

Liverpool John Moores University

Title: ENGINEERING MATHEMATICS
Status: Definitive
Code: **5009BEHN** (102309)
Version Start Date: 01-08-2016

Owning School/Faculty: Applied Mathematics
Teaching School/Faculty: Applied Mathematics

Team	Leader
Paul Strickland	Y

Academic Level: FHEQ5
Credit Value: 12
Total Delivered Hours: 39
Total Learning Hours: 120
Private Study: 81

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	24
Tutorial	12

Grading Basis: BTEC

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	unseen	70	3
Report	AS2	statistics	15	
Report	AS3	use of algebra and calculus	15	

Aims

To provide an introduction to a variety of mathematical techniques, including trigonometry, the construction and solution of algebraic equations, the use of calculus in engineering, and the basics of probability and statistics.

To ensure that students can apply these methods to engineering problems.

Learning Outcomes

After completing the module the student should be able to:

- 1 Demonstrate a knowledge of the properties of trigonometric functions.
- 2 Construct and solve algebraic equations representing engineering problems.
- 3 Use calculus to determine maximum and minimum values.
- 4 Use calculus to calculate areas and volumes.
- 5 Define engineering problems using differential equations, and solve these equations using analytical and numerical methods.
- 6 Analyse problems using probability and statistics.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	3	4	5	6
STATISTICS REPORT	2	3	4	5		
ALGEBRA AND CALCULUS REPORT	6					

Outline Syllabus

Trigonometry: graphs, wave features, addition of waves, trigonometric identities.

Algebraic equations: construction of engineering equations. Solution of linear simultaneous equations by inverse methods and Gaussian elimination. Bisection and Newton-Raphson methods.

Calculus: stationary values, and use in engineering, for functions of one or two variables. Use of calculus to calculate areas and volumes. Integration by parts, substitution and partial fractions

Differential equations: use in engineering, linear constant coefficient equation, initial conditions, basic numerical solution of differential equations. Euler's method, and use of software.

Probability and statistics: binomial, normal and Poisson distributions, linear regression, confidence intervals, sampling, statistical quality control.

Learning Activities

A combination of lectures and working through problems.

Notes

The module presents mathematical techniques and applies them to engineering problems.