The University of Texas at TYLER
COLLEGE OF ENGINEERING

Department of Mechanical Engineering
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MENG 4349 – Introduction to Renewable Energy Systems
Course Syllabus

Semester / Year	Fall 2022
Catalog Description	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.
Prerequisites	MENG 4349 Thermodynamics
Section Number(s)	030 & 040
Instructor	Dr. S Maloney
Contact info	smaloney@uttyler.edu
Class Type / Location	Face to Face at HEC Campus in Room A216 and zoom to Tyler Campus
Zoom details	TBD
Class Times	Mon/Wed 2:30PM to 3:50PM
Office Hours	Mon/Wed/Thur 8:00-9:00AM
Credits	3 credit hours
Textbooks and Reference Materials	1. Kanoglu, et.al. Fundamentals and Applications of Renewable Energy 1st Edition, McGraw Hill Education, 2019 (Chapters 1 through 5)
Optional References	N/A
Additional requirements	N/A
Instruction / Evaluation Method/	This course will rely on a variety of methods to assess and evaluate student learning, including: **Projects:** There will be six projects, two for solar thermal, solar electric photovoltaics and wind energy respectively. **Quizzes:** There will also be three quizzes. Each section will have an associated quiz that is due upon the completion of the lesson.
Homework	None
Grading Policy / Scale	Grading in this course will be based on the following: - Assignments: 120 points (6 x 20) - Quizzes: 30 points (3 x 10) - Final Exam 50 points Scale: A = > 90, B = > 80, C = > 70, D = > 60, F < 60.

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	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.
Important events/dates	Labor Day and Thanksgiving Week – No Classes
Attendance / Makeup policy	There will be no makeup for missed in-class work. An opportunity to make up a missed exam/assignment may be available to students with an excused absence. Be advised that makeup exams/assignments maybe more challenging. Excused absences include absences for University-sponsored events and for religious observances (see the University policy link above for the procedures to follow). 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.
Course Learning Objectives / ABET & PEOs relation	By the end of this course students will be able to: 1. Identify solar and wind energy system components 2. Calculate the available solar and wind power in a particular location 3. Select and size solar and wind systems for energy applications 4. Perform economic analysis of solar and wind energy projects

Lesson Plan

Orientation/Syllabus Review
The Energy Landscape
Overview of Renewable Energy Technologies
Solar Thermal • Solar Energy Fundamentals • Types of Solar Collectors • Solar Water Heating • Solar Thermal Power • Solar Thermal Cooling • Solar Desalination/Distillation • Solar Thermal System Basic Economics
Solar Electric Photovoltaics (PV) • PV System Components • PV System Materials & Design • Considerations in PV Selection & Sizing • Solar PV System Basic Economics
Wind Energy • Origin and Power in the Wind and Historical Perspectives on Wind Turbines • Wind Energy Fundamentals

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- Wind Turbine Types and Power Performance Curve
- Wind Power Potential
- Wind Power Density
- Wind Turbine Efficiency & Betz Limit
- Considerations in Wind Power Applications & Selection
- Wind Energy System Basic Economics

Assignments and Quizzes	**Points**
Solar Thermal Quiz	10
Solar Thermal Projects	40
Solar PV Quiz	10
Solar PV Projects	40
Wind Energy Quiz	10
Wind Energy Projects	40
Final Exam	50
Total	200