

Liverpool John Moores University

Title: Engineering Mathematics 1b
Status: Definitive
Code: **4502USST** (126431)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: University of Shanghai For Science and Technology

Team	Leader
Stewart Chidlow	Y

Academic Level: FHEQ4 **Credit Value:** 10 **Total Delivered Hours:** 35
Total Learning Hours: 100 **Private Study:** 65

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	22
Tutorial	11

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 Apply vectors in the solution of engineering problems
- 2 Apply matrices in the solution of engineering problems and matrices
- 3 Apply techniques in differentiation to the solution of engineering problems
- 4 Apply techniques in integration to the solution of engineering problems
- 5 Solve first order ordinary differential equations by the method of separation of variables and apply to the modelling of engineering problems
- 6 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
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Outline Syllabus

Basic vector algebra including Cartesian components and products. Differentiation of vectors. Applications.

Basic matrix manipulation including the inverse matrix. Solution of systems of linear equations.

Gradient of curve, Applications. Stationary points. Rates of change.

Integral calculus as inverse of differentiation and as a limit of a sum. Standard integrals, linearity, integration of composite functions. Other methods of integration. Numerical integration.

Ordinary differential equations. First order linear, constant coefficient equations.

Separation of variables. Application to modelling

Linear independence, Rank of a Matrix, Symmetric Matrix; Reduction to Canonical form; Higher order differentiation and Optimization on one variable function.

Learning Activities

A combination of lectures and tutorials.

Notes

This module provides a foundation in engineering mathematics for level four students in mechanical and electrical engineering, to enable them to apply this to the solution of engineering problems.