

**Renewable Energy**  
**MECH 4394 (CRN 19306)**  
**Course Syllabus**  
**Fall 2022**

**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:** LART 211

**INSTRUCTOR:** Dr. Evgeny Shafirovich

**E-MAIL:** [eshafirovich2@utep.edu](mailto:eshafirovich2@utep.edu)

**OFFICE:** A112

**OFFICE HOURS:** TR 11:00 am – 12:00 pm, 1:00 pm – 2:00 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 be using Blackboard for uploading lectures and other materials, updating the syllabus if necessary, 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 (open books, open notes). There is no final (comprehensive) exam in this course.

**GRADING:** To adjust the results of tests with multiple-choice questions to the grade-score system commonly used in the U.S., 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 determined as the average of your scores in the five tests (from Test 2 through Test 6). Good results in Test 1 may give you an additional credit.

**COURSE CALENDAR**

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

## **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](#).

## **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, or email them at [cass@utep.edu](mailto:cass@utep.edu), or apply for accommodations online via the [CASS portal](#).

## **COVID-19 PRECAUTIONS**

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to [covidaction@utep.edu](mailto:covidaction@utep.edu), so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID 19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit [epstrong.org](http://epstrong.org)