



# MATH288

## Advanced Topics in Mathematics II

S1 Day 2018

*Dept of Mathematics*

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#### Disclaimer

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## General Information

Unit convenor and teaching staff

Unit convenor

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Adam Sikora

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Credit points

3

Prerequisites

(MATH133 or MATH136(HD)) and permission by special approval

Corequisites

Co-badged status

Unit description

This unit is designed for students enrolled in the Bachelor of Advanced Science in Mathematics, and for strong Mathematics majors seeking to widen their mathematical background. Topics are chosen from accessible areas of current research to excite and challenge talented students.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

Demonstrate a well-developed knowledge of the principles, concepts and techniques of

the topics covered.

Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.

Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.

Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## General Assessment Information

This unit is taught concurrently with MATH388. As a result, some material is at a more advanced level than would normally be appropriate for a 200-level unit. MATH288 students are nonetheless encouraged to attempt all parts of the unit; they will be assessed taking their level into account.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Assignment 1</u></a>	25%	No	As advised in lectures
<a href="#"><u>Assignment 2</u></a>	25%	No	As advised in lectures
<a href="#"><u>Assignment 3</u></a>	25%	No	As advised in lectures
<a href="#"><u>Assignment 4</u></a>	25%	No	As advised in lectures

### Assignment 1

Due: **As advised in lectures**

Weighting: **25%**

Assignment

On successful completion you will be able to:

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## Assignment 2

Due: **As advised in lectures**

Weighting: **25%**

Assignment

On successful completion you will be able to:

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## Assignment 3

Due: **As advised in lectures**

Weighting: **25%**

Assignment

On successful completion you will be able to:

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## Assignment 4

Due: **As advised in lectures**

Weighting: **25%**

Assessment

On successful completion you will be able to:

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## Delivery and Resources

### Classes

**Lectures:** you should attend each two-hour block in each lecture stream each week, making a total of four hours.

<a href="#">MATH288/S1/Day/Lecture_1/01</a>	Wednesday	2:00pm	4:00pm	2:00			Adam Sikora
<a href="#">MATH288/S1/Day/Lecture_2/01</a>	Thursday	9:00am	11:00am	2:00			Rod Yager

## Technology Used and Required

Students are expected to have access to an internet enabled computer with a web browser and Adobe Reader software. Accounts are available for all students in the Mathematics/Physics computing laboratory (E7B 209). Computers for student use are available also in the Library and MUSE

**Difficulties with your home computer or internet connection do not constitute a reasonable excuse for lateness of, or failure to submit, assessment tasks.**

## Unit Schedule

Adam Sikora - Introduction to measure theory.

Rod Yager - Number theory

## Learning and Teaching Activities

### Lectures

There will be two two hours lectures per week

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au).

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](https://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)

- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.

### Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

### Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve



practical and abstract problems across a range of areas in the topics covered.

## **Assessment tasks**

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## **Discipline Specific Knowledge and Skills**

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## **Assessment tasks**

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## **Critical, Analytical and Integrative Thinking**

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## **Assessment tasks**

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## **Problem Solving and Research Capability**

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## **Assessment tasks**

- Assignment 1
- Assignment 2

- Assignment 3
- Assignment 4

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.
- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

### Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate a well-developed knowledge of the principles, concepts and techniques of the topics covered.

- Construct sustained logical, clearly presented and justified mathematical arguments incorporating deductive reasoning, in the areas of the topics covered.
- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.

## Assessment task

- Assignment 4

## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

## Learning outcomes

- Apply mathematical principles, concepts, techniques and technology efficiently to solve practical and abstract problems across a range of areas in the topics covered.
- Demonstrate appropriate interpretation of information communicated in mathematical form in the context of the unit material.

## Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

## Changes since First Published

Date	Description
26/02/2018	The office number was adjusted.