

Engineering Mathematics 1a

Module Information

2022.01, Approved

Summary Information

Module Code	4501USST
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
University of Shanghai For Science and Technology

Learning Methods

Learning Method Type	Hours
Lecture	22
Tutorial	22

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 in the solution of engineering problems
MLO2	2	Apply basic mathematical functions in the solution of engineering problems
MLO3	3	Apply basic trigonometry to describe engineering waves in mechanical and electrical systems
MLO4	4	Apply basic complex numbers in the solution of engineering problems
MLO5	5	Apply exponentials and logarithms to solve relevant engineering problems.
MLO6	6	Apply complex numbers in the solution of engineering problems.
MLO7	7	Apply mathematical software to the solution of engineering mathematics problems

Module Content

Outline Syllabus	Revision of basic algebraic techniques: Substitution, simplification, factorisation, indices, evaluation and transposition of formulae, fractions and partial fractions. Linear and quadratic equations, linear simultaneous equations. Functions: Notation, types of function, composite and inverse, graphs. Trigonometry: 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. Exponential function: Properties and graph. Natural logarithm as inverse of exponential function, graph and properties. Definitions and calculation of hyperbolic functions including inverse functions. Complex numbers: Complex arithmetic, complex conjugate, Argand diagram. Rectangular, polar forms. Magnitude and phase. Very basic treatment of Euler's formula. Introduction to calculus: Limits, continuity, derivative by first principles; Derivative rules including chain rule, product rule, quotient rule; Derivatives of implicit functions and inverse functions.
Module Overview	
Additional Information	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.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Examination	100	2	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6, MLO7

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Stewart Chidlow	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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