



# MATH2907

## Discrete Mathematics II

Session 1, Special circumstances 2021

*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 activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face 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

Convener / Lecturer

Dominic Verity

[dominic.verity@mq.edu.au](mailto:dominic.verity@mq.edu.au)

Contact via By email

12WW 529

Please refer to iLearn

Convener / Lecturer

Steve Lack

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Christine Hale

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### Credit points

10

### Prerequisites

MATH1007 or MATH1020 or MATH1025 or DMTH137 or MATH133 or MATH136

### Corequisites

### Co-badged status

### Unit description

The purpose of this unit is to give a grounding in discrete mathematics. It is important preparation for theoretical computing, software engineering and abstract algebra. The unit explores topics in areas such as computability and computational complexity; formal languages and finite state machines; recurrence relations and generating functions; computational applications of graphs, trees and matrices; and formal methods in programming.

## Important Academic Dates

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

## Learning Outcomes

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

**ULO1:** Apply a broad range of standard mathematical techniques used in computer science.

**ULO2:** Use formal mathematical methods to design, model and validate solutions to computational problems.

**ULO3:** Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.

**ULO4:** Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

## General Assessment Information

**ASSESSMENT SUBMISSION:** Non-timed assessments, such as assignments, will be submitted online through the iLearn page.

Submit assessments online via the appropriate link on the 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.

- Assignment submission is via iLearn. You should upload this as a single scanned PDF file.
- Please note the quick guide on how to upload your assignments provided on the iLearn page.
- 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 assessment tasks must be submitted by the official due date and time. In the case of a late submission for a non-timed assessment (e.g. an assignment), if special consideration has NOT been granted, 20% of the earned mark will be deducted for each 24-hour period (or part thereof) that the submission is late for the first 2 days (including

weekends and/or public holidays). For example, if an assignment is submitted 25 hours late, its mark will attract a penalty equal to 40% of the earned mark. After 2 days (including weekends and public holidays) a mark of 0% will be awarded. Timed assessment tasks (e.g. tests, examinations) do not fall under these rules.

**FINAL EXAM POLICY:** It is Macquarie University policy not to set early examinations for individuals or groups of students. 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](http://ask.mq.edu.au).

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. By making a special consideration application for the final exam you are declaring yourself available for a resit during this supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Online quizzes</a>	10%	No	Weekly, starting in week 2
<a href="#">Assignment 1</a>	18%	No	Week 5
<a href="#">Assignment 2</a>	24%	No	Week 12
<a href="#">Module Examinations</a>	48%	No	Weeks 6, 10 and 13 and Final Exam Period

### Online quizzes

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Weekly, starting in week 2**

Weighting: **10%**

The quizzes are competency tests to ensure that all students who pass this unit possess certain basic skills.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
- Use formal mathematical methods to design, model and validate solutions to

computational problems.

- Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.
- Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

## Assignment 1

Assessment Type <sup>1</sup>: Problem set

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Week 5**

Weighting: **18%**

Solve a given set of questions and communicate your results in a clear and logical way in writing.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
- Use formal mathematical methods to design, model and validate solutions to computational problems.
- Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.
- Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

## Assignment 2

Assessment Type <sup>1</sup>: Project

Indicative Time on Task <sup>2</sup>: 15 hours

Due: **Week 12**

Weighting: **24%**

Solve a more involved project based problem, explain your solution and communicate your results in a clear and logical manner.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
- Use formal mathematical methods to design, model and validate solutions to

computational problems.

- Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.
- Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

## Module Examinations

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **Weeks 6, 10 and 13 and Final Exam Period**

Weighting: **48%**

The unit is structured as three modules. At the end of each module students complete a module exam which is offered during their SGTA class. They are offered a second opportunity to complete a different version of each module exam during the final exam period. If a student makes two attempts at an exam for a module, the final mark awarded is the maximum of the marks attained in each attempt.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
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<sup>1</sup> 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 [Learning Skills Unit](#) for academic skills support.

<sup>2</sup> 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:** Each week two (2) hours of lectures will be delivered live and online via zoom, and these will be supplemented by further pre-recorded lectures of around one (1) to two (2) hours duration each week. 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. In total you are expected to spend between three (3) and 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) 1-hour SGTA each week, starting in Week 2.

### Required and Recommended Texts and/or Materials

The recommended text for MATH2907 is

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

Other useful resources and materials will be made available via the MATH2907 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.

Furthermore, some assessments may require you to write solutions to problems in handwritten form and to scan them in for online upload. So you should have access to a device, such as a flatbed scanner or mobile phone, that will allow you to make electronic images of your work.

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 (INDICATIVE ONLY)	ASSESSMENT DUE
1 (22 February)	Languages and Automata	Formal Languages	
2 (1 March)		Finite State Machines	
3 (8 March)		Finite State Machines (Applications)	
4 (15 March)		Turing Machines	
5 (22 March)	Counting	Matrices and Linear Algebra	Assignment 1
6 (29 March)		Matrices and Linear Algebra	Module Exam 1

WEEK	MODULE	TOPIC (INDICATIVE ONLY)	ASSESSMENT DUE
Recess (5 April, 2 weeks)	-	-	-
7 (19 April)		Counting Arguments	
8 (26 April)		Recurrence Relations	
9 (3 May)		Generating Functions	
10 (10 May)	Graph Algorithms	Graphs, Trees and Data Structures	Module Exam 2
11 (17 May)		Graph Algorithms 1	
12 (24 May)		Graph Algorithms 2	Assignment 2
13 (31 May)	Recap	Discussion, Further Applications	Module Exam 3
Exam Period (7 June-)			Final Exam

**Please note:** this schedule may be subject to minor alteration as the semester progresses. You will be notified of any such changes via the Announcements Forum of the MATH2907 iLearn site.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). 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](#)

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

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/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](mailto:ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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](http://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 Enquiry Service

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

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Equity 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.

## 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.