

**Summary Information**

<b>Module Code</b>	4300CIV
<b>Formal Module Title</b>	Engineering Mathematics I
<b>Owning School</b>	Civil Engineering and Built Environment
<b>Career</b>	Undergraduate
<b>Credits</b>	20
<b>Academic level</b>	FHEQ Level 4
<b>Grading Schema</b>	40

**Module Contacts****Module Leader**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
Magomed Muradov	Yes	N/A

**Module Team Member**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
Pelumi Ojuri	Yes	N/A

**Partner Module Team**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
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**Teaching Responsibility**

<b>LJMU Schools involved in Delivery</b>
Civil Engineering and Built Environment

**Learning Methods**

Learning Method Type	Hours
Lecture	44
Tutorial	11
Workshop	11

### Module Offering(s)

Offering Code	Location	Start Month	Duration
SEP-CTY	CTY	September	12 Weeks

### Aims and Outcomes

<b>Aims</b>	To develop knowledge and understanding of the mathematics underpinning engineering, and to apply these techniques within an engineering context.
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### Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Use basic algebraic manipulations, matrices and mathematical functions proficiently in the analysis and solution of engineering problems.
MLO2	Use and apply mathematical software to the solution of engineering mathematics problems.
MLO3	Apply differential and integral calculus proficiently in the analysis and solution of engineering problems.
MLO4	Communicate effectively through the clear presentation of mathematical equations and formulae.

### Module Content

Outline Syllabus
Fractions, exponents, scientific notation, factorisation, transposition of formulae. SI units, dimensional analysis. Trigonometry for surveying and forces. Basic vector algebra for forces. Functions, linear and quadratic equations, linear simultaneous equations. Application: Vertical alignment of road/rail. The exponential function and logarithms. Calculus: Limits, Differentiation, Integration, Numerical integration. Applications: rates of change, stationary points, centroids, moments of area. Roots: Numerical techniques, iterative methods for transcendental equations, including the Newton-Raphson method. Applications: Solving cubic equations. Basic matrix manipulation including the inverse matrix. Applications: Solution of systems of linear equations. 1st order differential equations. Application: Falling head permeability test. Complex numbers: Complex arithmetic, complex conjugate, Argand diagram. Rectangular, polar forms. Magnitude and phase, Euler's formula.

### Module Overview

**Additional Information**

This module provides a foundation in engineering mathematics for use in the analysis and solution of engineering problems.

**Assessments**

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Essay	IN-CLASS TEST	30	0	MLO4, MLO3, MLO1, MLO2
Centralised Exam	Examination	70	2	MLO4, MLO3, MLO1