

Liverpool John Moores University

Title: Advanced Mathematics for Engineering
Status: Definitive
Code: **5001ENGFRI** (117000)
Version Start Date: 01-08-2016

Owning School/Faculty: Maritime and Mechanical Engineering
Teaching School/Faculty: Maritime and Mechanical Engineering

Team	Leader
Russell English	Y
Michael Nieves	

Academic Level: FHEQ5 **Credit Value:** 10 **Total Delivered Hours:** 26
Total Learning Hours: 100 **Private Study:** 74

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	18
Tutorial	6

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	exam	60	2
Technology	Coursework	technology	40	

Aims

To provide a foundation in advanced 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 complex numbers to the solution of engineering problems
- 2 Solve first and second order ordinary differential equations and apply to the modelling of engineering problems
- 3 Use Laplace transforms in the solution of engineering problems
- 4 Use Fourier methods in the solution of engineering problems
- 5 Apply z-transforms to signal processing
- 6 Apply mathematical software to the solution of engineering problems

Learning Outcomes of Assessments

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

Exam	1	2	3	4	5	
Coursework	1	2	3	4	5	6

Outline Syllabus

Complex numbers: Complex arithmetic, complex conjugate, Argand diagram. Rectangular, polar forms. Magnitude and phase. Euler's formula.

The solution of first order ODE's by for example, separation of variables

The solution of inhomogeneous second order ODE's by the method of undetermined coefficients.

Periodic functions. Fourier series for functions of any period. Harmonics.

Laplace and Fourier transform: Definitions, properties, inversion and applications

The z-transform: Definitions, properties, inversion of z-transform. Applications to signal processing.

Apply mathematical software e.g. MATHCAD or DERIVE to the solution of engineering problems

Learning Activities

A combination of lectures and tutorials.

Notes

Advanced methods in engineering mathematics are studied and applied.