

MA124-6 Mathematics by Computer

21/22

Department

Warwick Mathematics Institute

Level

Undergraduate Level 1

Module leader

Dwight Barkley

Credit value

6

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

The module provides an overview of using the computer as a tool to provide intuition, guide and test hypotheses, enhance understanding and make predictions on mathematical questions. It particularly aims at learning to use computer-based mathematics through contact sessions in the computer room, where the students can explore mathematical questions in a computer-aided way.

[Module web page](#)

Module aims

The first aim is to show how the computer may be used, throughout all of mathematics, to enhance understanding, make predictions, test hypotheses. This will be achieved primarily through eight hours of computer-based contact sessions.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

After a brief introduction into technicalities in representing mathematics on a computer, the module will each week explore a different theme taken from other year one mathematics core modules,

such as Analysis, Probability Theory, Differential Equations, Linear Algebra, or Foundations, and use the computer to build intuition around aspects of these themes, and explore mathematical questions.

Learning outcomes

By the end of the module, students should be able to:

- You will learn how to graph functions, study vectors and matrices graphically and numerically,
- How to iterate and use iteration to study sequences and series,
- How to solve algebraic and differential equations numerically and how to study statistical properties of sets of numbers.

Indicative reading list

DJ & NJ Higham, MATLAB guide, SIAM Publications, Philadelphia, September 2000.

Subject specific skills

At the end of the module, students will be able to

- use the Matlab software package to create simple programs and perform interactive analysis
- understand rudimentary computer programming control structures
- graph functions using the computer
- study matrices graphically and numerically
- employ iteration and recursion to study sequences and series
- solve algebraic and differential equations numerically
- use computer generated random numbers

Transferable skills

The module will teach students basic computer skills and their relationship with mathematics. It will encourage them to use the computer as an exploratory tool research and equip them with foundational programming knowledge.

Study

Study time

Type	Required
Lectures	10 sessions of 1 hour (17%)
Other activity	10 hours (17%)
Private study	40 hours (67%)
Total	60 hours

Private study description

Review lectured material and work on set exercises.

Other activity description

Help Class

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time
Assignments	100%	
Five assignments		

Assessment group R

	Weighting	Study time
Module is not suitable for reassessment	100%	

Feedback on assessment

Marked assignments.

Availability

Courses

This module is Core for:

- UMAA-G100 Undergraduate Mathematics (BSc)
 - Year 1 of G100 Mathematics
 - Year 1 of G100 Mathematics
 - Year 1 of G100 Mathematics

- UMAA-G103 Undergraduate Mathematics (MMath)
 - Year 1 of G100 Mathematics
 - Year 1 of G103 Mathematics (MMath)
 - Year 1 of G103 Mathematics (MMath)
- Year 1 of UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
- Year 1 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 1 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)
- Year 1 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 1 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- Year 1 of UMAA-G101 Undergraduate Mathematics with Intercalated Year

This module is Option list A for:

- UCSA-G4G1 Undergraduate Discrete Mathematics
 - Year 1 of G4G1 Discrete Mathematics
 - Year 1 of G4G1 Discrete Mathematics
- Year 1 of UCSA-G4G3 Undergraduate Discrete Mathematics
- UMAA-GV17 Undergraduate Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy

This module is Option list B for:

- UMAA-GV17 Undergraduate Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy