

**MENG 4349 – Introduction to Renewable Energy Systems**  
**Course Syllabus**

<b>Semester / Year</b>	Fall 2024
<b>Catalog Description</b>	The course will introduce renewable energy technologies with an emphasis on solar and wind energy potential and application to power generation. Topics include solar and wind energy principles, solar and wind site assessment, solar panel and wind turbine components, power generation machinery, control systems, connection to the electric grid, and maintenance.
<b>Prerequisites</b>	MENG 3401 Thermodynamics
<b>Section Number(s)</b>	050 & 051
<b>Instructor Name</b>	Dr. Soren Maloney
<b>Contact Information</b>	Office: HEC A206 or via Zoom (details posted on Canvas) E-mail: <a href="mailto:smaloney@uttyler.edu">smaloney@uttyler.edu</a>
<b>Class Type / Instruction Mode / Location</b>	Hybrid, Face to Face at HEC Campus in Room A218 and Zoom to Tyler Campus Ratliff Building North 03040 (see Canvas for zoom instructions) <b>Note: All exams will be in-person. Students MUST take exams on campus.</b>
<b>Class Times</b>	Tue/Thur 5:00PM to 6:20PM
<b>Office Hours</b>	Mondays 9-10AM and 12PM to 2PM or by appointment
<b>No. of Credits</b>	3 credit hours
<b>Recommended Textbook</b>	1. Introduction to Environmental Science - 2nd Edition, <a href="https://open.umn.edu/opentextbooks/textbooks/562">https://open.umn.edu/opentextbooks/textbooks/562</a> 2 Sustainability: A Comprehensive Foundation <a href="https://open.umn.edu/opentextbooks/textbooks/96">https://open.umn.edu/opentextbooks/textbooks/96</a> 3. Direct Energy, <a href="https://open.umn.edu/opentextbooks/textbooks/direct-energy">https://open.umn.edu/opentextbooks/textbooks/direct-energy</a> 4. Introduction to Environmental Sciences and Sustainability, <a href="https://pressbooks.uwf.edu/envrioscience/">https://pressbooks.uwf.edu/envrioscience/</a> 5. Entrepreneurship Lecture Series, <a href="https://openstax.org/details/books/entrepreneurship">https://openstax.org/details/books/entrepreneurship</a>
<b>Optional References</b>	Kanoglu, et.al. Fundamentals and Applications of Renewable Energy 1st Edition, McGraw Hill Education, 2019 (Chapters 1 through 5)
<b>Additional Rules and Requirements</b>	Students can use AI programs (ChatGPT, Copilot, etc) in this course. If you utilize an AI tool to help create content for an assignment, you must acknowledge and cite the tool's contribution to your work.
<b>Evaluation Method /</b>	This course will rely on a variety of methods to assess and evaluate student learning, including: <b>Exams:</b> There will be three exams, one each for solar thermal, solar electric photovoltaics and wind energy respectively.

	<p>- Exams: 600 points (3 x 200)</p> <p>- Renewable Energy Idea Pitch Presentation: 200 points</p>
<b>Grading Policy / Scale</b>	<p>Grading in this course will be based on the following: Scale: A =&gt; 90, B =&gt; 80, C =&gt; 70, D =&gt; 60, F &lt; 60. Grade appeal: grades can be appealed by meeting the instructor during office hours, but no later than a week after the grade has been given.</p>
<b>Important Events / Dates</b>	<p>See UT Tyler Academic Calendar: <a href="https://www.uttyler.edu/schedule/files/2024-2025/academic-calendar-2024-2025-main-20240724.pdf">https://www.uttyler.edu/schedule/files/2024-2025/academic-calendar-2024-2025-main-20240724.pdf</a></p> <p>Labor Day – No classes – September 2 Census Date – September 9 Exam 1 – Solar PV – September 25 Exam 2 – Solar Thermal – October 23 Exam 3 – Wind – Nov 20 Thanksgiving week – No classes – November 25-29 Idea Pitch Presentations – December 4 Makeup Exams – December 11 <b>Note: All exams will be in-person. Students MUST take exams on campus.</b></p>
<b>Attendance / Makeup policy / other rules</b>	<p>Attendance and participation to lectures are expected per university’s class attendance policy. There will be no makeup for missed in-class work. An opportunity to make up a missed exam may be available to students with an excused absence. Be advised that makeup exams may be more challenging. Excused absences include absences for university sponsored events and for religious observances (see the University policy). Other makeups are granted only in extreme cases and at the discretion of the instructor. Excused absence due to illness will require evidence of treatment by medical personnel or at a medical facility. Make-up assignments or exams if approved will be administered during finals week.</p>
<b>Course Learning Objectives / ABET &amp; PEOs relation</b>	<p>By the end of this course students will be able to:</p> <ol style="list-style-type: none"> <li>1. Identify solar and wind energy system components</li> <li>2. Calculate the available solar and wind power in a particular location</li> <li>3. Select and size solar and wind systems for energy applications</li> <li>4. Perform economic analysis of solar and wind energy projects</li> </ol>
<b>Tentative Topics / Course Plan</b>	<p>Orientation/Syllabus Review The Energy Landscape Overview of Renewable Energy Technologies Solar Thermal</p> <ul style="list-style-type: none"> <li>• Solar Energy Fundamentals</li> <li>• Types of Solar Collectors</li> <li>• Solar Water Heating</li> <li>• Solar Thermal Power</li> <li>• Solar Thermal Cooling</li> <li>• Solar Desalination/Distillation</li> <li>• Solar Thermal System Basic Economics</li> </ul> <p>Solar Electric Photovoltaics (PV)</p> <ul style="list-style-type: none"> <li>• PV System Components</li> <li>• PV System Materials &amp; Design</li> </ul>



	<ul style="list-style-type: none"><li>• Considerations in PV Selection &amp; Sizing</li><li>• Solar PV System Basic Economics</li></ul> <p>Wind Energy</p> <ul style="list-style-type: none"><li>• Origin and Power in the Wind and Historical Perspectives on Wind Turbines</li><li>• Wind Energy Fundamentals</li><li>• Wind Turbine Types and Power Performance Curve</li><li>• Wind Power Potential</li><li>• Wind Power Density</li><li>• Wind Turbine Efficiency &amp; Betz Limit</li><li>• Considerations in Wind Power Applications &amp; Selection</li><li>• Wind Energy System Basic Economic</li></ul> <p>Introduction to Entrepreneurship in Renewable Energy</p> <ul style="list-style-type: none"><li>• Entrepreneurship in Renewable Energy</li><li>• Creativity, Innovation &amp; Invention</li><li>• Identifying Entrepreneurial Opportunity</li><li>• Problem Solving &amp; Need Recognition Techniques</li><li>• Telling Your Entrepreneurial Story and Pitching the Idea</li></ul>
<b>University Policies</b>	<a href="https://www.uttlyer.edu/offices/academic-affairs/files/syllabus-information.pdf">https://www.uttlyer.edu/offices/academic-affairs/files/syllabus-information.pdf</a>