

Renewable Energy
MECH 4390/4394 (CRN 26529/24958)
Syllabus
Spring 2024

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: BUSN 331

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: MT 1:00 pm – 2:50 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. They will be conducted in class during regular class hours. All tests are open books and open notes. Use of any electronic devices is prohibited. If you want to use slides that were uploaded to Blackboard, you will need to print them before the test.

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	1/16	1	Overview. Why renewable energy?	Ch. 1 and slides
1	R	1/18	2	First and second laws of thermodynamics	Ch. 2 and slides
2	T	1/23	3	Entropy	Ch. 2 and slides
2	R	1/25	4	Exergy	Ch. 2 and slides
3	T	1/30	5	Thermochemistry	Ch. 2 and slides
3	R	2/1	6	Heat transfer	Ch. 2 and slides
4	T	2/6		Test 1: Lectures 1 - 6	
4	R	2/8	7	<i>Review of Test 1.</i> Energy and power units, primary and secondary energy sources, energy lifecycle	Slides
5	T	2/13	8	Fossil fuels	Slides
5	R	2/15	9	Nuclear energy	Slides
6	T	2/20		Test 2: Lecture 7, Fossil, Nuclear	
6	R	2/22	10	<i>Review of Test 2.</i> Wind energy	Ch. 5 and slides
7	T	2/27	11	Wind energy	Ch. 5 and slides
7	R	2/29	12	Hydropower	Ch. 6 and slides
8	T	3/5		Test 3: Wind and Hydro	
8	R	3/7	13	<i>Review of Test 3.</i> Geothermal energy	Ch. 7 and slides
				<i>Spring Break</i>	
9	T	3/19	14	Geothermal energy	Ch. 7 and slides
9	R	3/21	15	Biomass energy	Ch. 8 and slides
10	T	3/26	16	Ocean energy	Ch. 9 and slides
10	R	3/28	17	Fundamentals of solar energy	Ch. 3 and slides
11	T	4/2		Test 4: Geothermal, Biomass, Ocean	
11	R	4/4	18	<i>Review of Test 4.</i> Solar energy applications 1	Ch. 4 and slides
12	T	4/9	19	Solar energy applications 2	Ch. 4 and slides
12	R	4/11	20	Solar energy applications 2	Ch. 4 and slides
13	T	4/16		Test 5: Solar	
13	R	4/18	21	<i>Review of Test 5.</i> Energy storage	Ch. 10 and slides
14	T	4/23	22	Energy storage	Ch. 10 and slides
14	R	4/25	23	Energy and the environment	Ch. 12 and slides
15	T	4/30	24	Energy and the environment	Ch. 12 and slides
15	R	5/2		Test 6: Energy Storage; Energy and the Environment. <i>Review of Test 6</i>	

No Final Exam

January 5, 2024

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.

ACCOMODATIONS POLICY

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, 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](#).

CAMPUS RESOURCES

UTEP provides a variety of student services and support. Please refer to the QR code below for a listing of campus resources.

