Academic School / Department: Business and Economics

Programme: Mathematics Minor

FHEQ Level: 5

Course Title: Linear Algebra

Course Code: MTH 5220

Course Leader: Ana Oliveira

Student Engagement Hours: 120 (standard 3- credit BA course)
Lectures: 35
Seminar / Tutorials: 10
Independent / Guided Learning: 75

Semester: Fall, Spring, Summer

Credits: 12 UK CATS credits
6 ECTS credits
3 US credits

Course Description:
The course provides a detailed study of set theory, systems of linear equations, theory of vectors and vector spaces, algebra of matrices, determinants and characteristic polynomials, mappings and linear transformations, canonical forms and invariance, eigenvectors and eigenvalues. These concepts are useful as they form a basis of a deeper understanding of advanced mathematics and have wide applications in physical and social sciences. Specific applications in economics will be explored.

Prerequisites:
MTH 4110 Calculus and Applications

Aims and Objectives:
The course provides students with an understanding of a number of topics and concepts in linear algebra. The course also introduce techniques of proof which are useful to other courses. The course aims to encourage students to develop interest in the subject and pursue other courses that require these skills

Programme Outcomes:
These learning outcomes satisfy the program outcomes for Combined Studies:
Aii, Bi, Biii, Ciii, Dii; Economics: A2, B2, C4, D and Business: B4, D2, D4

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A detailed list of the programme outcomes are found in the Programme Specification.

This is located at the archive maintained by the Registry and found at: https://www.richmond.ac.uk/programme-and-course-specifications/

Learning Outcomes:
By the end of this course, successful students should be able to:

- Have a sound and broad understanding of how to solve systems of linear equations and matrix manipulation including computation of its inverse (when possible) and evaluate determinants

- Have a broad understanding of the concepts of vector and matrix algebra, including linear dependence/independence, basis and dimension of a subspace, rank and nullity

- Have an understanding of the principles and applications of eigenvectors and eigenvalues, Linear Transformations and present a rigorous analysis of problems

- Be able to choose the correct method/strategy to solve problems using appropriate mathematical routines and strategies

Indicative Content:
- Systems of linear equations; Row reduction and Matrix Equation
- Linear Transformations; Transformation Matrix;
- Matrix Operations; Inverse Matrix
- Vector Spaces; Null Space
- Vector Algebra, Basis, dimension and rank
- Eigenvectors and Eigenvalues
- Linear Transformation
- Orthogonality and Gram-Schmidt Process
- Least-Square Problem

Assessment:
This course conforms to the Richmond University Math Assessment Norms approved at Academic Board and located at: https://www.richmond.ac.uk/policies/

Teaching Methodology:
Course material is presented and analyzed in the following ways:
a) Formal presentation of topics and worked exercises.
b) Self-learning assignments and directed mathematical exercises.
c) Participation in individual and group investigations.

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d) Where appropriate, students will be introduced to solution aids, such as hand-held calculators, mathematical tables and computer software

Indicative Text(s):
Lay, D.C., "*Linear Algebra and Its Applications*", 5th Edition, Pearson, 2014

Journals

Web Sites

See syllabus for complete reading list

Change Log for this CSD:

Nature of Change	Date Approved & Approval Body (School or AB)	Change Actioned by Registry Services