

MA21001: Mathematics 2A Guide 2011**Organisation**

The MA21001 module contains components of Calculus and Algebra which run concurrently for 11 teaching weeks. All organisation and teaching will be carried out by

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The Module Leader is Dr Wilmot-Smith. You may bring matters of concern about the course to the attention of the Mathematics Division Staff/Student Committee, which meets once each semester. A volunteer from MA21001 and MA22001 will act as class representative to sit on the Staff-Student Committee; their name will be posted on BlackBoard.

The weekly timetable for the module consists of six 55 minute classes, typically 4 lectures and 2 workshops.

Assessment

The overall assessment will be based on your marks for the coursework problems ('Homeworks'), class tests and a two hour degree examination. There will be three assessed Homeworks and one class test for each component of the course. The assessment weightings are shown in the table below:

Homeworks	20%
Mid-semester Tests (Weeks 6 & 7)	20%
Degree Examination	60%

Marks for any Homework not handed in by the deadline given will be deducted at the rate of 10% (per full or part day). Homework deadlines will be posted on MyDundee when the problem sheets are released.

To pass this module in December it is necessary to gain at least 40% in the overall assessment **and** obtain an average of at least 30% in the Homeworks **and** obtain an average of at least 30% in the Mid-semester Tests.

For those who fail the module in December there will be a two-hour resit examination paper at the August Examination diet. To pass this module in August it is necessary to gain at least 40% in the August Examination.

The Head of Division may debar a student not performing at a satisfactory level in the continuous assessments from entering the Degree Examination in December.

A medal may be awarded to the best student in the class.

Syllabus

This module contains the first half of the basic algebra and calculus required for intending honours students. The module may also be taken by science and arts students not intending to proceed to an honours mathematics degree. This module involves approximately 170 hours of student effort, including 66 contact hours

Calculus component

Differential Equations (3)

Revision of linear differential equations of second order with constant coefficients using undetermined coefficients.

General solutions and solutions satisfying initial conditions.

Resonance. Equations of higher order.

Functions of One Variable (10)

Hyperbolic Functions: Solution of simple equations, inverse functions.

Revision of standard methods of definite integration, including hyperbolic substitutions.

Applications of integration to arc length, volumes and curved surface area of solids of revolution, centres of mass, moments of inertia.

Taylor Series (9)

Limits, Continuity and Differentiability.

Rolle's Theorem, Mean Value Theorem.

L'Hôpital's Rule and Indeterminate Forms.

Infinite and improper integrals. Taylor & Maclaurin series.

Algebra component

Vectors and vector spaces (6)

Definition of a vector space, \mathbb{R}^n .

Vectors, lines and planes in \mathbb{R}^n .

Span, linear independence.

Basis and dimension.

Subspaces.

Inner product (5)

Scalar product, length.

Projection.

Normal form of hyperplanes in \mathbb{R}^n .

Orthogonality.

Linear equations and matrices (11)

Systems of linear equations.

Gaussian elimination.

Matrices and matrix operations, transposes and inverses.

Matrix equations.

LU factorisation.

Determinants.

Your Commitment

You should attend all lectures and workshops except on medical grounds or with the special permission of the lecturer concerned. If you are unable to attend the degree examination or complete elements of the coursework on time (e.g. hand in homework solutions) then you should inform the Module Leader and submit a medical certificate. Medical certificates should be submitted to your School Office (for students advised by Mathematics this is the Office for the School of Engineering, Physics and Mathematics and is in the Fulton Building).

Study Support

If you are having difficulty with the course you are encouraged to seek help at an early stage by making an appointment to see one of the lecturers. You may also obtain additional help from the Maths Base (see BlackBoard for details) or your Personal Tutor.

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

The main texts for this module are:

WIE Calculus Early Transcendentals (Brief), 8th Edition
by Howard A. Anton, Irl Bivens, Stephen Davis
Publisher: John Wiley & Sons, New York.

Linear Algebra by David Poole
(Brooks/Cole, ISBN 0-53434174-8).

Many similar textbooks may be found in the University Library.

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