

## Liverpool John Moores University

Title: Engineering Mathematics 1b  
Status: Definitive  
Code: **4502MECBHG** (128769)  
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering  
Teaching School/Faculty: Beaconhouse IC Islamabad

Team	Leader
Russell English	Y

**Academic Level:** FHEQ4      **Credit Value:** 10      **Total Delivered Hours:** 33  
**Total Learning Hours:** 100      **Private Study:** 67

### 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
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 vectors in the solution of engineering problems
- 2 Use 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 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
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## Outline Syllabus

*Introduction of the use of a computer algebra system. 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.*

*Differential calculus of one variable: Gradient of curve, derivatives of standard functions, linearity, derivatives of composite functions, products and quotients. 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*

## 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.