

MA3E7-15 Problem Solving

22/23

Department

Warwick Mathematics Institute

Level

Undergraduate Level 3

Module leader

Siri Chongchitnan

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module gives you the opportunity to engage in mathematical problem solving and to develop problem solving skills through reflecting on a set of heuristics. You will work both individually and in groups on mathematical problems, drawing out the strategies you use and comparing them with other approaches.

[Module web page](#)

Module aims

This module will enable students to develop their problem-solving skills; use explicit strategies for beginning, working on and reflecting on mathematical problems; draw together mathematical and reasoning techniques to explore open-ended problems; use and develop schema of heuristics for problem solving. This module should provide students with the confidence to tackle unfamiliar problems, think through solutions and present rigorous and convincing arguments for their conjectures. While only a modest level of mathematical background is needed, the skills developed will have wide-ranging applicability. This module will also be of particular interest to students who are looking into teaching as a career.

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.

Getting Started

Phases of Work

Responses to being Stuck

Attack: Conjecturing

Attack: Justifying and Convincing

Still Stuck

Developing and Internal Monitor

Developing Mathematical Thinking

Learning outcomes

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

- Use an explicit problem solving scheme to control their approach to mathematical problems.
- Explain the role played by different phases of problem solving.
- Critically evaluate their own problem solving practice.

Indicative reading list

The module is based on Thinking Mathematically (second edition), by John Mason, Leone Burton and Kaye Stacey

Subject specific skills

See learning outcomes

Transferable skills

Students will acquire key reasoning and problem solving skills from working individually and in small groups, which will empower them to address new problems with confidence.

Study

Study time

Type	Required
Lectures	10 sessions of 2 hours (13%)
Seminars	9 sessions of 1 hour (6%)
Private study	121 hours (81%)
Total	150 hours

Private study description

121 hours private study, working on assignments, revision for exam, reviewing lectured material and assessed problem solving.

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 C1

	Weighting	Study time
Weekly problem solving seminars	10%	
Assignment	40%	
Take-home assignment		
In-person Examination	50%	
<ul style="list-style-type: none">• Answerbook Pink (12 page)		

Assessment group R

	Weighting	Study time
In-person Examination - Resit	100%	
<ul style="list-style-type: none">• Answerbook Pink (12 page)		

Feedback on assessment

Written feedback on weekly problems with further verbal feedback during lectures, more extensive online feedback on assignment.

[Past exam papers for MA3E7](#)

Availability

Courses

This module is Optional for:

- Year 1 of TMAA-G1PE Master of Advanced Study in Mathematical Sciences
- UCSA-G4G1 Undergraduate Discrete Mathematics
 - Year 3 of G4G1 Discrete Mathematics
 - Year 3 of G4G1 Discrete Mathematics
- Year 3 of UCSA-G4G3 Undergraduate Discrete Mathematics
- Year 4 of UCSA-G4G4 Undergraduate Discrete Mathematics (with Intercalated Year)
- Year 4 of UCSA-G4G2 Undergraduate Discrete Mathematics with Intercalated Year
- Year 3 of UMAA-GL11 Undergraduate Mathematics and Economics

This module is Core option list B for:

- UMAA-GV17 Undergraduate Mathematics and Philosophy
 - Year 3 of GV17 Mathematics and Philosophy
 - Year 3 of GV17 Mathematics and Philosophy
 - Year 3 of GV17 Mathematics and Philosophy
- Year 3 of UMAA-GV19 Undergraduate Mathematics and Philosophy with Specialism in Logic and Foundations

This module is Core option list D for:

- UMAA-GV18 Undergraduate Mathematics and Philosophy with Intercalated Year
 - Year 4 of GV18 Mathematics and Philosophy with Intercalated Year
 - Year 4 of GV18 Mathematics and Philosophy with Intercalated Year
- Year 4 of UMAA-GV19 Undergraduate Mathematics and Philosophy with Specialism in Logic and Foundations

This module is Option list A for:

- Year 1 of TMAA-G1PD Postgraduate Taught Interdisciplinary Mathematics (Diploma plus MSc)
- Year 1 of TMAA-G1P0 Postgraduate Taught Mathematics
- Year 1 of TMAA-G1PC Postgraduate Taught Mathematics (Diploma plus MSc)
- UMAA-G100 Undergraduate Mathematics (BSc)
 - Year 3 of G100 Mathematics
 - Year 3 of G100 Mathematics
 - Year 3 of G100 Mathematics
- Year 3 of UMAA-G103 Undergraduate Mathematics (MMath)
- Year 4 of UMAA-G101 Undergraduate Mathematics with Intercalated Year

This module is Option list B for:

- UMAA-G105 Undergraduate Master of Mathematics (with Intercalated Year)
 - Year 4 of G105 Mathematics (MMath) with Intercalated Year
 - Year 5 of G105 Mathematics (MMath) with Intercalated Year

- UMAA-G103 Undergraduate Mathematics (MMath)
 - Year 3 of G103 Mathematics (MMath)
 - Year 3 of G103 Mathematics (MMath)
 - Year 4 of G103 Mathematics (MMath)
 - Year 4 of G103 Mathematics (MMath)
- UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
 - Year 3 of G106 Mathematics (MMath) with Study in Europe
 - Year 4 of G106 Mathematics (MMath) with Study in Europe

This module is Option list E for:

- Year 4 of USTA-G301 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics (with Intercolated