



MATH2210

Pure Mathematics II

Session 2, Special circumstance 2020

Department of Mathematics and Statistics

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Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff

Convenor, Lecturer

Steve Lack

steve.lack@mq.edu.au

Contact via email

12 Wally's Walk 730

Please refer to iLearn

Lecturer

Xuan Duong

xuan.duong@mq.edu.au

Contact via email

12 Wally's Walk 729

Please refer to iLearn

Credit points

10

Prerequisites

MATH2010 or MATH235

Corequisites

Co-badged status

Unit description

This unit will introduce students to the abstract approach to mathematics, which offers great benefits in terms of simplicity, rigour, and generality. The key components of this are the careful definition of the objects of interest, the development of intuition allowing consequences of these definitions to be found, and the rigorous proof of these consequences. As such, it represents an important stepping stone towards many later mathematics units, as well as being valuable in its own right. This introduction will be taught in the context of different areas of mathematics, including: analysis, which concerns limits and convergence in many contexts; algebra, which concerns the nature and properties of mathematical operations; and discrete mathematics, which involves topics such as logic and counting.

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:

ULO1: Demonstrate an understanding of the abstract approach to mathematics, including its benefits with regards to simplicity, rigour, and generality.

ULO2: Construct formal proofs of simple statements in the subject areas of the unit.

ULO3: Formulate problems in mathematical terms using a variety of methods from analysis, algebra, and discrete mathematics.

ULO4: Demonstrate an understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences.

ULO5: Appropriately interpret information communicated in mathematical form.

ULO6: Appropriately present information, reasoning and conclusions in a variety of modes to diverse audiences (expert and non-expert).

ULO7: Demonstrate an understanding of ethical issues relating to professional mathematical work, identify and address ethical issues arising in such professional work and make ethical decisions while collecting and analysing data and reporting findings.

ULO8: Work effectively, responsibly and safely in an individual or team context.

General Assessment Information

HURDLES: Collaboration in the SGTAs is a hurdle requirement. You must attend and participate in at least 10 of the 12 SGTAs. (Of course you should actually do so for all of them.)

ONLINE SUBMISSION: Submission of assignments and the report will be online through the appropriate link on the MATH2210 iLearn page.

A personalized cover sheet is not required with online submissions. Read the submission statement carefully before accepting it as there are substantial penalties for making a false declaration.

You should upload your work as a single scanned PDF file.

Please make sure that each page in your uploaded assignment or report corresponds to only one A4 page (do not upload an A3 page worth of content as an A4 page in landscape). If you are using an app like Clear Scanner, please make sure that the photos you are using are clear and shadow-free.

It is your responsibility to make sure your assignment submission is legible.

If there are technical obstructions to your submitting online, please email us to let us know.

You may submit as often as required prior to the due date/time. Please note that each submission will completely replace any previous submissions. It is in your interests to make

frequent submissions of your partially completed work as insurance against technical or other problems near the submission deadline.

It is recommended that students use the following computer software to prepare the report:

- **LaTeX:** LaTeX is a free mathematical typesetting program. Access and installation instructions may be found at: <https://www.latex-project.org/get/>
 - Students may also use the free online LaTeX compiler, Overleaf, which is found at: <https://www.overleaf.com>

LATE SUBMISSION OF WORK: All assignments or assessments must be submitted by the official due date and time. The penalty for late submissions will be 20% per day unless an extension has been granted following a successful application for [Special Consideration](#). Please contact the unit convenor for advice as soon as you become aware that you may have difficulty meeting any of the assignment deadlines.

FINAL EXAM POLICY: All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period. The only excuse for not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these special circumstances, you may apply for special consideration via ask.mq.edu.au.

SUPPLEMENTARY EXAMINATIONS:

IMPORTANT: If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. If you apply for special consideration, you must give the supplementary examination priority over any other pre-existing commitments, as such commitments will not usually be considered an acceptable basis for a second application for special consideration. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in iLearn (<https://bit.ly/FSESupp>) for dates, and approved applicants will receive an individual notification sometime in the week prior to the exam with the exact date and time of their supplementary examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	20%	No	Week 6
Assignment 2	20%	No	Week 12
Report	20%	No	Week 13
Final Exam	40%	No	Final exam period
Collaboration in SGTAs	0%	Yes	All weeks

Assignment 1

Assessment Type ¹: Problem set

Indicative Time on Task ²: 5 hours

Due: **Week 6**

Weighting: **20%**

Set of questions with short answers involving proofs, calculations, and written responses.

