**Course Code:** EE4395/EE5380 
**Course Title:** Special Topic - Renewable Energy/ Energy Sustainability 
**Classification:** Special Topics Course 
**Credits:** 3

**Prerequisites:**

**Co-requisites:**

**Schedule:** Two - 80 minutes lectures per week

**Instructor:** Deidra R. Hodges, drhodges@utep.edu 
Phone: 915-747-7950

**Office and Hours:** A-304 
T & TH: 9:00 AM - 11:30 AM 
Others: by appointment

---

**Course Description:**

Energy is a major key to industrial development and a worldwide economy. Constantly growing demand for energy that relies on a finite supply of fossil fuels, presents challenges for scientists, engineers and governments to explore and develop alternative sources of energy that are continuous, renewable and environmentally friendly. This course provides important knowledge about many aspects of renewable energy sources. This course assesses the current and potential future energy systems, covers resources, extraction, conversion, and end-use, and emphasizes meeting regional and global energy in the 21st century in a sustainable manner. Students will learn the fundamental and quantitative principles of the renewable energy options, as well as their potential economic and societal impact.

**Textbook:** 

**References:**

**Course Objectives:**

This course provides students with the basic information needed to understand the principles of renewable energy and energy sustainability. Upon successful completion of this course, students should be able to:

1. Discuss the major issues and current solutions of renewable and alternative energy sources, resources and challenges.
2. Discuss and list the most widely used renewable energy sources.
3. Describe wind energy conversion systems.
4. Discuss and explain the fundamentals of Photovoltaic Energy Conversion.
5. Discuss and explain concentrated solar power and solar thermal power.
6. Discuss and explain energy storage including batteries, fuel cells, superconductors, supercapacitors, and flywheels.
7. Discuss and explain emerging renewable energy sources, including tidal power, wave power, biomass, geothermal, thermal energy conversion and satellite power.
8. List electric vehicles technologies and manufactures, and the current challenges.
9. Describe challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.
10. Discuss remedies/potential solutions to the supply and environmental issues associated with fossil fuels and other energy sources.
11. Design and demonstrate a renewable energy power generation system that drives a load.
Topics Covered:

<table>
<thead>
<tr>
<th>Wk.</th>
<th>Topics</th>
<th>Wk.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Factors Promoting Renewable Energy</td>
<td>9</td>
<td>CSP and Solar Thermal</td>
</tr>
<tr>
<td>2</td>
<td>Wind Energy Conversion Systems</td>
<td>10</td>
<td>Electric Vehicles and the Smart Grid</td>
</tr>
<tr>
<td>3</td>
<td>Wind Energy Conversion Systems</td>
<td>11</td>
<td>Fusion Reactors and Long Distance Power</td>
</tr>
<tr>
<td>4</td>
<td>Energy Storage</td>
<td>12</td>
<td>Graduate Student Research Lectures</td>
</tr>
<tr>
<td>5</td>
<td>Emerging Renewable Energy Sources</td>
<td>13</td>
<td>Graduate Student Research Lectures</td>
</tr>
<tr>
<td>6</td>
<td>Emerging Renewable Energy Sources</td>
<td>14</td>
<td>Project Presentations and Demonstrations</td>
</tr>
<tr>
<td>7</td>
<td>Photovoltaics</td>
<td>15</td>
<td>Project Presentations and Demonstrations</td>
</tr>
<tr>
<td>8</td>
<td>Midterm Exam: October 19, 2017</td>
<td>16</td>
<td>Final Exam: December 12, 2017</td>
</tr>
</tbody>
</table>

Evaluation Criteria:

Instruments for course evaluation will be used to measure established course objectives.

**EE4395**

<table>
<thead>
<tr>
<th>Grade Composition</th>
<th>Grade Composition</th>
<th>Grade Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>15% Homework</td>
<td>10% Homework</td>
<td>A = 90 - 100</td>
</tr>
<tr>
<td>10% Quizzes</td>
<td>10% Quizzes</td>
<td>B = 80 – 89</td>
</tr>
<tr>
<td>25% Exam</td>
<td>25% Exam</td>
<td>C = 70 - 79</td>
</tr>
<tr>
<td>25% Final Project</td>
<td>20% Final Project</td>
<td>D = 60 - 69</td>
</tr>
<tr>
<td>25% Final Exam</td>
<td>25% Final Exam</td>
<td>F = 0 – 59</td>
</tr>
</tbody>
</table>

10% Graduate Student Lectures – 20 minutes (~15 slides)

**EE5380**

**November 21-30, 2017**

**Homework – Late penalty:** one letter grade per day late decrease from the actual homework grade.

**Quizzes** – Several **unannounced** and **announced** quizzes will be given **5-10 minutes** after the start of class.

**Exams** – A midterm exam will be given **October 19, 2017**.

**Final Project** – Design, build and demonstrate a sustainable energy system using a renewable source. The system should generate power and drive a load. Grades will be calculated based on the following:
1) demonstration of final projects, 2) PowerPoint presentation, 3) project simulation included in the final report, and 4) a project final reports that include a system schematic, photographs, and a project description, and 5) a discussion and inclusion of a related **peer-reviewed** journal article.

**Final Exam** – The final exam is comprehensive and is given in accordance with the University’s Final Exam schedule, **Tuesday, December 12, 2017, 1:00-3:45 pm.**

**NO USE OF CELL PHONES, LAPTOPS, TABLETS OR OTHER DEVICES ON EXAMS. NO RESTROOM BREAKS DURING EXAMS.**

**Course Drop Deadline:** The deadline to drop this course with an automatic W is **Nov. 3rd**.
**Attendance**: Attendance is mandatory. When absent, the student is responsible for obtaining notes, handouts, and assignments and for meeting the same deadlines as the rest of the class. Excused absences are limited to documented medical emergencies, religious holidays and UTEP sponsored and/or required activities.

**Cell Phone and Laptop Policy**: Cell phones are not permitted during the lecture. Laptops may be used during assignments as specified by instructor. Students are required to turn off cell phones before entering the classroom. Cell phones should be placed out of sight (like in a purse or backpack). Students should NOT receive or make any calls/text messages during class. Students using cell phones during class will be asked to leave and will receive a zero for attendance and on all group assignments completed that day.

**Academic Dishonesty**: As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or material that are attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Engineering Dean’s Office and the Office of the Dean of Students. The Dean of Students will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students' home page at www.utep.edu/dos/acadintg.htm for more information.