Engineering Mathematics I

Module Information

2022.01, Approved

Summary Information

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

Teaching Responsibility

LJMU Schools involved in Delivery
Civil Engineering and Built Environment

Learning Methods

Learning Method Type	Hours
Lecture	22
Online	11
Workshop	11

Module Offering(s)

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

Aims and Outcomes

Aims	To develop knowledge and understanding of the mathematics underpinning engineering, and to apply these techniques within an engineering context.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Use basic algebraic manipulations, matrices and mathematical functions proficiently in the analysis and solution of engineering problems.
MLO2	2	Use and apply mathematical software to the solution of engineering mathematics problems.
MLO3	3	Apply differential and integral calculus proficiently in the analysis and solution of engineering problems.
MLO4	4	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)	Module Learning Outcome Mapping
Test	In-Class Test	30	0	MLO1, MLO2, MLO3, MLO4
Centralised Exam	Examination	70	2	MLO1, MLO3, MLO4

Module Contacts

Module Leader

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

Partner Module Team

Contact Name	Applies to all offerings	Offerings