

The University of Texas at El Paso

College of Engineering

Department of Electrical and Computer Engineering

Course Syllabus

ECE4310/ECE5314 Applied Photovoltaics

Spring 2026

Course Information:

Classroom: Texas Western Hall 314

CRN: 25213/ 25212

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

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

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.

EDGE Advantages

This course is designed to equip students with essential Edge Advantages that contribute to their professional and personal development. Through the completion of course requirements and assignments, such as team projects, presentations, and essays, students will develop the following Edge Advantages:

	Problem-Solving	Assignments will challenge students to identify and address complex issues using innovative and analytical approaches.
	Communication	Class discussions and written assignments will improve students' skills in articulating ideas clearly and persuasively in both oral and written forms.
	Confidence	By actively participating and successfully completing assignments, students will build self-assurance in their abilities to tackle academic and real-world challenges.
	Critical Thinking	The course's emphasis on analysis and synthesis of information will strengthen students' abilities to think critically and make informed decisions.

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 13 th , 2026

Grades will be given based on following distribution:

Assignments	20%
Attendance	10%
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 9-11, 2026**

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 13th, 2026 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 2nd, 2026**.

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.

Illness Precautions: Please stay home if you have symptoms of a communicable illness. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations.

Institutional Policies

Academic Honesty: Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Community Standards (<https://www.utep.edu/student-affairs/standards/>) for possible disciplinary action. To learn more, please visit HOOP (<https://www.utep.edu/hoop/section-2/student-conduct-and-discipline.html>): Student Conduct and Discipline.

Center for Accommodations and Support Services (CASS): The University is committed to providing reasonable accommodations to students with documented disabilities. Students who become pregnant may also request reasonable accommodations, in accordance with state and federal laws and regulations and University policy. Accommodations that constitute undue hardship are not reasonable. To make a request, please register with the UTEP Center for Accommodations and Support Services (CASS). Contact CASS at 915-747-5148, email them at cass@utep.edu, visit their office located in UTEP Union East, Room 106, or apply for accommodations online via the CASS portal. For additional information, please visit the CASS website at 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.

Guidance on Artificial Intelligence: Some AI technologies or automated tools, particularly generative AI such as ChatGPT, can be beneficial during the early brainstorming stages of an activity, and you are welcome to explore them for that purpose. However, keep in mind that AI-generated ideas are not your own and may hinder your ability to think critically and creatively about a problem. It is also important to

remember that these technologies often “hallucinate” or produce materials and information that are inaccurate or incomplete—even providing false citations for use.

That said, you are not allowed to submit any AI-generated work in this course as your own. If you use any information or materials created by AI technology, you are required to cite it like you would any other source. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the Office of Community Standards (<https://www.utep.edu/student-affairs/standards/>).

Copyright Notice: Materials presented and posted within this course are protected by copyright laws. The materials presented during this course are only intended for use of students enrolled in this course and for the duration of the course.

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.