University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
ECE-467	Renewable Energy Sources and Technologies	6
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	ECE-210
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	4th	Dr Marios Nestoros
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

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:

- 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 operational aspects of renewable energy technologies and their utilization as a source of electrical energy
- Demonstrate understanding of the limitations of each technology and the environmental impact they have

Course Contents:

1. Introduction: fossil fuel based technologies, 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, solar thermal conversion systems, solar thermal collector energy balance, economics of solar energy and environmental considerations.
3. Wind Energy: wind characteristics, wind turbines and conversion efficiency, Environmental issues
4. Hydropower: principle, size and types of energy conversion schemes, pumped storage, assessment of annual energy output, turbine and generator types, environmental impact
5. Tidal Energy: cause of tides, ocean energy potential, tidal energy technologies,
6. Wave Energy: water waves, conversion devices, social environmental aspects
7. Geothermal Energy: resources and technologies, basic principles, operation, performance, efficiency and cost, economics, environmental impact.
8. Biomass: biomass types, basic principles, operation, performance, efficiency, cost, advantages and disadvantages, economics, environmental impact.
9. European trends in renewable energy sources and the case of Cyprus

Learning Activities and Teaching Methods:

Lectures, tutorials

Assessment Methods:

Homework, Midterm Exam, Final Examination

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Godfrey Boyle	Renewable Energy, Power for a Sustainable Future	Oxford University Press	2012	9780199545339

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J. Twidell, A. D. Weir	Renewable Energy Resources	Taylor and Francis	2006	9780419253303
B. Sorensen	Renewable Energy: Its physics, engineering, environmental impacts, economics & planning	Elsevier Acad. Press	2010	9780123750259

J. Andrews and N. Jelly	Energy Science principle's, technologies and impacts	Oxford University Press	2013	9780199592371
Egbert Boecker and Rienk van Grondelle	Environmental Physics Sustainable Energy and Climate Change	Wiley	2011	9780470666760
McKay	Sustainable Energy – Without the Hot Air. McKay	http://www.inference.phy.cam.ac.uk/sustainable/book/tex/sewtha.pdf		