

Module specification

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Module Code	ENG5D2
Module Title	Digital Innovation in Engineering
Level	5
Credit value	20
Faculty	FACE
HECoS Code	100184
Cost Code	GAME
Pre-requisite module	N/A

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
FdEng Industrial Engineering (Mechanical)	Core
FdEng Industrial Engineering (Electrical)	
BEng (Hons) Mechanical Engineering with Manufacture	
BEng (Hons) Electrical Engineering with Manufacture	
BEng (Hons) Sustainable Energy Engineering	
BEng (Hons) Mechanical Engineering	
BEng (Hons) Renewable Energy Engineering	

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 develops applied understanding through a balance of theory and practice. Learners undertake both classroom study and supervised practical activity to explore design, implementation, and evaluation processes. Collaborative work and enquiry-based learning foster communication, teamwork, and the confidence to apply problem-solving techniques in varied contexts.

This module aims to introduce and develop students' understanding of the application of modern digital technologies within an engineering context. It explores both the opportunities and limitations associated with these technologies, with a focus on their role in enhancing engineering systems and processes.

Module Learning Outcomes

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

1	Systematically describe the influence of current and future disruptive technologies in a manufacturing and production environment (AHEP-4 F4).
2	Show a systematic understanding of digital twins and how they can be used within a given area of engineering.
3	Analyse how Artificial Intelligence can enhance engineering applications within a given industry and to understand their limitations and risks.

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: Coursework

This module is assessed through a single piece of coursework designed to evaluate students' understanding of the application of modern engineering approaches as alternatives to traditional methods.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1-3	Coursework	3000	100	N/A

Derogations

Credits shall be awarded by an Assessment Board for those modules in which a pass mark 40% has been achieved, with a minimum mark of 30% in each assessment element.

Learning and Teaching Strategies

Learning integrates conceptual study with practical investigation to deepen understanding and enhance problem-solving ability. Students participate in lectures, laboratory work, and team-based projects that encourage collaboration and communication. Online materials, recordings, and discussion forums support blended engagement. Tutorials promote reflective learning and increasing autonomy in preparation for advanced study.

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

Global Engineering and Industrial Economics: Examination of global engineering practices and the principles of industrial economics within a modern globalised manufacturing environment, including the impact of technological change on production systems.

Disruptive and Emerging Technologies: Analysis of the implementation of disruptive and future technologies, supported by statistical analysis and interpretation of engineering data to understand their influence on manufacturing processes.

Robotics and Automation Systems: Introduction to the principles, applications, and integration of robotics and automation technologies within industrial engineering environments.

Economics of Automation: Evaluation of the economic implications of adopting automation technologies, including cost, productivity, efficiency, and return on investment in modern industrial settings.

Artificial Intelligence in Engineering: Exploration of the opportunities for applying artificial intelligence within engineering contexts, including data-driven decision-making and system optimisation.

Limitations and Risks of AI: Critical analysis of the limitations, challenges, and risks associated with AI implementation in engineering applications, including reliability, ethics, and operational constraints

Indicative Bibliography

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

Essential Reads:

J. K. Liker and G. Trachilis, *Developing Lean Leaders at All Levels: A Practical Guide*. Lean Leadership Institute, 2014

Other indicative reading:

N/A

Administrative Information

For office use only	
Initial approval date	June 2026
With effect from date	September 2026
Date and details of revision	
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