Liverpool John Moores University

Title:	ADVANCED MATHEMATICAL METHODS
Status:	Definitive
Code:	**6004MATHS** (103241)
Version Start Date:	01-08-2016
Owning School/Faculty:	Applied Mathematics
Teaching School/Faculty:	Applied Mathematics

Team	Leader
Paulo Lisboa	Y

Academic Level:	FHEQ6	**Credit Value:**	12	**Total Delivered Hours:**	38
Total Learning Hours:	120	**Private Study:**	82		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	24
Tutorial	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Questions on Fourier series and vector calculus.	25	
Exam	AS1	Examination	75	2

Aims

To further develop the student's ability to understand and use a wide range of mathematical methods in the solution of problems arising in the field of applicable mathematics.

Learning Outcomes

After completing the module the student should be able to:

1 Use the Laplace transform to solve certain ordinary differential equations, including those involving either the step or impulse functions.
2 Analyze periodic phenomena into corresponding Fourier series, using both analytic and numerical techniques.
3 Solve partial differential equations analytically using separation of variables.
4 Determine the grad. div. and curl of scalar and vector quantities and establish and use interrelationships between them.
5 State the theorems of Gauss, Green and Stokes and be able to apply them in a selection of case studies from physics and engineering.

Learning Outcomes of Assessments

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

Report	1	2			
Exam	1	2	3	4	5

Outline Syllabus

Fourier series: functions of arbitrary period, Odd and even functions, half range series.
Vector calculus: grad., div. and curl.
Partial differential equations: solution by separation of variable with applications to the wave, Laplace and diffusion equations.
Laplace transforms: definition, tables, properties, inverse, theorems, convolution, application to the solution of ODEs which may include the step and impulse functions.
Multiple integrals in Cartesian co-ordinates only. Theorems of Gauss, Green and Stokes with physical applications.

Learning Activities

Lectures, tutorials, directed reading, computer lab work and coursework.

Notes

This module underlines the integrating links between mathematical models and applications by extending the student's repertoire of the former in order to facilitate the solution of problems from a range of fields of application.