Faculty)	**TBA- It will be posted at my office's window**
Class Days	**Tuesday-Thursday**	Office Phone # (PT may use dept. number)	**(760) 355-5719**
Class Times Units	**8:00 –10:05 am (Lecture Tues.)** **8:00 -11:10 am (Lab Weds.)** **4**	Who students should contact if emergency or other absence	Dept Secretary, Tisha Nelson is an option **(760) 355-6361**

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. (Nontransferable AA/AS degree only)

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skill, knowledge and or attitudes as 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

Below is the Instructional Scale:

Breakdown (1200 points)
Exams: 550
Assignments: 250
Lab activities: 250
***Participation**: **150**
1200

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.
***Participation- This course will meet two days per week of classroom and lab. Therefore, class participation and lab will be part of your grade for this semester.**
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

The course grade is based on total points accumulated during the semester. There is a maximum of 1200 points. Very limited extra credit points may be available, either through some class participation activity, group work or perfect attendance. Failing to turn in regular assignments will stop you from being able to earn extra credit points and late assignments will have points subtracted.
Final Grades are calculated as follows:

Grade	Points
A	**1200-1080**
B	**1079-960**
C	**959-840**
D	**839-720**
F	Below **719**

Grading Rubrics: In addition to the percentages and points listed above the following grading rubric (standards expected) will be used when grading student assignments. The description that best fits your work will be the **assigned grade.**

Grade	Rubric or Standard Expected
A	Focused and clearly organized. Contains advanced critical thinking and analysis. Convincing evidence is provided to support conclusions. Clearly meets or exceeds assignment requirements.
B	Generally focused with some development of ideas, but may be simplistic or repetitive. Evidence is provided to support conclusions. Occasional grammatical errors. Meets

assignment requirements but does not exceed.

C Unfocused, underdeveloped, or rambling, but has some coherence. Minimal evidence is provided to support conclusions. Several grammatical errors. Meets

D Unfocused, underdeveloped, and/or rambling. Limited evidence is used to support conclusions. Serious grammatical errors that impede overall understanding. Does not address the assignment requirements

F Unfocused, underdeveloped, and/or rambling. Incomplete or too brief. No evidence is used to support conclusions. Serious grammatical errors that block overall understanding. Does not meet assignment requirements. Minimal to no student effort.

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. **Consider:** specifics for your class/program
- 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.
- 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, no one who is not enrolled in the class may attend, including children.

Academic Honesty

- Plagiarism is to take and present 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 correctly 'cite a source', 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, or assisting others in using materials, which are prohibited or inappropriate in the context of the academic assignment in question.

  Anyone caught cheating or 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 School 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) use of a commercial term paper service

Additional Help – Discretionary Section and Language

Canvas support center: https://www.imperial.edu/students/canvas

- Learning Labs: There are several 'labs' on campus to assist you through the use of computers, tutors, or a combination. Please consult your college map for the Math Lab, Reading & Writing Lab, and Learning Services (library). Please speak to the instructor about labs unique to your specific program
- Library Services: There is more to our library than just books. You have access to tutors in the learning 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. If you feel you need to be evaluated for educational accommodations, the DSP&S office is located in Building 2100, telephone 760-355-6313.

Student Counseling and Health Services

Students have counseling and health services available, provided by the pre-paid Student Health Fee. We now also have a fulltime mental health counselor. For information see http://www.imperial.edu/students/student-health-center/. The IVC Student Health Center is located in the Health Science building in Room 2109, telephone 760-355-6310.

Student Rights and Responsibilities

Students have the right to experience a positive learning environment and due process. For further information regarding student rights and responsibilities please refer to the IVC General Catalog available online at http://www.imperial.edu/index.php?option=com_docman&task=doc_download&gid=4516&Itemid=762

Information Literacy

Imperial Valley College is dedicated to help students skillfully discover, evaluate, and use information from all sources. Students can access tutorials at http://www.imperial.edu/courses-and-programs/divisions/arts-and-letters/library-department/info-lit-tutorials/

Anticipated Class Schedule / Calendar

The instructor will provide a tentative, provisional overview of the reading, assignments, tests, or other activity for the duration of the course. The faculty may find a table format useful for this purpose.

Date or Week	Activity, Assignment, Topic / Lab Activity	Dates: Due/Tests
Week 1 February 18 - 20	Syllabus & Introduction to PV2 NCCER; NCCER registration; Download Canvas;	Review Lab assignment
Week 2 Feb. 25- 27	Module#57105-11-Maintenance & Troubleshooting; **New Virtual Video Assignment**	Lab- Review PV1-Solar rooftop installation

Date or Week	Activity, Assignment, Topic / Lab Activity	Dates: Due/Tests
Week 3 March 03 - 05	Review Test#1; New Module NCCER#57103-11-System Design;	**Lab-** Review PV1-Solar rooftop installation
Week 4 March 10 -12	**Test#1-Maintenance & Troubleshooting & Assign Due;** Cont. Module#57103-11-System Design	**Assignment Due & Virtual Video Assign.**
Week 5 March 17-19	Cont. w/ System Design; Review Test#2; **Virtual Video Assignment**	**Lab-** Review PV1-Solar rooftop installation
Week 6 March 24 - 26	**Test#2-System Design & Assign Due;** Energy Storage-Understanding Flood batteries & Li-ion & Installation-Handout & PowerPoint.	**Assignment Due & Virtual Video Assign.**
Week 7 March 31-April 02	Cont. w/ Energy Storage-Flood batteries & Li-ion & Installation. **Virtual Video Assignment**	**Lab-** Basic batteries w/panel
Week 8 April 14-16	******SPRING BREAK**** CLASS CLOSED**	
Week 9 April 21-23	Energy Storage- Understanding Flood batteries & Li-ion; Review Test#2	LAB-Cont. w/basic batteries w/panel
Week 10 April 28-30	**Test#3-Energy Storage & Assign Due;** New Module NCCER#57103-11-System Design (**60 hours**);	**Assignment Due & Virtual Video Assign.**
Week 11 April 23-25	Cont. w/ System Design; **Virtual Video Assignment**	**Lab**-Installing Inverter & Residential Service panel "Live" power
Week 12 May 05-07	Cont. w/System Design; Cont. w/ Virtual Video Assignment; Review Test#4	**Lab**-Installing Inverter & Residential Service panel "Live" power
Week 13 May 12-14	**Test#4-System Design**; Lab Review: Understanding AC Disconnect/ DC Disconnect, Residential Service Panel &	**Assignment Due & Virtual Video Assign.**
Week 14 May 19-21	**Wrap-up Solar Group Projects;** Make-up test	**Final Project Due**
Week 15 May 26-28	Turn-in all assignments & Make-up test continue	**Final Project Due**
Week 16 June 03-05	**Review Final**	
Week 17 June 10-12	**Final Test**	

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