

Summary Information

Module Code	4315CIT
Formal Module Title	Engineering Mathematics 1a
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Changshu Institute of Technology

Learning Methods

Learning Method Type	Hours
Lecture	48

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	To provide a foundation in engineering mathematics for its application to the solution of engineering problems
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Use basic algebraic manipulations and mathematical functions in the solution of engineering problems.
MLO2	2	Use basic trigonometry to describe engineering waves in mechanical and electrical systems.
MLO3	3	Use exponentials and logarithms to solve relevant engineering problems.
MLO4	4	Apply complex numbers in the solution of engineering problems.
MLO5	5	Use and apply mathematical software to the solution of engineering mathematics.

Module Content

Outline Syllabus	<p>1. Revision of basic algebraic techniques: Representation of numbers, Rules of arithmetic, Modulus and intervals. Substitution, simplification, factorization, indices, evaluation and transposition of formulae, fractions and partial fractions. Number and accuracy.</p> <p>2. Geometry: Coordinates, Straight lines, Circles, Conics.</p> <p>3. Introduction of the use of a mathematical software, e.g. MATLAB.</p> <p>4. Functions: Notation, types of function, composite and inverse, graphs.</p> <p>5. Linear and quadratic functions: Linear functions, Least squares fit, Quadratic functions.</p> <p>6. Polynomial functions: Factorization, Nested multiplication and synthetic division, Roots of polynomial functions.</p> <p>7. Rational functions: Partial fractions, Asymptotes, Parametric representation.</p> <p>8. Circular functions: Angles and circular measure. Trigonometric ratios for right-angled triangles. Sine and cosine rules. Trigonometric functions and their graphs, simple trigonometric identities and equations. Engineering waves in mechanical and electrical problems.</p> <p>9. Exponential function: Properties and graph. Natural logarithm as inverse of exponential function, graph and properties. Definitions and calculation of hyperbolic functions including inverse functions.</p> <p>10. Complex numbers: Complex arithmetic, complex conjugate, Argand diagram. Rectangular, polar forms. Magnitude and phase. Very basic treatment of Euler's formula.</p> <p>11. Vector Algebra: Basic definition and properties, Scalar product and vector product, Vector treatment of the geometry of lines and planes, Engineering application.</p>
Module Overview	
Additional Information	<p>This module provides a foundation in pre-calculus for level four students in mechanical and electrical engineering, to enable them to apply this to the solution of engineering problems. For each topic area of the syllabus, relevant commands will be given for application of a symbolic algebra package, e.g. Matlab to harder problems. Examinations are 2 hour duration.</p>

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Examination	100	2	MLO3, MLO4, MLO1, MLO2, MLO5

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Clifford Mayhew	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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