University of Dundee


Organization

The MA32005 module runs for 11 teaching weeks in the second semester, and is worth 15 SCQF credits (equal to 7.5 ECTS points). The lecturer is

Prof Ping Lin
Mathematics Division,
Room J16, Fulton Building,
Tel: 01382 – 384473
email: plin@maths.dundee.ac.uk

You should make an appointment to see Professor Lin if you have a problem regarding the course. You may also bring matters of concern about the course to the attention of the Mathematics Division Staff/Student Committee, which meets once each semester.

Timetable

The class will meet 3 times (sometimes 4 times) each week for lectures, tutorials and computer sessions. Lectures and tutorials will be held at room 1G06 in Dalhousie Building on Mondays (3-4pm) and at Carnelly Small Lecture Theatre on Tuesdays (4-5pm), and at room 2.12 on Fridays (10-11am, weeks 22-26). Computer sessions will be held in room J19 in the Fulton Building for one or two hours each week (Fridays noon-2pm) during weeks 15-21.

Syllabus

In order to take this course you should have passed modules MA21001 and MA22001, or have an equivalent qualification.

Matrix algebra is a fundamental and widely used resource for modelling a wide variety of problems in science, technology, industry and commerce.

The aim of this course is to use computers to implement algorithms and to solve a number of problems that can be stated in terms of matrix-related equations, and to understand the relevant matrix theory that underpins these algorithms.

Course Content

Direct Methods for Solving Linear Systems of Equations
Basic properties of matrices, Gaussian elimination, partial pivoting. LU-factorization. Tridiagonal systems.

Iterative Methods
A general iterative method and convergence, Jacobi method, Gauss-Seidel method, SOR (successive over-relaxation)

Iterative Methods for Solving Eigenvalue Problems
Review of eigenvalue problems, QR factorizations

Using MATLAB to solve problems in linear algebra
Introduction to MATLAB, Application of MATLAB to algorithms for LU factorization, iterative methods and QR factorizations.
Assessment

There will be three pieces of assessed MATLAB course-work which together count for 30%. The remaining 70% will come from the degree examination, which will be held in the May diet of Degree Examinations. Honours degree examinations will be two hours in length. The pass mark will be 40% overall.

If you score less than 40% overall, you will be able to sit an examination in the resit Degree Examination Diet. In this case 100% of the assessment mark is from this examination. The pass mark will be 40%. For the purposes of Honours Classification any pass achieved at the resit diet will be capped at 40%.

If you are unable to attend an element of assessment (such as a Class Test or a Degree Examination because of illness, you must supply a medical certificate covering the relevant period to your School Office. If illness prevents you from attending other meetings of the class, please keep your School Office informed of the reasons for your absence.

Feedback

At the end of each section of the module you will be asked to complete a confidential questionnaire regarding the content and presentation of the module. This is an important element in the University’s Academic Standards procedures.

Recommended Books


There are also many other useful books on linear algebra in the main library.