

Liverpool John Moores University

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Title: Engineering Mathematics 1a
Status: Definitive
Code: **4101SBC** (124853)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: The Sino-British College

Team	Leader
James Ren	Y

Academic Level: FHEQ4 **Credit Value:** 10 **Total Delivered Hours:** 46
Total Learning Hours: 100 **Private Study:** 54

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	100	2

Aims

To provide a foundation in engineering mathematics for its application to the solution of engineering problems

Learning Outcomes

After completing the module the student should be able to:

- 1 Use basic algebraic manipulations in the solution of engineering problems
- 2 Use basic mathematical functions in the solution of engineering problems
- 3 Use basic trigonometry to describe engineering waves in mechanical and electrical systems
- 4 Use basic complex numbers in the solution of engineering problems
- 5 Use exponentials and logarithms to solve relevant engineering problems.
- 6 Apply complex numbers in the solution of engineering problems.
- 7 Use and apply mathematical software to the solution of engineering mathematics problems

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3	4	5	6	7
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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.

Learning Activities

A combination of lectures and tutorials.

Notes

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.