Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	ENG4C2
Module Title	Engineering Maths
Level	Level 4
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) FdEng Industrial Engineering (Electrical) BEng (Hons) Mechanical Engineering with Manufacture BEng (Hons) Electrical Engineering with Manufacture BEng (Hons) Sustainable Energy Engineering BEng (Hons) Aerospace Engineering BEng (Hons) Mechanical Engineering BEng (Hons) Motorsport Engineering BEng (Hons) Electrical Engineering BEng (Hons) Renewable Energy Engineering	Core

Breakdown of module hours

Learning and teaching hours	42 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	0 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	**42 hrs**
Placement hours	0 hrs
Guided independent study hours	158 hrs
Module duration (Total hours)	**200 hrs**

Module aims

This module introduces students to the fundamental principles and key concepts of the discipline through structured, tutor-led sessions. It provides a strong theoretical foundation while encouraging the development of analytical thinking and problem-solving ability. Learning activities establish essential academic and professional skills required for progression to applied study at higher levels.

This module aims to provide students with a foundation in mathematical knowledge covering a wide range of f basic topics, and to develop the application of mathematical principles to the solution of engineering problems, including through the use of computer modelling software.

Module Learning Outcomes

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

1	Apply algebraic and trigonometric methods to formulate, manipulate, and analyse functions relevant to engineering problems.
2	Use mathematical modelling software to support the solution and visualisation of engineering problems.
3	Apply vectors, matrices, and complex numbers to solve structured mathematical problems in engineering contexts.
4	Apply differentiation and integration techniques, including first-order differential equations, to analyse simple engineering systems and interpret results.

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 assessment evaluates students' ability to apply fundamental mathematical techniques and modelling tools to engineering problems. Students complete a structured coursework assignment involving problem-solving tasks and the use of mathematical modelling software.

The submission should demonstrate:

- correct application of algebraic and trigonometric methods
- appropriate use of mathematical modelling software
- clear presentation of working and results
- basic interpretation of outputs in an engineering context

Assessment 2: Time-Constrained Assessment – In-class test

This assessment evaluates students' ability to apply mathematical methods under controlled conditions. Students complete a time-constrained problem-solving assessment covering vectors, matrices, complex numbers, and calculus.

The assessment requires students to:

- apply appropriate mathematical techniques
- demonstrate clear method and working
- obtain correct solutions
- interpret results where appropriate

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1-2	Coursework	1000	50	
2	3-4	In-class test	2 hrs	50	

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 and teaching are centred on developing understanding through structured, tutor-led delivery. Students engage in lectures, seminars, and guided study that introduce core concepts and academic conventions. The approach builds confidence and encourages participation, supported by digital materials available through the Virtual Learning Environment. Tutorials help consolidate learning and promote the transition to independent 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

Algebra and trigonometry for engineering:

Algebraic manipulation, polynomials, and solution of equations. Trigonometric functions and identities. Representation and interpretation of functions, including graphical methods, gradients, and intercepts.

Vectors, matrices, and complex numbers:

Vector operations, matrix manipulation, and determinants. Application of complex numbers in different forms, including arithmetic operations, powers, and roots.

Calculus and differential equations:

Differentiation and integration techniques, including applications to engineering problems such as rates of change and accumulated quantities. Introduction to first-order differential equations and their application to simple dynamic systems.

Mathematical modelling and software tools:

Use of mathematical modelling software (e.g. MATLAB) to support problem solving, visualisation, and analysis of engineering systems.

Indicative Bibliography

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

Essential Reads:

J. Bird, Bird's Engineering Mathematics, 9th Ed. Routledge, 2021.

Other indicative reading:

K. Singh, Engineering Mathematics through Applications, 2nd Ed. Palgrave Macmillan Limited, 2011.

S. Attaway, *MATLAB: An Introduction to Programming and Problem Solving*, 6th ed. Amsterdam: Butterworth-Heinemann, 2023.

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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