

Renewable Energy
MECH 4394 (CRN 14825)
Course Syllabus
Fall 2023

COURSE OBJECTIVES: Renewable energy is the fastest-growing energy source in the United States, increasing 100% from 2000 to 2018. In 2019, U.S. renewable energy consumption surpassed coal. The course covers fundamentals of renewable energy technologies that utilize solar, wind, hydro, geothermal, biomass, and ocean energy resources.

TIME: TR 3:00 pm – 4:20 pm

LOCATION: BUSS 329

INSTRUCTOR: Dr. Evgeny Shafirovich

E-MAIL: eshafirovich2@utep.edu

If you need to contact me, send me an email from your UTEP account. Do not use MS Teams!

OFFICE: A112

OFFICE HOURS: TR 10:30 am – 11:30 am, 1:30 pm – 2:30 pm

TEXTBOOK: M. Kanoglu, Y.A. Cengel, and J.M. Cimbala, *Fundamentals and Applications of Renewable Energy*, McGraw Hill, 2020, ISBN: 978-1-260-45530-4

BLACKBOARD: Instructor will use Blackboard for uploading lectures and other materials, updating the syllabus, and communicating with students via announcements and email.

TESTS: There are six tests with multiple-choice questions. All tests are open books and notes.

GRADING: To adjust the results of tests with multiple-choice questions to the grade-score system commonly used in the U.S. (A: 90 or more, B: 80 or more, etc.), the score in each test will be determined using the following formula:

$$\text{Score (\%)} = \left(1 + \frac{\text{Number of obtained points}}{\text{Maximum number of points}} \right) \cdot 50\%$$

The score for the course will be the higher of the two averages:

- The average of your scores in all six tests.
- The average of your scores in five tests: from Test 2 through Test 6.

COURSE CALENDAR

Week	Day	Date	Lecture	Topic	Assigned Reading
1	T	8/29	1	Overview. Why renewable energy?	Ch. 1 and slides
1	R	8/31	2	First and second laws of thermodynamics	Ch. 2 and slides
2	T	9/5	3	Entropy	Ch. 2 and slides
2	R	9/7	4	Exergy	Ch. 2 and slides
3	T	9/12	5	Thermochemistry	Ch. 2 and slides
3	R	9/14	6	Heat transfer	Ch. 2 and slides
4	T	9/19		Test 1: Lectures 1 - 6	
4	R	9/21	7	<i>Review of Test 1.</i> Energy and power units, primary and secondary energy sources, energy lifecycle	Slides
5	T	9/26	8	Fossil fuels	Slides
5	R	9/28	9	Nuclear energy	Slides
6	T	10/3	10	Wind energy Test 2: Lecture 7, Fossil, and Nuclear	Ch. 5 and slides
6	R	10/5	11	<i>Review of Test 2.</i> Wind energy	Ch. 5 and slides
7	T	10/10	12	Hydropower	Ch. 6 and slides
7	R	10/12	13	Geothermal energy	Ch. 7 and slides
8	T	10/17	14	Geothermal energy Test 3: Wind and Hydro	Ch. 7 and slides
8	R	10/19	15	<i>Review of Test 3.</i> Biomass energy	Ch. 8 and slides
9	T	10/24	16	Biomass energy	
9	R	10/26	17	Ocean energy	Ch. 9 and slides
10	T	10/31	18	Fundamentals of solar energy Test 4: Geothermal and Biomass	Ch. 3 and slides
10	R	11/2	19	<i>Review of Test 4.</i> Fundamentals of solar energy. Solar energy applications 1	Ch. 3 and slides Ch. 4 and slides
11	T	11/7	20	Solar energy applications 2	Ch. 4 and slides
11	R	11/9	21	Solar energy applications 2	Ch. 4 and slides
12	T	11/14	22	Energy storage Test 5: Ocean and Solar	Slides
12	R	11/16	23	<i>Review of Test 5.</i> Energy storage	Slides
13	T	11/21	24	Hydrogen and fuel cells	Ch. 10 and slides
13	R	11/23		<i>Thanksgiving Day</i>	
14	T	11/28	25	Energy and the environment	Ch. 12 and slides
14	R	11/30	26	Energy and the environment	Ch. 12 and slides
15	T	12/5		Test 6: Energy Storage, Hydrogen and Fuel Cells, Energy and Environment	
15	R	12/7		<i>Review of Test 6</i>	

No Final Exam

ACCOMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services \(CASS\)](#). Contact the Center for Accommodations and Support Services at 915-747-5148, email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).

SCHOLASTIC INTEGRITY

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 Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).