



MATH1007

Discrete Mathematics I

Session 2, Special circumstance 2020

Department of Mathematics and Statistics

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Disclaimer

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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

Richard Garner

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Christopher Gordon

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Credit points

10

Prerequisites

Corequisites

Co-badged status

Unit description

This unit provides a background in the area of discrete mathematics to provide an adequate foundation for further study in computer science. It is also of great interest to students wishing to pursue further study in mathematics. In this unit, students study propositional and predicate logic; methods of proof; fundamental structures in discrete mathematics such as sets, functions, relations and equivalence relations; Boolean algebra and digital logic; elementary number theory; graphs and trees; and elementary counting techniques.

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 knowledge of the basic concepts of discrete mathematics, including logic, sets, functions relations, proofs, counting arguments, elementary number theory, matrices, and graph theory.

ULO2: Construct logical, clearly presented and justified mathematical arguments in the context of discrete mathematics.

ULO3: Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.

ULO4: Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.

ULO5: Understand ethical application of mathematical approaches to solving problems and appropriately reference and acknowledge sources in a mathematical context.

ULO6: Communicate to a general audience the relevance of mathematics to computer science.

ULO7: Demonstrate foundational learning skills including active engagement in your learning process.

General Assessment Information

HURDLES: Lecture activities and SGTAs are hurdle assessments, which will be evaluated by the successful completion of a simple task during one of the online lectures each week and during your SGTA class (either online or on campus). To meet the lecture activity hurdle you must complete 8 of the 13 lecture tasks and to meet the SGTA hurdle you must complete 8 of the 12 SGTA tasks. The midterm test in week 5 is also a hurdle assessment, which you must pass (a mark of 50% or better) to meet the hurdle requirement.

ASSIGNMENT SUBMISSION: Assignment submission will be online through the appropriate link on the MATH1007 iLearn page.

A personalised 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 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.

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
Lecture Activity (weekly)	0%	Yes	Weekly from week 1 onwards
Participation in SGTA classes (online)	0%	Yes	Weekly from week 2 onwards
Midterm Test	20%	Yes	Week 5
Assignment 1	20%	No	Week 7
Assignment 2	20%	No	Week 12
Final exam	40%	No	Formal examination period

Lecture Activity (weekly)

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **Weekly from week 1 onwards**

Weighting: **0%**

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

Students are expected to demonstrate their ability to engage with the unit by participating in lecture activities.

On successful completion you will be able to:

- Demonstrate knowledge of the basic concepts of discrete mathematics, including logic, sets, functions relations, proofs, counting arguments, elementary number theory, matrices, and graph theory.
- Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.
- Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.

Participation in SGTA classes (online)

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **Weekly from week 2 onwards**

Weighting: **0%**

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

Answering questions based on the previous week's lecture material

On successful completion you will be able to:

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- Construct logical, clearly presented and justified mathematical arguments in the context of discrete mathematics.
- Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.
- Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.
- Demonstrate foundational learning skills including active engagement in your learning process.

Midterm Test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **Week 5**

Weighting: **20%**

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

Set of questions with short answers required (using words, numerical analysis, graphs and formulas).

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- Construct logical, clearly presented and justified mathematical arguments in the context of discrete mathematics.
- Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.
- Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.
- Demonstrate foundational learning skills including active engagement in your learning process.

Assignment 1

Assessment Type ¹: Problem set

Indicative Time on Task ²: 6 hours

Due: **Week 7**

Weighting: **20%**

Problems are chosen to explore concepts and techniques learned in the unit. Students will solve the problems using logical mathematical arguments and submit clearly written solutions

On successful completion you will be able to:

- Demonstrate knowledge of the basic concepts of discrete mathematics, including logic, sets, functions relations, proofs, counting arguments, elementary number theory, matrices, and graph theory.
- Construct logical, clearly presented and justified mathematical arguments in the context of discrete mathematics.

- Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.
- Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.
- Understand ethical application of mathematical approaches to solving problems and appropriately reference and acknowledge sources in a mathematical context.
- Communicate to a general audience the relevance of mathematics to computer science.
- Demonstrate foundational learning skills including active engagement in your learning process.

