MATH0014 Algebra 3: Further Linear Algebra

Year:	2024–2025
Code:	MATH0014
Level:	5 (UG)
Normal student group(s):	UG: Year 2 Mathematics degrees and Year 3 Mathematics and Statistical Science degrees
Value:	15 credits (= 7.5 ECTS credits)
Term:	1
Assessment:	The weighting of the module is 85% exam, 9% written coursework, 4% quizzes, 2% participation. In the participation mark, 1% will be awarded for missing no more than 3 tutorials and 1% will be awarded for giving a presentation in a tutorial. (The final exam for MATH0014 will take place during the main exam period, April/May 2024)
Normal Pre-requisites:	MATH0006
Lecturer:	Dr R Reynolds

Course Description and Objectives

In this course, we will aim to further the study of some key concepts of linear algebra, through the study of notions related to polynomial rings over fields, matrix diagonalisability and the Jordan normal form, linear and bilinear forms, and inner product spaces.

Recommended Texts

There is a number of textbooks covering the subject area(s) studied in this course. We will aim to make the course quite self-contained, but please feel free to contact the lecturer if you would like to obtain some further information regarding suitable textbooks for the course.

Detailed Syllabus

Polynomial rings: A description of some of the basic objects of abstract algebra and an introduction to the theory of polynomial rings (over fields), including the presence of a Euclidean algorithm and associated results.

Linear maps and the Jordan normal form: A review of more basic parts of the theory of linear maps, including the notion of matrix diagonalisability, and a study of the Jordan normal form, including theory leading to the Primary Decomposition Theorem and methods of computation.

Linear and bilinear forms, and inner product spaces: An introduction to the theory of linear forms, including notions related to quadratic forms and canonical forms, as well as an introduction to the theory of real and complex inner product spaces.