MA152-15 Mathematical Analysis 2

24/25

Department
Warwick Mathematics Institute
Level
Undergraduate Level 1
Module leader
Daniel Ueltschi
Credit value
15
Module duration
10 weeks
Assessment
Multiple
Study location
University of Warwick main campus, Coventry

Description

Introductory description

Mathematical Analysis is the heart of modern Mathematics. This module is the second 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.

- Differentiability
- Higher order derivatives
- Taylor's Theorem
- Taylor's Series

- Riemann Integration
- Fundamental Theorem of Calculus
- Improper integrals

Learning outcomes

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

- learn differentiability, including higher derivatives and properties of differentiable functions
- develop the working knowledge of Taylor's series and theorem, ultimately understanding representability of a function by a power series
- develop a good working knowledge of the construction of the Riemann integral
- understand and apply the fundamental properties of the integral such as integrability of continuous functions on bounded intervals or the Fundamental Theorem of Calculus

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	30 sessions of 1 hour (77%)
Total	39 hours

Type	Required
Online learning (independent)	9 sessions of 1 hour (23%)
Total	39 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.

Assessment

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

Students can register for this module without taking any assessment.

Assessment group D

	Weighting	Study time	Eligible for self-certification
Assignments	15%	20 hours	No
In-person Examination	85%	39 hours	No

- Answerbook Gold (24 page)

Assessment group R

	Weighting	Study time	Eligible for self-certification
In-person Examination - Resit	100%		No

- Answerbook Gold (24 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 MA152

Availability

Courses

This module is Core for:

- Year 1 of UMAA-GV17 Undergraduate Mathematics and Philosophy
- Year 1 of UPXA-GF13 Undergraduate Mathematics and Physics (BSc)
- UPXA-FG31 Undergraduate Mathematics and Physics (MMathPhys)
    - Year 1 of GF13 Mathematics and Physics
    - Year 1 of FG31 Mathematics and Physics (MMathPhys)
- Year 1 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- Year 1 of USTA-GG14 Undergraduate Mathematics and Statistics (BSc)