

ECE 530 - Contemporary Energy Applications

Catalog Description: Contemporary energy issues and applications; fundamental physics of renewable energy sources; devices used to harvest energy from these sources; state-of-the-art renewable energy technology; microgrid operation.

Credits: 4 **Terms Offered:** Fall

Prerequisites: Graduate standing in ECE

Corequisites: None

Courses that require this as a prerequisite: None

Structure: Two 110-minute lectures per week

Instructors: Ted Brekken and Eduardo Cotilla-Sanchez

Course content:

- Wind energy
- Solar energy
- Energy storage
- Grid operation

Measurable Student Outcomes:

Upon completing this course, students will be able to...

1. State the salient features of the major renewable energy sources. (ABET SO 1, 2, 4, 6)
2. Describe the advantages and disadvantages of renewable energy sources compared to dispatchable fossil fuel sources. (ABET SO 1, 2, 4, 6)
3. Simulate and report on the expected power and energy production of a renewable energy plant in microgrid operation. (ABET SO 1, 2, 3, 6, 7)

Learning Resources:

- Energy Science: Principles, Technologies, and Impacts. John Andrews and Nick Jelley. Oxford University Press. Fourth edition.

Evaluation of Student Performance:

- 25% Homework and quizzes
- 25% Midterm
- 25% Final
- 25% Final Project

Use of Artificial Intelligence (AI): Minor Uses Permitted: For this course, you must be the author of all work. You may use AI in some minor ways. For example, unless otherwise specified in the assignment, you may use AI to edit text you have drafted, or design presentation slides. You may NOT use AI for any purpose while taking a quiz or test, generate content that is directly used in an assignment (such as code, text, images, or other media), or analyze data. Always review individual assignments for specific instructions.

Academic Calendar: All students are subject to the registration and refund deadlines as stated in the Academic Calendar: <https://registrar.oregonstate.edu/osu-academic-calendar>

Statement Regarding Students with Disabilities: Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Student Conduct Expectations: <https://beav.es/codeofconduct>

Reach Out for Success: University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at oregonstate.edu/ReachOut. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).

Student Bill of Rights: OSU has twelve established student rights. They include due process in all university disciplinary processes, an equal opportunity to learn, and grading in accordance with the course syllabus: <https://asosu.oregonstate.edu/advocacy/rights>

Student Learning Experience Survey: During Fall, Winter, and Spring term the online Student Learning Experience surveys open to students the Wednesday of week 9 and close the Sunday before Finals Week. Students will receive notification, instructions, and the link through their ONID email. They may also log into the survey via MyOregonState or directly at <https://beav.es/Student-Learning-Survey>. Survey results are extremely important and are used to help improve courses and the learning experience of future students. Responses are anonymous (unless a student chooses to "sign" their comments, agreeing to relinquish anonymity of written comments) and are not available to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.

Revised: 3 Sep 2024