

## MODULE DESCRIPTOR

<b>MODULE TITLE</b>	RENEWABLE ENERGY SOURCES		
<b>MODULE CODE</b>	EL3802(L6)	<b>CREDIT VALUE</b>	20 CREDITS / 10 ECTS
<b>CAMPUS</b>	UCLAN CYPRUS		
<b>SCHOOL</b>	SCHOOL OF SCIENCE		

### MODULE AIMS

The aim of this module is to enable students to develop a thorough knowledge of the fundamental topics in the fields of Renewable Energy Sources.

### MODULE CONTENT

Introduction to renewable energy and meteorology

#### Wind and Solar Energy

Wind Energy: Basic principles, energy from the wind, wind turbines, location assessment, DFIG and Synchronous Permanent Generator Schemes, efficiencies, off-shore wind turbines technologies.

Solar Photovoltaic (PV): Basic principles, MPPT (Maximum Power Point Tracking), PV types, PV standalone system, Grid-connected PV system, PV integration, System design, economics

Storage: Long and short term hydroelectricity, pressurized air in empty mines, batteries, flywheel systems, super capacitors

#### Introduction to other renewable energy sources:

Solar thermal energy, solar thermal engines and electricity generation

Biomass: Type of Biomass, production from biomass, environment impacts.

Hydroelectricity: resources, capacity and output, type of hydroelectricity plants, turbines,

Geothermal: Overview, geothermal exploration and resources

Heat pumps: Basic principles, ground source heat pumps

Tidal and wave energy.

Distributed generation

### INTENDED LEARNING OUTCOMES

<b>On successful completion of this module a student will be able to:</b>	
1.	Critically discuss the effects of meteorological phenomena on the production of energy by renewable sources.
2.	Consolidate and enhance students' knowledge in Solar Photovoltaics and Wind Energy.
3.	Discuss and evaluate energy sources such as Biomass, Hydroelectricity, Geothermal and Wave energy.
4.	Clearly communicate solutions and ideas regarding the distribution of the generated energy to the main electricity networks.

## **TEACHING METHODS**

The material will be covered by presentation lectures, tutorials to deepen the knowledge provided in lectures and one course work in an appropriate topic of renewable energy sources. In order to make students acquire a broader knowledge and practical experience some Laboratory sessions will be also offered to students.

In addition to that a lecture will be given by external researcher to provide to students some aspects of the related to the topic research work.

Finally, one or two visits to renewable energy plants for instance a Photovoltaic park and a Wind unit will be organized. These visits will give the opportunity to students to enlarge their knowledge on the practical aspects of the study field and come in contact with employers and employees.

The lectures, tutorials and any other educational material will be made available to students in the VLE. Lecturers will regularly offer individual assistance to students. Appropriate bibliography will be provided to students.

## **ASSESSMENT METHODS**

This module is assessed through a report and a Written Examination.