On successful completion you will be able to:

- Demonstrate an understanding of the abstract approach to mathematics, including its benefits with regards to simplicity, rigour, and generality.
- Construct formal proofs of simple statements in the subject areas of the unit.
- Formulate problems in mathematical terms using a variety of methods from analysis, algebra, and discrete mathematics.
- Demonstrate an understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences.
- Appropriately interpret information communicated in mathematical form.
- Appropriately present information, reasoning and conclusions in a variety of modes to diverse audiences (expert and non-expert).

Assignment 2

Assessment Type ¹: Problem set

Indicative Time on Task ²: 5 hours

Due: **Week 12**

Weighting: **20%**

Set of questions with short answers involving proofs, calculations, and written responses.

On successful completion you will be able to:

- Demonstrate an understanding of the abstract approach to mathematics, including its benefits with regards to simplicity, rigour, and generality.
- Construct formal proofs of simple statements in the subject areas of the unit.
- Formulate problems in mathematical terms using a variety of methods from analysis, algebra, and discrete mathematics.

- Demonstrate an understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences.
- Appropriately interpret information communicated in mathematical form.
- Appropriately present information, reasoning and conclusions in a variety of modes to diverse audiences (expert and non-expert).

Report

Assessment Type ¹: Report

Indicative Time on Task ²: 10 hours

Due: **Week 13**

Weighting: **20%**

Report building on one of the topics covered in lectures.

On successful completion you will be able to:

- Demonstrate an understanding of the abstract approach to mathematics, including its benefits with regards to simplicity, rigour, and generality.
- Construct formal proofs of simple statements in the subject areas of the unit.
- Formulate problems in mathematical terms using a variety of methods from analysis, algebra, and discrete mathematics.
- Demonstrate an understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences.
- Appropriately interpret information communicated in mathematical form.
- Appropriately present information, reasoning and conclusions in a variety of modes to diverse audiences (expert and non-expert).

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 13 hours

Due: **Final exam period**

Weighting: **40%**

This will be a summative examination conducted during the final examination period.

On successful completion you will be able to:

- Demonstrate an understanding of the abstract approach to mathematics, including its benefits with regards to simplicity, rigour, and generality.
- Construct formal proofs of simple statements in the subject areas of the unit.
- Formulate problems in mathematical terms using a variety of methods from analysis, algebra, and discrete mathematics.
- Demonstrate an understanding of the breadth of the discipline, its role in other fields, and the way other fields contribute to the development of the mathematical sciences.
- Appropriately interpret information communicated in mathematical form.

Collaboration in SGTAs

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **All weeks**

Weighting: **0%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Students will be required to work in the SGTAs in a collaborative, professional, and ethical manner.

On successful completion you will be able to:

- Appropriately present information, reasoning and conclusions in a variety of modes to diverse audiences (expert and non-expert).
- Demonstrate an understanding of ethical issues relating to professional mathematical work, identify and address ethical issues arising in such professional work and make ethical decisions while collecting and analysing data and reporting findings.
- Work effectively, responsibly and safely in an individual or team context.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

There will be 3 hours of lectures each week, and 1 hour SGTA, starting from week 2.

There is no official textbook for this unit. Detailed notes will be provided, supplemented by links to online material where appropriate.

Unit Schedule

The following timetable is indicative only, and may be modified during the semester if necessary.

Week 1: Sets and Counting
Week 2: Relations
Week 3: Natural numbers
Week 4: Real numbers
Week 5: Complex numbers
Week 6: Algebra
Week 7: Continuity
Week 8: Compactness
Week 9: Banach spaces
Week 10: Differentiability
Week 11: Contraction mappings
Week 12: Inverse and implicit function theorems
Week 13: Revision

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.*)

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](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://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 published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@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) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

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

If you are a Global MBA student contact globalmba.support@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/.

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.