

MODULE DESCRIPTOR

Module Title

Introduction to Renewable Energy

Reference	ENM503	Version	4
Created	August 2023	SCQF Level	SCQF 11
Approved	November 2020	SCQF Points	15
Amended	June 2024	ECTS Points	7.5

Aims of Module

This module aims to demonstrate critical awareness and understanding of the advanced technologies implemented in the transformation of renewable energy to electricity, while looking into the challenges and economics of operating such renewable energy systems.

Learning Outcomes for Module

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

- 1 Appraise the fundamentals, prospects, challenges, and the application of renewable energy technologies as sources for sustainable energy.
- 2 Analyse the principles of energy conversion for electricity generation from the different renewable sources.
- 3 Evaluate the advanced technologies applied in the transportation of the renewable-electricity and in addressing the challenges to its grid-integration.
- 4 Make informed judgement on the economics of operating renewable energy systems.

Indicative Module Content

Energy classification, statistics of energy generation and consumption, environmental concerns, and the electricity market reform. Energy conversion and principles of electricity generation from renewable energy sources as sustainable sources. Renewable energy systems fundamentals, operation and challenges. Offshore wind farms and the basic operation of wind turbines. Transportation of the renewably generated electrical power to substations and the grid integration. Challenges to the integration of large-scale renewable energy generation into the electricity grid and strategies to offset them. Economics of operating offshore renewable energy systems.

Module Delivery

This module will be delivered full time on campus and online via distance learning. The module is taught through lectures and case studies.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	50	50
Non-Contact Hours	100	100
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

ASSESSMENT PLAN

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

Component 1

Type:	Examination	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	Closed book examination.				

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

The module has 1 assessment component (exam) and an overall grade D is required to pass the module.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 TWIDELL, J. and WEIR, T., 2015. Renewable energy resources. Routledge.
- 2 THEODORE, W., 2007. Electrical machines, drives and power systems, 6/E. Pearson Education India.
- 3 TAVNER, P., 2012. Offshore Wind Turbines: Reliability. Availability and Maintenance, The Institution of Engineering and Technology, London, UK.
- 4 BANSAL, R. ed., 2017. Handbook of Distributed Generation: Electric Power Technologies, Economics and Environmental Impacts. Springer.
- 5 JONES, L.E., 2017. Renewable energy integration: practical management of variability, uncertainty, and flexibility in power grids. Academic Press.
- 6 RASHID, M.H., 2016. Electric Renewable Energy Systems. Academic Press.
- 7 PITT, E., 2009. Assessment of Performance of Wave Energy Conversion Systems: Marine Renewable Energy Guides. Department of Energy and Climate Change.