

Module specification

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Module Code	ENG787
Module Title	Energy Reduction & Sustainability
Level	7
Credit value	20
Faculty	FAST
HECoS Code	100175
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MSc Engineering (Renewable & Sustainable Energy) MSc Engineering (Renewable & Sustainable Energy) with Advanced Practice MEng Renewable & Sustainable Engineering	Core

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
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	22 nd Aug 2022
With effect from date	Sept 2022
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 energy reduction with an overarching background of reducing carbon emissions from practical real-world applications in business, industry or residential applications. The student will be required to act on their own investigations and initiative together with decision making to design optimum solutions to a specific self-chosen energy reduction scheme. This aims to challenge the student to develop critical evaluation and selection skills of products and services through self-created methodologies, synthesising ideas, and information to generate a transformative 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 model and evaluate all types of energy demand profiles for a real-world scenario in either a business, industrial or residential application.
2	Interpret and apprise various energy saving measures across a range of technologies and applications including life cycle analysis and embodied energy.
3	Employ complex critical decision-making in designing optimum solutions to reduce energy usage across either business, industrial or a residential environment using a self-created methodology and a variety of criterion.

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: A written coursework on a given case study selected in either a business, industrial or residential setting. The yearly energy demand profile of the case study will be obtained or estimated. A scheme of work will be designed to reduce the overall energy usage of the case study. Options for energy reduction will be discussed and an optimum solution justified based on investment required, energy usage savings, embodied energy, carbon dioxide footprint and life cycle analysis together with any other harmful effects of manufacture. 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	1-3	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

- Governmental energy saving legislation, energy labelling requirements.
- Codes of practice
- Environmental labelling standards and methods
- Life cycle analysis
- Building envelope performance
- Building automation for energy efficiency
- Energy efficiency in Industrial processes and businesses.
- Energy efficiency in residential
- Energy saving devices for electricity, heating and water.

Indicative Bibliography:

Essential Reads

A. Francesco and D. Umberto, 'Handbook of Energy Efficiency in Buildings, A Life Cycle Approach'. *Science direct*, 2018. doi. <https://doi.org/10.1016/C2016-0-02638-4>

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
Communication