Liverpool John Moores University

Title:	ADVANCED CALCULUS
Status:	Definitive
Code:	**6109MATHS** (124206)
Version Start Date:	01-08-2021
Owning School/Faculty:	Computer Science and Mathematics
Teaching School/Faculty:	Computer Science and Mathematics

Team	Leader
Ivan Olier-Caparroso	Y

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	57
Total Learning Hours:	200	**Private Study:**	143		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Tutorial	33

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Calculations involving calculus of complex and vectors, and transforms. This will mainly be in mathematical notation rather than words.	40	
Exam	AS2	Examination	60	2

Aims

Extend students' mastery of calculus in application areas such as vectors, complex numbers transforms and series.

Learning Outcomes

After completing the module the student should be able to:

1 Use complex analysis to solve problems in calculus.
2 Determine the gradient, divergence and curl of scalar and vector quantities as appropriate, state the theorems of Gauss, Green and Stokes and apply them in a selection of case studies from physics and engineering.
3 Analyze periodic phenomena into corresponding Fourier series, using both analytic and numerical techniques.
4 Know the basic properties of the complex Fourier transform, including the Fourier Inversion Theorem, and be able to calculate direct and inverse Fourier transforms, applying these results to convolution integral equations; and
be able to use the Laplace transform method to solve linear ordinary differential equations and convolution type integral equations.

Learning Outcomes of Assessments

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

Application casy study	1	2	3	4
Examination	1	2	3	4

Outline Syllabus

Complex analysis, continuity, analytic functions, integration, Cauchy's Theorem. Fourier series, using real and complex methods, with application to series summation.
Vector calculus, grad, div and curl, integration, and the the theorems of Green, Stokes and Gauss.
Laplace and Fourier transforms, with applications to the solution of differential equations.

Learning Activities

Lectures and tutorials, solving problems in vector and complex calculus and transformations.

Notes

This module gives students the opportunity to apply mathematics to scientific problems.