Assignment 2

Assessment Type ¹: Problem set

Indicative Time on Task ²: 6 hours

Due: **Week 12**

Weighting: **20%**

Problems are chosen to explore concepts and techniques learned in the unit. Students will solve the problems using logical mathematical arguments and submit clearly written solutions

On successful completion you will be able to:

- Demonstrate knowledge of the basic concepts of discrete mathematics, including logic, sets, functions relations, proofs, counting arguments, elementary number theory, matrices, and graph theory.
- Construct logical, clearly presented and justified mathematical arguments in the context of discrete mathematics.
- Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.
- Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.
- Understand ethical application of mathematical approaches to solving problems and appropriately reference and acknowledge sources in a mathematical context.
- Communicate to a general audience the relevance of mathematics to computer science.
- Demonstrate foundational learning skills including active engagement in your learning process.

Final exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 12 hours

Due: **Formal examination period**

Weighting: **40%**

This will be held during the final exam period. The students will be required to demonstrate understanding of the unit, implement mathematical techniques to solve problems, and communicate mathematical ideas in writing.

On successful completion you will be able to:

- Demonstrate knowledge of the basic concepts of discrete mathematics, including logic, sets, functions relations, proofs, counting arguments, elementary number theory, matrices, and graph theory.
- Construct logical, clearly presented and justified mathematical arguments in the context of discrete mathematics.
- Apply the principles, concepts, and techniques learned in this unit to solve practical and abstract problems.
- Demonstrate appropriate interpretation of information communicated in mathematical form and formulate ideas and language from discrete mathematics.
- Demonstrate foundational learning skills including active engagement in your learning process.

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

Classes

Lectures: lectures will be delivered online or, in a few cases, in the form of pre-recorded videos. You should attend all scheduled online lectures and you are strongly advised to watch any pre-

recorded videos in the week that they are released to you. If a specific online lecture in any week is to be replaced by a pre-recorded video then you will be notified of that fact on iLearn at the beginning of that week. In total you are expected to spend four (4) hours each week attending online lectures and/or reviewing lecture videos.

Small Group Teaching Activities (SGTA): you can attend an SGTA either on campus or, in some cases, online. In either mode you should attend one 1-hour SGTA each week, starting in Week 2.

Workshops: the Numeracy Centre runs regular workshops for students in this unit.

Required and Recommended Texts and/or Materials

The recommended text for MATH1007 is

- Kenneth H Rosen, Discrete Mathematics and Its Applications, McGraw-Hill, any edition.

Other useful resources and materials will be made available via the MATH1007 iLearn site.

Technology Used and Required

Students are expected to have access to an internet-enabled computer with a web browser and Adobe Reader software. Most areas of the university provide wireless access for portable devices. There are computers for student use in the Library.

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

WEEK	MODULE	TOPIC	ASSESSMENT DUE
	Logic	Propositional logic, truth tables, boolean algebra.	
	Logic	Laws of logic, predicate logic and negation, proofs.	
	Logic	Application: Logic gates, digital circuits and minimisation.	
	Graphs	Introduction to graph theory: undirected, directed and weighted graphs, degree of a vertex, equivalent graphs, complete and bipartite graphs.	
	Graphs	Walks, paths and cycles, trees and forests, Euler's formula.	Midterm test
	Graphs	Application: Organising data in graphs and trees, graph traversal.	
	Numbers	Properties of natural numbers, introduction to recursion and induction.	Assignment 1

WEEK	MODULE	TOPIC	ASSESSMENT DUE
	Numbers	Peano's axioms, addition and multiplication, Euclid's algorithm, induction proofs	
	Numbers	Application: Natural numbers in programming, binary, octal and hexadecimal numbers, implementing arithmetic in hardware.	
	Sets	Sets: Operations on sets, Cartesian products, powersets. Relations: symmetry, reflexivity, transitivity, equivalence.	
	Sets	Functions: injectivity, surjectivity, invertibility. Basic counting arguments.	
	Sets	Application: Counting arguments in practice.	Assignment 2
		Revision and discussion	
			Final exam

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 \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/p\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/p)

[olicy-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.

Changes from Previous Offering

Replaced two separate lecture streams with a single stream comprised of 4 modules: Logic, Graphs, Numbers and Sets.

Midterm test moved to an earlier point in the semester (week 5), to provide more effective early formative feedback.