

Renewable Energy
MECH 4390 (CRN 16354)
Syllabus
Fall 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: Quinn Hall 203

INSTRUCTOR: Dr. Evgeny Shafirovich

E-MAIL: eshafirovich2@utep.edu

OFFICE: A112

OFFICE HOURS: by appointment

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

TEXTBOOK: M. Kanoglu, Y.A. Cengel, and J.M. Cimbala, *Fundamentals and Applications of Renewable Energy*, 2nd Edition, McGraw Hill, 2023, ISBN: 978-1-265-07965-9

BLACKBOARD: Instructor will use Blackboard for uploading course 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 uploaded to Blackboard, print them out. There is no final exam.

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 average of your scores in the six tests.

COURSE CALENDAR

Week	Day	Date	Lecture	Topic	Material
1	T	8/27	1	Overview. Introduction to renewable energy	Ch. 1 and slides
1	R	8/29	2	Fossil fuels	Ch. 1 and slides
2	T	9/3	3	Nuclear energy	Ch. 1 and slides
2	R	9/5	4	First and second laws of thermodynamics	Ch. 2 and slides
3	T	9/10	5	Entropy	Ch. 2 and slides
3	R	9/12	6	Exergy	Ch. 2 and slides
4	T	9/17		Test 1: Introduction, Fossil, Nuclear	Lectures 1 – 3
4	R	9/19	7	<i>Review of Test 1</i> Thermochemistry	Ch. 2 and slides
5	T	9/24	8	Heat transfer	Ch. 2 and slides
5	R	9/26	9	Fundamentals of solar energy	Ch. 3 and slides
6	T	10/1		Test 2: Review of Thermal Sciences	Lectures 4 – 8
6	R	10/3	10	<i>Review of Test 2</i> Solar energy applications 1	Ch. 4 and slides
7	T	10/8	11	Solar energy applications 2	Chs. 4-5 and slides
7	R	10/10	12	Solar energy applications 2	Ch. 4 and slides
8	T	10/15		Test 3: Solar	Lectures 9 – 12
8	R	10/17	13	<i>Review of Test 3</i> Wind energy	Ch. 6 and slides
9	T	10/22	14	Wind energy	Ch. 6 and slides
9	R	10/24	15	Hydropower	Ch. 7 and slides
10	T	10/29		Test 4: Wind and Hydro	Lectures 13 – 15
10	R	10/31	16	<i>Review of Test 4</i> Geothermal energy	Ch. 8 and slides
11	T	11/5	17	Geothermal energy	Ch. 8 and slides
11	R	11/7	18	Biomass energy	Ch. 9 and slides
12	T	11/12	19	Ocean energy	Ch. 10 and slides
12	R	11/14	20	Energy storage	Slides
13	T	11/19		Test 5: Geothermal, Biomass, Ocean	Lectures 16 – 19
13	R	11/21	21	<i>Review of Test 5</i> Energy storage	Ch. 11 and slides
14	T	11/26	22	Energy and the environment	Ch. 13 and slides
14	R	11/28		<i>Thanksgiving Day</i>	
15	T	12/3	23	Energy and the environment	Ch. 13 and slides
15	R	12/5		Test 6: Energy Storage; Energy and the Environment	Lectures 20 – 23

August 19, 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 accommodation.

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 Community Standards for possible disciplinary action. To learn more, please visit <https://www.utep.edu/hoop/section-2/student-conduct-and-discipline.html>.

CAMPUS RESOURCES

UTEP provides a variety of student services and support. Please refer to the QR code below for a listing of campus resources or visit https://www.utep.edu/advising/student_resources/student-success-resource-hub.html.

