

## Liverpool John Moores University

Warning: An incomplete or missing proforma may have resulted from system verification processing

Title: Engineering Mathematics 1b  
Status: Definitive  
Code: **4001MEQR** (129287)  
Version Start Date: 01-08-2021  
  
Owning School/Faculty: Engineering  
Teaching School/Faculty: Oryx Universal College WLL

Team	Leader
Amir Asghari	Y

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

### Delivery Options

Course typically offered: S2, Summer NS2 (S2 for Jan)

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
-------------------	---	---	---	---	---	---

### **Outline Syllabus**

*Introduction of the use of a computer algebra system e.g. MATHCAD. 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.

For each topic area of the syllabus, relevant commands will be given for application of a symbolic algebra package, e.g. Mathcad to harder problems.