Module specification

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Module Code	ENG781
Module Title	Renewable Technology & Storage Integration Engineering
Level	7
Credit value	20
Faculty	FAST
HECoS Code	100166
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MSc Engineering (Aeronautical) MSc Engineering (Aeronautical) with Advanced Practice MSc Engineering (Mechanical Manufacture) MSc Engineering (Mechanical Manufacture) with Advanced Practice MSc Engineering (Automotive) MSc Engineering (Automotive) with Advanced Practice MSc Engineering (Renewable & Sustainable Energy) MSc Engineering (Renewable & Sustainable Energy) with Advanced Practice MSc Engineering (Electrical & Electronic) MSc Engineering (Electrical & Electronic) with Advanced Practice MSc Engineering (Management) MSc Engineering (Management) with Advanced Practice MEng Aeronautical Engineering MEng Automotive Engineering MEng Electrical and Electronic Engineering MEng Mechanical Engineering MEng Renewable and Sustainable Engineering	Optional

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	30 hrs
Placement tutor support	0 hrs
Supervised learning e.g., practical classes, workshops	0 hrs

Learning and teaching hours	30 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**30** hrs
Placement / work-based learning	0 hrs
Guided independent study	170 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	22nd Aug 2022
With effect from date	Sept 22
Date and details of revision	
Version number	1

Module aims

This module aims to equip the student with the capability to master complex specialised skills in the area of renewable energy with an overarching background of planning various renewable energy schemes and the prediction of combined energy outputs to supply a given demand profile.

- Combine energy storage in a smart grid to supply a varied demand in a smart grid.
- Act on own investigations and initiative together with decision making to supply an optimum solution to a specific energy grid demand.
- Challenge critical evaluation and selection skills from the different non-dispatchable supply profiles of renewables matched with storage.
- Create methodologies to generate an optimum energy secure solution.

Module Learning Outcomes - at the end of this module, students will be able to:

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: **M1, M2** & **M7**

1	Accurately predict, model, and evaluate a range of typical energy supply profiles from renewable energy schemes.
2	Appraise and interpret renewable energy supply profiles and how they can be combined, with the addition of energy storage to match real world energy demand profiles.
3	Employ complex critical decision-making in designing optimum solutions, using a wide range consideration through a self-created methodology.

4	Analyse and interpret historic long term (solar and wind) minimums in relation to energy security of non-dispatchable renewables.
5	Produce a renewable energy scheme and storage energy model to supply a given demand profile.

Assessment

Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment One: An individually prepared coursework student will be asked to design solar and wind energy schemes using specialist software and interpret their energy profile, together with energy storage, against a given load profile. The student will then be tasked with finding the most efficient solution to supply the demand profile using a self-created methodology and a wide range of considerations. Assessment one is a written coursework (5000 words) and represents 100% of the overall module mark.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-5	Coursework	100%

Derogations

Credits shall be awarded by an assessment board for those Level 7 modules in which an overall mark of at least 50% has been achieved with a minimum mark of 40% in each assessment element.

Learning and Teaching Strategies

A series of workshop style lectures with student-led seminars and small group activities. Directed learning using library and internet resources will be facilitated using Moodle and MS Teams. This module will also follow the ALF (Active Learning Framework) guidelines, which will include alternative methods of assessment and a blended approach to delivery, with some theory and software sessions being delivered online (depending on requirements and student experience).

Indicative Syllabus Outline

- Energy demand profile modelling
- Wind energy production profile modelling
- Solar energy production profile modelling
- Hydro energy production profile modelling
- Energy storage

- Energy grids
- Optimum solutions for smart grids

Indicative Bibliography:

Essential Reads

B. Everett. *Energy Systems and Sustainability:* Power for a Sustainable Future. UK: Open University, 2021.

Other indicative reading

https://www.energyinst.org/

http://www.decc.gov.uk/

Plus, various others to be signposted on Moodle

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

Core Attributes
Engaged
Enterprising
Creative
Ethical

Key Attitudes
Commitment
Curiosity
Resilience
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Organisation
Critical Thinking
Emotional Intelligence
Communication