

Liverpool John Moores University

Title: PURE MATHEMATICS 1
Status: Definitive
Code: **4110EDSTUD** (117570)
Version Start Date: 01-08-2016

Owning School/Faculty: Education
Teaching School/Faculty: Education

Team	Leader
Marcus Hill	Y

Academic Level: FHEQ4 **Credit Value:** 24 **Total Delivered Hours:** 50
Total Learning Hours: 240 **Private Study:** 190

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	36
Workshop	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS2		50	2
Portfolio	AS1		50	

Aims

To develop knowledge and techniques in matrix and vector algebra and their applications in the solution of systems of linear equations, basic vector calculus, the use of polar coordinates and complex numbers and the connections between these and other areas of mathematics..

Learning Outcomes

After completing the module the student should be able to:

- 1 Understand and use matrix and vector algebra concepts and operations, including basic vector calculus.
- 2 Solve linear systems of linear algebraic equations and understand the conditions for the existence of solutions
- 3 Use polar coordinates in two dimensional space to represent points and functions, translating to and from rectangular coordinates and using calculus thereon.
- 4 Understand and use complex numbers, including their algebra and representations in the Argand diagram

Learning Outcomes of Assessments

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

2 hour terminal assessment	2	3	4
Matrix algebra problems	1		

Outline Syllabus

Matrix and vector algebra concepts including linear combinations, matrix multiplication and the scalar and vector products of vectors.

Special types of matrices – e.g. inverse, diagonal, symmetric – and their significance and applications.

Methods for solving systems of linear equations: Gaussian elimination, use of inverse matrices.

Eigenvalues and eigenvectors and their significance and applications.

Applications of matrix algebra in geometry, including Euclidean transformations.

Calculus of simple vector functions and its applications.

Representation of points and functions in R^2 using polar coordinates.

Translating between polar and rectangular coordinates.

Calculus in polar coordinates.

Algebra and representation of complex numbers.

Using the Argand diagram, the connections to and differences from two dimensional real space.

The polar form of complex numbers, Euler's relation and de Moivre's theorem.

Learning Activities

Lectures, workshops and independent learning activities.

Notes

Core course for Mathematics and Education Studies