Liverpool John Moores University

Title:	Engineering Mathematics 1a
Status:	Definitive
Code:	**4101MAN** (121946)
Version Start Date:	01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Amir Asghari	Y
Stewart Chidlow	

Academic Level:	FHEQ4	**Credit Value:**	10	**Total Delivered Hours:**	22
Total Learning Hours:	100	**Private Study:**	78		

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	16.5
Tutorial	5.5

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	Weekly online coursework delivered using a virtual learning environment	100	

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:

Online Assessment   1   2   3   4   5   6   7

Outline Syllabus

Introduction of the use of a computer algebra system e.g. MATHCAD. Use of the software applied to the syllabus items below

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.

For each topic area of the syllabus, relevant commands will be given for application of a symbolic algebra package, e.g. Mathcad to more difficult problems.

Coursework assessment will be through online questions delivered using MapleTA online assessment software

In this module, the knowledge learning outcomes are K1.