

Module Title Renewable Energy Systems	Reference	EN4571
	SCQF	SCQF
Keywords Solar power, Wind power, Biomass, Hydro power, Wave power, Tidal power.	Level	10
	SCQF Points	15
	ECTS Points	7.5
	Created	December 2003
	Approved	March 2004
	Amended	August 2011
	Version No.	2

This Version is No Longer Current

The latest version of this module is available [here](#)

Prerequisites for Module

Energy and The Environment (EN2570) and Energy Conversion and Storage (EN3570) are desired pre-requisites

Corequisite Modules

None.

Precluded Modules

None.

Aims of Module

To provide students with an understanding of the physical, technological, economic and environmental aspects of

Wave power; wave theory, energy potential, energy extraction, deep water and shore line schemes, environmental considerations, economics and future prospects. Tidal power; tide theory, energy potential; energy extraction, tidal barrages, tidal streams; environmental considerations, economics and future development. Wind power; the resource, energy and power in the wind, components of a wind turbine, aerodynamics and blade design, turbine control strategies, electrical energy production, environmental impact, economics, commercial development.

Indicative Student Workload

renewable energy sources, and of their present and potential future role in energy supply systems.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1. Recognise and discuss the basic physical and technological factors that determine the design and use of renewable energy systems.
2. Explain, in principle, how to assess the resources available from alternative energy sources and the economics of using them.
3. Appraise the environmental and social costs and benefits of using alternative energy sources.
4. Discuss the main factors that will determine the role that alternative energy sources will play in national, regional and world energy supply systems in the future.

Indicative Module Content

Solar power; solar radiation spectrum; photovoltaics; principles, types and electrical

<i>Contact Hours</i>	Full Time	Part Time
Assessment	6	6
Lectures	24	24
Tutorials	12	12

Directed Study

57 57

Private Study

51 51

Mode of Delivery

This is a lecture based course supplemented with tutorial and seminar sessions.

Assessment Plan

	Learning Outcomes Assessed
Component 1	1,2,3
Component 2	1,2,3,4

Component 1 will consist of a structured report on a case study. (Weighting 30%)

Component 2 will be a closed book examination. (Weighting 70%)

Indicative Bibliography

principles, types and system characteristics; remote and grid connected systems, BIPV systems; economics and environmental impact.

Biomass and biofuels, extracting the energy; agricultural residues, energy from refuse, energy crops; environmental benefits and impact; economics.

Hydroelectricity; the resource, large scale and small scale schemes, turbines, environmental considerations, economics and future prospects.

1. BOYLE, G., 2004. Renewable Energy ? Power for a Sustainable Future. 2nd ed. Oxford: Oxford University Press.
2. MANWELL, J.F., MCGOWAN, J.G. AND ROGERS, A.L., 2002. Wind Energy Explained. Chichester: Wiley
3. Twidell, J.W. and Weir, A.D., 2006. Renewable Energy Resources, 2nd ed. London: Taylor and Francis