



MATH2907

Discrete Mathematics II

Session 1, In person-scheduled-weekday, North Ryde 2023

School of Mathematical and Physical Sciences

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General Information

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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://www.mq.edu.au/study/calendar-of-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

Requirements to Pass this Unit To pass this unit you must:

- Achieve each hurdle task, and
- Achieve a total mark equal to or greater than 50%, and
- Participate in a minimum of 10 of the 12 weekly SGTA classes, and

Hurdle Assessments

- Participation in SGTA classes (weight 0%) Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of mathematical techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 of the 12 SGTAs. This is a hurdle assessment meaning that failure to meet this requirement may result in a fail grade for the unit. Students are permitted up to two absences: additional absences will require a Special Consideration to be applied for (see below).

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern. For any late submission of time sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration. Assessments where Late Submissions will be accepted, or not accepted:

- Assignment 1 – YES, Standard Late Penalty applies
- Assignment 2 – YES, Standard Late Penalty applies
- Module Test 1 - NO, unless Special Consideration is granted
- Module Test 2 - NO, unless Special Consideration is granted
- Module Test 3 - NO, unless Special Consideration is granted

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment.

Written Assessments/Quizzes/Tests: If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Participation in SGTA classes: To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 10 out of 12 of the weekly SGTA classes. If you miss a weekly SGTA class due to a serious, unavoidable and significant disruption, contact your convenor ASAP as you may be able to attend another class that week. If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time. Note that a Special Consideration should only be applied for if you miss more than two of the weekly SGTA classes.

Assessment Tasks

Name	Weighting	Hurdle	Due
Participation in SGTA classes	0%	Yes	Weekly
Assignment 1	18%	No	Week 5
Assignment 2	24%	No	Week 12
Online quizzes	10%	No	Weekly
Module Examinations	48%	No	Weeks 6, 10, 13 and Final Exam period

Participation in SGTA classes

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Weekly**

Weighting: **0%**

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

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of mathematical techniques. To pass this hurdle assessment, you must be able ability to

engage with the unit by actively participating progress in SGTA classes developing and communicating knowledge and skills in 10 out of 12 SGTAs.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
- Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

Assignment 1

Assessment Type ¹: Problem set

Indicative Time on Task ²: 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.
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- Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.
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Assignment 2

Assessment Type ¹: Project

Indicative Time on Task ²: 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.

Online quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **Weekly**

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.

Module Examinations

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **Weeks 6, 10, 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.
- 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.

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 (beginning in Week 1): There are two one-hour lectures each week. SGTA classes (beginning in Week 2): Students must register in and attend one two-hour class per week. This is a hurdle requirement. Missing more than two SGTA classes will result in failure of the unit.

Suggested textbooks The following textbooks are useful as supplementary resources, for additional questions and explanations. They are available from the Macquarie University library:

- 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	Assessment due
1 (20 Feb)	1	Graph algorithms	
2 (27 Feb)		Graph algorithms	Quiz
3 (6 Mar)		Linear algebra	Quiz
4 (13 Mar)		Linear algebra	Quiz
5 (20 Mar)	2	Languages and grammar	Assignment 1, Quiz
6 (27 Mar)		Languages and grammar	Module Exam 1, Quiz
7 (3 Apr)		Finite state machines	Quiz
Mid term break			
8 (24 Apr)		Finite state machines	Quiz
9 (1 May)	3	Finite state machines and Turing Machines	Quiz
10 (8 May)		Counting	Module Exam 2, Quiz
11 (15 May)		Recurrence relations	Quiz
12 (22 May)		Generating functions	Assignment 2, Quiz
13 (29 May)		Revision, catchup	Module Exam 3, Quiz

The timing of the specific topics is indicative only and may need to be adjusted. Any such adjustment will be advertised via iLearn.

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](#)
- [Assessment Procedure](#)
- [Complaints Resolution 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

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

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the 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

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

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

The SGTAs are a hurdle in session 1, 2023.