

# MA140-10 Mathematical Analysis 1

**24/25**

**Department**

Warwick Mathematics Institute

**Level**

Undergraduate Level 1

**Module leader**

Joel Moreira

**Credit value**

10

**Module duration**

10 weeks

**Assessment**

Multiple

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

Mathematical Analysis is the heart of modern Mathematics. This module is the first in a series of modules where the subject of Analysis is rigorously developed.

### Module aims

The principal aim is to develop Analysis in dimension 1, with much greater precision and rigour than the students had at school. While the high-school Analysis is focusing on problem solving methods, the university-level Analysis is switching the focus to the mathematical concepts and clarity of thought.

### 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.

- Inequalities
- Real numbers
- Sequences of numbers
- Limits
- Series

- Continuity
- Uniform continuity

## Learning outcomes

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

- develop deep understanding of the real numbers and the symbol 'infinity'
- develop working knowledge of sequences and series, including limits, conditional and absolute convergence
- learn the properties of continuous and absolutely continuous functions

## Indicative reading list

M. Hart, Guide to Analysis, Macmillan.

M. Spivak, Calculus, Benjamin. R.G Bartle and D.R Sherbert, Introduction to Real Analysis (4th Edition), Wiley (2011)

L. Alcock, How to think about Analysis, Oxford University Press (2014)

[View reading list on Talis Aspire](#)

## Subject specific skills

Analysis gives first-year undergraduates a first excursion in to pure mathematics. The students will gain a new perspective and a deeper understanding of familiar mathematics which they have seen in school (e.g. real numbers, functions and differentiation). In Analysis, these concepts are developed with mathematical rigour, which characterises much of university mathematics to follow.

## Transferable skills

Students will acquire key reasoning and problem solving skills, empower them to address new problems with confidence.

## Study

### Study time

| Type                          | Required                    |
|-------------------------------|-----------------------------|
| Lectures                      | 20 sessions of 1 hour (48%) |
| Online learning (independent) | 9 sessions of 1 hour (21%)  |
| Private study                 | 13 hours (31%)              |
| Total                         | 42 hours                    |

### Private study description

Working on assignments, going over lecture notes, text books, exam revision.

## Costs

No further costs have been identified for this module.

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## Assessment

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

### Assessment group D

|                       | <b>Weighting</b> | <b>Study time</b> |
|-----------------------|------------------|-------------------|
| Assignments           | 15%              | 20 hours          |
| In-person Examination | 85%              | 38 hours          |

- Answerbook Pink (12 page)

### Assessment group R

|                               | <b>Weighting</b> | <b>Study time</b> |
|-------------------------------|------------------|-------------------|
| In-person Examination - Resit | 100%             |                   |

- Answerbook Pink (12 page)

## Feedback on assessment

Marked homework (both assessed and formative) is returned and discussed in smaller classes. Exam feedback is given.

[Past exam papers for MA140](#)

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## Availability

## Courses

This module is Core 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
- UPXA-GF13 Undergraduate Mathematics and Physics (BSc)
  - Year 1 of GF13 Mathematics and Physics
  - Year 1 of GF13 Mathematics and Physics
- UPXA-FG31 Undergraduate Mathematics and Physics (MMathPhys)
  - Year 1 of FG31 Mathematics and Physics (MMathPhys)
  - Year 1 of FG31 Mathematics and Physics (MMathPhys)
- Year 1 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
  - Year 1 of GG14 Mathematics and Statistics
  - Year 1 of GG14 Mathematics and Statistics