Module Definition Form (MDF)

Module code: MOD007035	**Version:** 4 **Date Amended:** 24/Jul/2024

1. Module Title
Applied Engineering Mathematics

2a. Module Leader
Lida Krimpeni

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
4

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	None		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

Develop the underpinning engineering mathematical skills needed to solve technical and applied problems. The mathematical skills are essential for the successful completion of your project and knowledge-based modules. The module will focus on teaching mathematics while solving applied engineering problems, formulas, and expressions. Algebraic skills will also be extensively developed to carry out mathematical analyses and solve engineering problems. The module will include algebraic skills, trigonometry, vectors, geometry, basic calculus, and their application to solving practical engineering problems. The teaching of this module includes introducing external self-learning and assessment tools in mathematics, allowing flexible and independent learning. The module will be assessed with reference to the application of mathematics in engineering problems.

6b. Outline Content

Arithmetical skills: BODMAS, Estimating and rounding, Fractions, ratios, percentages. Powers and Logarithms (applications include use of a calculator and calculating an engineering variable in a complex formula).
Algebraic skills: Collecting like terms, Expanding brackets, Simplifying, Factorisation, Rearrangement of formulae to determine new subjects, Arithmetic of algebraic fractions, Partial fractions, Polynomials & application in engineering
Equations: Evaluating expressions and independent variables, Graphs and charting in excel, Simultaneous linear equations, analytical and graphical solutions, Solutions of quadratic equations
Trigonometry and Geometry: Basic geometric shapes, geometric similarity, Vectors, Rotation and angles, Solution of practical problems using Pythagoras, Sine and cosine rule. Circles and angular measurements, Basic trigonometric curves, Linear interpolation (applications include adding forces as vectors, force decomposition), Geometric Area (2D) and Volume (3D) calculations.
Calculus: Concept of differentiation, differentiating simple equations, optimisation using differentiation, rate of change and differentiation, basic integration, integration, and area under the curve.

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

Microsoft Office

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Interpret engineering mathematical expressions
2	Knowledge and Understanding	Describe and apply algebraic, trigonometrical and geometrical techniques to solve engineering problems
3	Intellectual, practical, affective and transferrable skills	Select and develop appropriate mathematical solutions to solve practical engineering problems
4	Intellectual, practical, affective and transferrable skills	Apply and communicate skills effectively through solution of engineering problems using appropriate structure and format

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	20	1-4	Lecture 2hr x 10 weeks
Other teacher managed learning	20	1-4	Tutorials and seminars 2hr x 10 weeks
Student managed learning	110	1-4	Including 4 hours per week using online resources
TOTAL:	150		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-4	50 (%)	Fine Grade	30 (%)

010-1: 500 - word equivalence, technical report applying mathematical skills to applied engineering problems. 010-2: Canvas Quiz, 500 words equivalence

Assessment components for Element 010

Component No.	Assessment Title	Submission Method	Weighting (%)	Components needed for Mark Calculation?
010/1	Technical Report 500 word equivalence	Canvas	50 (%)	All
010/2	Canvas Quiz 500 words equivalence	Scheduled Activity: Timetabled assessment task	50 (%)	

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Examination	1-3	50 (%)	Fine Grade	30 (%)

90-minute examination

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]