Course information 2018–19
MT2175 Further linear algebra (half course)

In *MT1173 Algebra*, students have met many of the key concepts of linear algebra. In this course, we study further theoretical material and look at additional applications of linear algebra.

Prerequisite

If taken as part of a BSc degree, the following courses must be passed before this half course may be attempted:

MT1173 Algebra

Exclusion

This half course may not be taken with: *MT3095 Further mathematics for economists*.

Aims and objectives

This half course is designed to:

- enable students to acquire further skills in the techniques of linear algebra, as well as understanding of the principles underlying the subject
- prepare students for further courses in mathematics and/or related disciplines (e.g. economics, actuarial science).

Essential reading

For full details, please refer to the reading list

Anthony, M. and M. Harvey, *Linear Algebra: Concepts and Methods*. (Cambridge University Press)

Learning outcomes

At the end of this half course and having completed the essential reading and activities students should have:

- ☑ knowledge of the concepts, terminology, techniques and conventions covered in the half course.
- ☑ The ability to demonstrate an understanding of the underlying principles of the subject.
- ☑ The ability to demonstrate the ability to solve unseen mathematical problems involving an understanding of the concepts.

Assessment

This half course is assessed by a two-hour unseen written examination.

Syllabus

This is a description of the material to be examined. On registration, students will receive a detailed subject guide which provides a framework for covering the topics in the syllabus and directions to the essential reading

This course continues the study of linear algebra initiated in MT1173 Algebra.

Topics covered are:

Diagonalisation and Jordan normal form, applied to systems of differential equations.

Inner products, orthogonality, quadratic forms, and orthogonal diagonalisation.

Direct sums and projections, with applications to least squares.

Generalized inverses.

Complex numbers. Complex matrices and vector spaces. Hermitian and unitary matrices, unitary diagonalisation and spectral decomposition