

**SYLLABUS**

<b>Code/Name</b>	MCE 311 / Renewable Energy
<b>Type</b>	Required
<b>Credit/ECTS</b>	3/4
<b>Hour per Week</b>	3 (3+0+0)
<b>Level/Year</b>	Undergraduate/3
<b>Semester</b>	Fall
<b>Classroom</b>	D204
<b>Content</b>	Introduction to renewable energy. Fundamentals of solar energy, solar energy applications, solar collectors, and photovoltaic systems. Wind power and hydropower. Geothermal, biomass, wave, and tidal energies. Hydrogen and fuel cells. Economic and environmental considerations. Lab applications.
<b>Prerequisites</b>	
<b>Textbooks</b>	<b>Primary</b> M Kanoglu, Y A Cengel, J M Cimbala, <i>Fundamentals and Applications of Renewable Energy</i> , McGraw-Hill, 2023. Second Edition <b>Supplementary</b> B K Hodge. <i>Alternative Energy Systems</i> . Wiley, 2010.
<b>Objectives</b>	<ul style="list-style-type: none"><li>• To provide an overview of renewable energy resources and the technologies</li><li>• To analyze renewable energy systems</li><li>• To assess the performance of renewable energy applications</li></ul>
<b>Course Outcomes</b>	In this course, you will be able to: C01 Identify and describe the main characteristics of renewable energy sources C02 Categorize technologies for harnessing renewable energy sources C03 Illustrate the operation and main components of different renewable energy systems C04 Compare different renewable energy technologies and choose the most appropriate based on site conditions C05 Perform technical and economic assessments of renewable energy systems C06 Conduct experiments on various renewable energy applications

**Weekly Schedule of Topics**

W	Topic
1	Introduction to renewable energy
2	Fossil fuel systems
3	Solar fundamentals
4	Solar thermal systems
5	Solar photovoltaic systems
6	Wind energy
7	Hydropower
8	Geothermal energy, direct applications
9	Geothermal energy, power production
10	Biomass energy
11	Ocean, tidal, and wave energies
12	Hydrogen energy and fuel cells

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13 Economics of renewable energy applications

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14 Hybrid systems

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**Professional Contribution**

Ability to understand, select, analyze, and improve renewable energy systems

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**Contribution to Program Outcomes\***

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	0	0	0	0	0	0	0	0	3	0	1
CO2	0	3	0	0	0	0	0	0	3	0	1
CO3	0	3	0	0	0	0	0	0	3	0	1
CO4	2	5	0	2	0	0	0	0	3	0	0
CO5	5	3	0	5	0	4	4	0	3	4	3
CO6	0	0	5	5	0	5	2	0	3	0	0

\* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

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**Special Conditions**

- Students work on presentations on a special topic in renewable energies
  - The consequence of violation of the attendance rule is to receive a grade of NA.
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**Requirements**

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<b>Evaluation</b>	Midterm Exam	40%
	Quiz	10%
	Presentation	10%
	<u>Final Exam</u>	<u>40%</u>
	Total	100%

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**Rubric**

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**Course Policy**

1. You must attend at least 70% of the sessions, including the add-drop period.
  2. Be in the class on time.
  3. English should always be used to communicate with one another.
  4. The mobile phone should be switched off and put away during the class.
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**Cheating & Plagiarism**

- Copying or letting someone copy your work on exams, assignments, or reports is cheating.
  - Cutting and pasting text, figures, and tables from web sources or any other electronic source is plagiarism.
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**Instructor**

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Room	216	Office Hours	

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