



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
MENG-486	Alternative Energy Systems	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
MENG-252, MENG-280	Engineering	Fall, Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Elective	Engineering	English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr Elias Yfantis	3 <sup>rd</sup> or 4 <sup>th</sup>
<b>Mode of Delivery</b>	<b>Work Placement</b>	<b>Corequisites</b>
Face-to-Face	N/A	None

### Course Objectives:

The main objectives of the course are to:

- Introduce the renewable energy sources and the corresponding conversion systems
- Provide the fundamental knowledge that underpins the renewable energy technologies
- Analyze the operation and performance of the different engineering systems used
- Present the relevant social, environmental and economic issues

### Learning Outcomes:

After completion of the course students are expected to be able to:

- Demonstrate understanding of the requirements for energy conversion from renewable sources
- Demonstrate understanding of the key characteristics of the different systems
- Analyze operation and performance of the renewable energy systems
- Demonstrate understanding of the limitations of each technology and the environmental impact they have

### Course Content:

- Introduction: fossil fuel-based technologies, energy consumption, energy and environment, renewable and alternative energy resources
- Solar Energy: solar photovoltaic conversion, solar thermal conversion systems, solar thermal collector energy balance, economics of solar energy and environmental considerations.
- Wind Energy: wind characteristics, wind turbines and conversion efficiency, environmental issues

- Hydropower: principle, size and types of energy conversion schemes, turbine and generator types, environmental impact
- Tidal Energy: cause of tides, ocean energy potential, tidal energy technologies,
- Wave Energy: water waves, conversion devices, social environmental aspects
- Geothermal Energy: resources and technologies, operation, performance, efficiency and cost, economics, environmental impact.
- Biomass: biomass types, advantages and disadvantages, economics, environmental impact.

**Learning Activities and Teaching Methods:**

Lectures, interactive teaching/learning, case studies, laboratory exercises.

**Assessment Methods:**

Homework, lab reports, midterm exam, final exam.

**Required Textbooks / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Renewable Energy Resources	J. Twidell, A. D. Weir	Taylor and Francis	2010	9780419253303

**Recommended Textbooks / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Renewable Energy, Power for a Sustainable Future	Godfrey Boyle	Oxford University Press	2012	9780199545339
Sustainable Energy – Without the Hot Air. McKay	McKay	<a href="http://www.inference.phy.cam.ac.uk/sustainable/book/text/sewtha.pdf">http://www.inference.phy.cam.ac.uk/sustainable/book/text/sewtha.pdf</a>		