

Summary Information

Module Code	4519USST
Formal Module Title	Engineering Mathematics 1b
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 4
Grading Schema	40

Module Contacts**Module Leader**

Contact Name	Applies to all offerings	Offerings
Dante Matellini	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
University of Shanghai For Science and Technology

Learning Methods

Learning Method Type	Hours
Lecture	22
Tutorial	11

Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-PAR	PAR	January	12 Weeks

Aims and Outcomes

Aims	To provide a foundation in engineering mathematics for its application to the solution of engineering problems. This module is a continuation from 4514USST - Engineering Mathematics 1a.
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Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Use vectors and matrices in the solution of engineering problems.
MLO2	Apply techniques of integration or differentiation in the solution of engineering problems.
MLO3	Solve first order ordinary differential equations by the method of separation of variables and apply to the modelling of engineering problems.
MLO4	Use and apply mathematical software to the solution of engineering problems.

Module Content

Outline Syllabus

Introduction of the use of a computer algebra system (for example MATLAB or similar). Use of the software applied to the syllabus items below.

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.

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

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, numerical integration. Applications of integration.

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

Separation of variables. Application to modelling.

Module Overview

Additional Information

This module provides a foundation in engineering mathematics for level 4 students in mechanical and electrical engineering to enable them to apply this to the solution of engineering problems.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Exam	Examination	100	2	MLO1, MLO2, MLO3, MLO4