

**The University of Texas at El Paso**

College of Engineering

Department of Electrical and Computer Engineering

**Course Syllabus**

ECE4310/ECE5314 Applied Photovoltaics

**Spring 2025**

**Course Information:**

**Classroom:** Chemistry Computer Sci Bldg 1.0204

**CRN:** 26612/26111

**Class Time:** MW 6:00 pm - 7:20 pm

<b>Instructor:</b>	Eric Galvan
<b>Office:</b>	
<b>Phone:</b>	
<b>Email:</b>	<a href="mailto:egalvan4@utep.edu">egalvan4@utep.edu</a>
<b>Office Hours:</b>	W 7:30 pm - 8:30 pm Others: by appointment
<b>Text:</b>	<ul style="list-style-type: none"><li>• Photovoltaics-Fundamentals, Technology, and Practice, 2<sup>nd</sup> Ed., Konrad Mertens, Wiley, 2019</li></ul>
<b>References:</b>	<ul style="list-style-type: none"><li>• Renewable Energy Systems, 1<sup>st</sup> Ed., David M. Buchla, Pearson, 2015.</li><li>• Renewable Energy System Design, 1st Ed., Ziyad Salameh, Elsevier, 2014.</li><li>• Lecture Notes and handouts provided by the instructor</li></ul>

**Course Description:** Overview of solar radiation and its properties; operating principles of photovoltaic systems and their characteristics; solar modules and solar generators; design and operation of grid-connected plants and common applications.

**Course Objectives and Learning Outcomes:** This course provides students with the basic information needed to understand the principles of solar photovoltaics. Upon successful completion of this course, students should be able to:

1. List and explain the main sources of solar energy and their primary applications in the United States and worldwide.
2. Describe challenges and problems associated with the use of solar energy, with regard to future supply and the environment.
3. Discuss remedies/potential solutions to the supply and environmental issues associated with photovoltaics, compared to other energy sources.

4. List and describe the balance of system components of a solar energy photovoltaic system.
5. Simulate, describe and illustrate basic electrical concepts and system components of a photovoltaic system.
6. Convert units of energy – to quantify energy demands and make comparisons among energy uses, resources, and technologies.
7. Design and demonstrate a photovoltaic energy system application.

**Course calendar and topics covered:**

Week 1. Introduction	Week 9. Thin-Film Compound Semiconductors
Week 2. Introduction	Week 10. PV Cell Interconnection and Module Fabrication
Week 3. Solar Radiation	Week 11. PV System Components
Week 4. Semiconductors and p-n junctions	Week 12. Design of Stand-alone PV Systems
Week 5. Solar Cell Operation	Week 13. Design of Grid-Connected PV Systems
Week 6. Solar Cell Properties and Design	Week 14. Specific Purpose PV Applications
Week 7. Solar Cell Properties and Design	Week 15. Project Presentations and Demonstrations
Week 8. Midterm Exam	Week 16. Final Exam: Wednesday, May 14 <sup>th</sup> , 2025

**Grades will be given based on following distribution:**

Assignments and Presentations	30%
Quizzes	10%
Midterm Exam	20%
Final Project	20%
Final Exam	20%
Total	100%

**Grading Scale:**

A	100-90%
B	89-80%
C	79-70%
D	69-60%
F	59-0%

**Calculator:** Basic scientific or non-programmable calculator is required for calculations. Students can only use basic scientific or non-programmable calculator during quizzes and exams. It is the student's responsibility to always have their calculator ready for in-class assignments, quizzes and exams.

**Blackboard:** Course materials such as lecture notes, syllabus, homework assignments, simulation projects, and announcements will be given in class and will also be available in the course blackboard.

**Assignments:** The homework assignments must be turned in by the due date. Late assignments will be decreased one letter grade per day late from the actual homework grade.

**Quizzes:** Unannounced and announced quizzes will be given at the beginning of the class. No make-up quiz will be given if you are late or absent without valid reason.

**Exams:** A midterm exam will be given the week of **March 3-5, 2025**

**Final project:** The project will be a team design engineering project. Design and demonstrate a photovoltaic energy system application. Grades will be calculated based on the following: 1) demonstration of final project, 2) PowerPoint presentation, 3) project simulation included in the final report, and 4) final project report that includes schematics, photographs, project description, and results discussion. More information and deadlines about the project will be given at a later date.

**Final Exam:** The final exam is comprehensive and is given in accordance with the University's Final Exam schedule, **Wednesday, May 14<sup>th</sup>, 2025 7:00 pm – 9:45 pm.**

**No Use of Cell Phones, Laptops, Tablets or Other Devices on Exams.**

**Class Participation and Activities:** There will be class group and individual activities. In order to get a grade for them you must participate in the activity.

**There will be No Make up for exams, quizzes, presentations, assignments, or any assigned tasks.** However, in case of pressing circumstances, make up will only be allowed for students with medical reason that prevents their attendance (written notification from doctor required), military duties (notification to be provided in advance), and for other compassionate reasons. Business related activities, car problems, and over sleeping are not considered compassionate reasons.

**Course Drop Deadline:** The deadline to drop this course with an automatic **W** is **April 4th, 2025.**

**Attendance:** Attendance is mandatory. When absent, the student is responsible for obtaining notes, handouts, and assignments and for meeting the same deadlines as the rest of the class. Excused absences are limited to documented medical emergencies, religious holidays and UTEP sponsored and/or required activities.

**Cell Phone and Laptop Policy:** Cell phones are not permitted during the lecture. Laptops may be used during assignments as specified by instructor. Students are required to turn off cell phones before entering the classroom. Cell phones should be placed out of sight (like in a purse or backpack). Students should NOT receive or make any calls/text messages during class. Students using cell phones during class will be asked to leave and will receive a zero for attendance and on all group assignments completed that day.

### **Institutional Policies**

**Academic Honesty:** As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of Student Conduct and Conflict Resolution (OSCCR). The Associate Dean of Students will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe

as dismissal from the University. See the OSCCR homepage at <https://www.utep.edu/student-affairs/osccr/> for more information.

**Center for Accommodations and Support Services (CASS):** If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass).

**Harassment:** Members of the UTEP community are protected from discrimination and harassment by State and Federal Laws. jokes, comments of sexual nature, as well as racist comments will not be tolerated. The student that violates this rule will be sent to the Dean of Students for disciplinary action.

**Disclaimer:** The content of this Syllabus may subject to change within reasonable limits according to instructor's discretion. Any changes will be announced in blackboard and in the class.