Module Proforma

Approved, 2022.02

Summary Information

Module Code	4110MATHS
Formal Module Title	Linear Algebra
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Robert Wilkinson	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
Stewart Chidlow	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	33

Module Offering(s)

Offering Code	Location	Start Month	Duration
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	To provide an introduction to Linear Algebra with a view towards solving real-world problems. Complete a Future Focus e-learning task.

Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Use the fundamental notions of linear independence, dimension, linearity of a map and orthogonality in concrete examples and real-world applications.
MLO2	Solve systems of linear equations. Derive the conditions for existence and uniqueness of solutions from the vector space structure defined by a system of linear equations.
MLO3	Characterise properties of matrices/linear maps (e.g., eigenvalues and eigenvectors; orthogonality) and exploit the results of this analysis in real-world applications.
MLO4	Identify and reflect upon the following aspects of self-awareness in respect of personal development and career planning: strength and weaknesses, motivations and values, ability to work with others.

Module Content

Outline Syllabus
Systems of linear equations: Gaussian elimination and the solution space of linear systems.Vector spaces, Sub-vector spaces and their geometry, Spanning sets.Basis and Dimension of a vector space.Linear maps and matrices. Kernel and image. Invertible matrices and determinants.Eigenvectors and eigenvalues. Characteristic polynomial. Matrix diagonalisation.Scalar products and orthogonality. Orthogonality and linear independence.

Module Overview
This module provides you with the experience of using pencil-and-paper techniques and mathematical software to solve realistic problems in Linear Algebra.

Additional Information

This module provides students with the experience of using pencil-and-paper techniques and mathematical software to solve realistic problems in Linear Algebra.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Portfolio	Portfolio	30	0	MLO3, MLO4, MLO1, MLO2
Centralised Exam	Examination	60	2	MLO3, MLO1, MLO2
Future Focus e-learning task	Future Focus	10	0	MLO4