

THE UNIVERSITY OF TEXAS AT EL PASO

COURSE SYLLABUS

ECE5312/ECE6312

Energy Sustainability

Fall 2024

Course Information:

Classroom: Undergraduate Learning Center 210

CRN: 15753/15787

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

Instructor:	Eric Galvan, Ph.D.
Office:	
Phone:	
Email:	egalvan4@utep.edu
Office Hours:	TR 7:30 pm - 8:30 pm Others: by appointment
Text:	
References:	<ul style="list-style-type: none">• Lecture Notes provided by the instructor.• Renewable Energy Systems, 1st Ed., David M. Buchla, Pearson, 2015.• Renewable Energy System Design, 1st Ed., Ziyad Salameh, Elsevier, 2014.

Course Description: Energy is a key driver for industrial and economic development. A constant growth in energy demand due to an increasing reliance on energy for day-to-day activities coupled with a finite supply of fossil fuels, has created great challenges for scientists, engineers and governments to explore and develop alternative energy sources that are continuous, renewable and environmentally friendly. This course provides important knowledge about many aspects of renewable energy sources, assessing the state-of-the-art and potential future renewable energy systems to meet end-use requirements as well as regional and global sustainable energy goals of the 21st century. In addition to the theory, quantitative principals and technological components, students will become familiar with the economic and social impacts of renewable energy options.

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

1. Discuss the major issues and current solutions of renewable and alternative energy sources, resources and challenges.
2. Discuss and list the most widely used renewable energy sources.
3. Describe wind energy conversion systems.
4. Discuss and explain the fundamentals of photovoltaic energy conversion.
5. Discuss and explain concentrated solar power and solar thermal power.
6. Discuss and explain energy storage including batteries, fuel cells, and pumped storage hydropower.
7. Discuss and explain emerging renewable energy sources, including tidal power, wave power, biomass, geothermal, and thermal energy conversion.
8. List electric vehicles technologies as well as the current challenges for transportation electrification.
9. Describe challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.
10. Discuss remedies/potential solutions to the supply and environmental issues associated with fossil fuels and other energy sources.
11. Design and demonstrate a renewable energy system application.

Course calendar and topics covered:

Week 1. Introduction	Week 9. Photovoltaics
Week 2. Factors Promoting Renewable Energy	Week 10. Photovoltaics
Week 3. Wind Energy Conversion Systems	Week 11. CSP and Solar Thermal
Week 4. Wind Energy Conversion Systems	Week 12. Electric Vehicles
Week 5. Energy Storage	Week 13. Electric Vehicles
Week 6. Energy Storage	Week 14. Special Topic Presentations
Week 7. Emerging Renewable Energy Sources	Week 15. Project Presentations and Demonstrations
Week 8. Midterm Exam	Week 16. Final Exam: December 12 th , 2024

Grades will be given based on following distribution:

Assignments and Presentations	25%
Quizzes	10%
Midterm Exam	20%
Final Project	25%
Final Exam	20%
Total	100%

Grading Scale:

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

Assignments: The homework assignments must be turned in at the beginning of the class 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 **October 15-17, 2024**

Final project: The project will be a team design engineering project. Design and demonstrate a sustainable energy system/renewable source 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, **Thursday, December 12th, 2024 7:00 pm – 9:45 pm.**

No Use of Cell Phones, Laptops, Tablets or Other Devices on Exams. No Restroom Breaks During 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 **Nov 1st, 2024.**

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 (e.g., in a backpack or purse). 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, 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.

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 or in the class.