



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
ECE-467	Renewable Energy Sources and Technologies	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
ECE-210	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 Marios Nestoros	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 most important renewable energy sources and the corresponding technologies used for energy conversion
- Familiarize students with the physical laws that underpin the renewable energy technologies
- Discuss the operation and performance of the different engineering technologies used
- Present the social, environmental and economic issues associated with each renewable energy technology

### 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 renewable energy source technologies
- Present principles and techniques to analyze the physical and operational aspects of the taught renewable energy technologies

- Demonstrate understanding of the limitations of each technology and the environmental impact they have

**Course Content:**

1. Introduction: fossil fuels, energy consumption, energy and environment, renewable and alternative energy resources
2. Solar Energy: solar radiation logistics, solar photovoltaic conversion, limitations of cell efficiency, stand alone and grid connected PV cell operation.
3. Solar thermal conversion systems, solar thermal collector energy balance, economics of solar energy and environmental considerations.
4. Wind Energy: wind characteristics, wind turbines and conversion efficiency, Environmental issues
5. Hydropower: principle, size and types of energy conversion schemes, pumped storage, turbine and generator types, environmental impact
6. Geothermal Energy: resources and technologies, basic principles, operation, performance, efficiency and cost, economics, environmental impact.
7. Biomass: biomass types, basic principles, operation, performance, efficiency, cost, advantages and disadvantages, economics, environmental impact.
8. Institutional and Economics Factors

**Learning Activities and Teaching Methods:**

Lectures, tutorials

**Assessment Methods:**

Homework, Midterm Exam, Final Examination

**Required Textbooks / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Renewable Energy	Robert Ehrlich	CRC Press	2022	9781000606348

**Recommended Textbooks / Readings:**

<b>Title</b>	<b>Author(s)</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Renewable Energy Resources	J. Twidell, A. D. Weir	Routledge	2021	9780429452161