Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	ENG7B4
Module Title	Energy Reduction & Sustainability
Level	Level 7
Credit value	20
Faculty	FACE
HECoS Code	100175
Cost Code	GAME
Pre-requisite module	N/A

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
MSc Engineering (Sustainable Energy)	Core

Breakdown of module hours

Learning and teaching hours	18 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	18 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	**36 hrs**
Placement hours	0 hrs
Guided independent study hours	164 hrs
Module duration (Total hours)	**200 hrs**

Module aims

This module fuses advanced theoretical study with applied experimentation, enabling learners to interrogate, test, and extend current professional and research practice. Through a combination of conceptual exploration and laboratory enquiry, students cultivate critical evaluation, leadership, and evidence-based decision-making skills suitable for professional or doctoral progression.

This module aims to equip students with advanced knowledge and skills to analyse, develop, and implement strategies for energy reduction and sustainable practices in complex systems.

Module Learning Outcomes

At the end of this module, students will be able to:

1	Demonstrate advanced knowledge of energy systems and sustainability principles (to include the entire lifecycle of a process), critically evaluating strategies for reducing energy consumption in complex engineering settings (AHEP-4 M7).
2	Apply systematic and innovative approaches to design, assess, and optimise energy-efficient solutions, integrating environmental sustainability considerations and regulatory requirements (AHEP-4 M7).
3	Critically appraise the environmental, economic, and social impacts of engineering decisions, and communicate recommendations effectively to diverse stakeholders (AHEP-4 M7).

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 1:

Students will complete an individual assignment applying energy reduction and sustainability principles to analyse, design, and evaluate practical engineering solutions.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1-3	Portfolio	4000	100	N/A

Derogations

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

Learning and Teaching Strategies

Learning integrates advanced theoretical study with applied experimentation, enabling students to test and extend current professional and research practice. Face-to-face sessions are complemented by virtual discussions, simulations, and case studies to support analytical depth. Tutorials and supervision focus on independent enquiry, innovation, and leadership in addressing complex challenges.

Welsh Elements

This module will be delivered through the medium of English; however, students have the option to submit their assessments in the medium of Welsh. While this module is not currently offered fully through Welsh, Welsh language support and guidance are available, and some learning materials or tutorial discussions may incorporate Welsh elements where appropriate. To further promote bilingual learning, all students have the opportunity to take the 20-credit Welsh for STEM short course, designed to develop confidence and subject-specific language skills in both English and Welsh.

Indicative Syllabus Outline

- Critically explore and appraise contemporary technologies and strategic approaches for energy reduction across the built environment, industrial systems, and transportation sectors.
- Critically evaluate sustainability frameworks, regulatory landscapes, and policy drivers shaping advanced engineering practice at local, national, and global levels.
- Design, develop, and model innovative energy-efficient solutions through the application of complex case studies and practice-based design projects.
- Integrate renewable energy systems and low-carbon technologies into coherent and sustainable engineering designs, considering technical and operational constraints.
- Systematically analyse the lifecycle, economic, environmental, and societal impacts of energy and sustainability interventions using advanced assessment methodologies.
- Formulate and communicate evidence-based, strategically informed recommendations for sustainable engineering solutions to diverse stakeholder groups.

Indicative Bibliography

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads:

G. C. Datta Roy, Implementing Energy Efficiency in Industries. Boca Raton, FL, USA: CRC Press, 2025.

Other indicative reading:

M. Kanoglu and Y. A. Cengel, Energy Efficiency and Management for Engineers. New York, NY, USA: McGraw-Hill Education, 2020.

Administrative Information

For office use only	
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