This Version is No Longer Current
The latest version of this module is available here

MODULE DESCRIPTOR

Module Title

Renewable Energy Systems

Reference	EN3571	Version	1
Created	March 2017	SCQF Level	SCQF 9
Approved	May 2017	SCQF Points	15
Amended	May 2017	ECTS Points	7.5

Aims of Module

To provide students with an understanding of the physical, technological, economic and environmental aspects of 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.
5	Using real world data, assess the needs of users, develop a recommendation for an alternative energy system and analyse the issues associated with switching to this system.

Indicative Module Content

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

Module Ref:	EN3571 v1

Module Delivery

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

Indicative Student Workload	Full Time	Part Time
Contact Hours	40	40
Non-Contact Hours	110	110
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	5
Description:	A case study				

Component 2

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 2, 3, 4
Description:	A closed book examination				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

To pass the module students must achieve at least a grade D AND a mark of 35% or more in each component.

Module Grade	Minimum Requirements to achieve Module Grade:
A	70% or more
B	60% to 69%
C	50% to 59%
D	40% to 49%
E	35% to 39%
F	34% or less
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Successful completion of stage 2
Corequisites for module	None.
Precluded Modules	None.

Module Ref:	EN3571 v1

INDICATIVE BIBLIOGRAPHY

1	Twidell, J.W. and Weir, A.D., 2015. Renewable Energy Resources, 3rd ed. Florence: Taylor and Francis
2	Narbel P.A., Hansen J.P., Lien J.R., 2014. Energy Technologies and Economics. Cham: Springer
3	MacKay, D.J.C, 2009. Sustainable energy- without the hot air, Cambridge: UIT
4	Ptasinski, K.J., 2016. Efficiency of Biomass Energy: An Exergy Approach to Biofuels, Power, and Biorefineries. Hoboken, NJ, USA: John Wiley & Sons