MODULE DESCRIPTOR

Module Title

Renewables and the Energy Transition

Reference	ENM505	Version	2
Created	August 2023	SCQF Level	SCQF 11
Approved	February 2022	SCQF Points	15
Amended	April 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 into clean electricity towards energy transition, while looking into the challenges and economics of operating such renewable-based energy systems.

Learning Outcomes for Module

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

1	Appraise the current energy transition and the role of renewable energy technologies.
2	Analyse the prospects, challenges, and fundamentals of energy conversion of the different renewable energy technologies.
3	Evaluate the advanced technologies applied in the transportation of renewable-electricity and the role of energy storage in addressing its grid-integration challenges.
4	Make informed judgement on the economics of operating renewable-based electrical power systems.

Indicative Module Content

Energy classification. Statistical overview of energy generation and consumption with the associated environmental concerns. The ongoing Energy Transition and the role of renewables. Renewable Energy Technologies - Fundamentals, Prospects, Challenges & how to address them. Principles of Electricity Generation from the different renewable sources. Renewable Electricity Transportation and the AC & DC Technologies applied in its Transportation. Challenges to the Integration of Renewable Electricity into the Electricity Network. Role of Energy Storage in Modern Power Systems and the Potential of Green Hydrogen Energy Storage Systems and Fuel Cells. The Economics of Operating Renewable-Based Power Generation Systems.

Module Delivery

Blended Delivery - Lectures and Guided Self-Study.

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Indicative Student Workload	Full Time	Part Time
Contact Hours	35	35
Non-Contact Hours	115	115
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:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	Individual written report.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

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	A background in engineering is beneficial.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1. TWIDELL, J. and WEIR, T., 2022. Renewable energy resources. Routledge.
2. TAVNER, P., 2021. Offshore Wind Turbines: Reliability. Availability and Maintenance, The Institution of Engineering and Technology, London, UK.
3. BANSAL, R. ed., 2017. Handbook of Distributed Generation: Electric Power Technologies, Economics and Environmental Impacts. Springer.
4. JONES, L.E., 2017. Renewable energy integration: practical management of variability, uncertainty, and flexibility in power grids. Academic Press.
5. RASHID, M.H., 2016. Electric Renewable Energy Systems. Academic Press.
6. PITT, E., 2009. Assessment of Performance of Wave Energy Conversion Systems: Marine Renewable Energy Guides. Department of Energy and Climate Change.
7. THEODORE, W., 2014. Electrical machines, drives and power systems, 6/E. Pearson Education India.