This Version is No Longer Current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

MODULE DESCRIPTOR

Module Title

Renewables and the Energy Transition

Reference	ENM505	Version	1
Created	February 2022	SCQF Level	SCQF 11
Approved	February 2022	SCQF Points	15
Amended		ECTS Points	7.5

Aims of Module

This module aims to demonstrate the ongoing worldwide energy transition whilst demonstrating critical awareness and understanding of the advanced technologies implemented in such transition. Demonstrated technologies include the transformation of renewable energy into electricity, the transportation of this electricity, and the energy storage technologies used to address challenges to the renewables integration into the electricity network. The module also aims to demonstrate the economics of operating renewable-based energy systems.

Learning Outcomes for Module

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

1	Demonstrate critical understanding of the current energy transition and the role of renewable energy technologies in producing sustainable energy.
2	Demonstrate extensive awareness and understanding of the fundamentals, prospects, operation, and the advanced technologies applied in the generation of electricity from the different renewable energy resources.
3	Demonstrate detailed awareness and understanding of the advanced technologies applied in the transportation of the renewably-generated electricity while identifying the challenges around its integration into the electricity network and the role of energy storage systems in addressing this.
4	Demonstrate knowledge and understanding of the economics of operating renewable-based electrical power systems.

Indicative Module Content

An Outlook on the Energy classification and usage, the associated environmental concerns and the ongoing Energy Transition. Renewable Energy Technologies - Fundamentals, Prospects, Operation, Challenges & How to address them. Principles of Electricity Generation from the different renewable sources. Challenges to the Integration of Large-Scale Renewable Energy Generation into the Electricity Network. Role of Energy Storage in Modern Power Systems and the Potential of Green Hydrogen Energy Storage Systems and Fuel Cells. Renewable Electricity Transportation and the AC & DC Technologies applied in its Transportation to Electricity Network. The Economics of Operating Renewable-Based Power Generation Systems.

Module Ref:	ENM505 v1

Module Delivery

This is a short course that will be delivered off campus.

Indicative Student Workload	Full Time	Part Time
Contact Hours	N/A	N/A
Non-Contact Hours	N/A	150
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	N/A	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:	Group coursework comprised of a report (40%) and a presentation (60%).				

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.