MATH2907

Discrete Mathematics II

Session 1, In person-scheduled-weekday, North Ryde 2022

School of Mathematical and Physical Sciences

Contents

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General Information

Unit convenor and teaching staff
Lecturer, Unit convenor
Steve Lack
steve.lack@mq.edu.au
Contact via email
730, 12 Wally's Walk
see iLearn

Lecturer
Christopher Gordon
chris.gordon@mq.edu.au
Contact via email
618, 12 Wally's Walk
see iLearn

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

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: Assignments must be submitted by 5:00 pm on their due date. Should these assessments be missed due to illness or misadventure, students should apply for Special Consideration. If no Special Consideration is granted, the following penalties apply:

A 12-hour grace period will be given after which the following deductions will be applied to the awarded assessment mark: 12 to 24 hours late = 10% deduction; for each day thereafter, an additional 10% per day or part thereof will be applied until five days beyond the due date. After this time, a mark of zero (0) will be given. For example, an assessment worth 20% is due 5 pm

on 1 January. Student A submits the assessment at 1 pm, 3 January. The assessment received a mark of 15/20. A 20% deduction is then applied to the mark of 15, resulting in the loss of three (3) marks. Student A is then awarded a final mark of 12/20.

This does not apply to quizzes or module exams, which must be done at the specified times, unless Special Consideration has been granted.

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.

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
Module Examinations	48%	No	Weeks 6, 10, 13, and Final Exam period
Assignment 2	24%	No	Week 12
Assignment 1	18%	No	Week 5
Online quizzes	10%	No	Weekly, starting in week 2

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.
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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.

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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.

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- 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, 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:

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[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

Offshore students

Offshore students must contact the unit convenor as soon as possible to discuss study options.

Classes

Lectures: Each week two (2) hours of live lectures will be delivered, and available via Echo360. These may sometimes be supplemented by further pre-recorded lectures.

Small Group Teaching Activities (SGTA): There will be a 2-hour SGTA each week, starting from 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	Assessment due
1 (21 Feb)	1	Graph algorithms	
2 (28 Feb)		Graph algorithms	Quiz
3 (7 Mar)		Linear algebra	Quiz
4 (14 Mar)		Linear algebra	Quiz
5 (21 Mar)	2	Languages and grammar	Assignment 1, Quiz
6 (28 Mar)		Languages and grammar	Module Exam 1, Quiz
7 (4 Apr)		Finite state machines	Quiz

Week	Module	Topic	Assessment due
Recess			
8 (25 Apr)		Finite state machines	Quiz
9 (2 May)	3	Finite state machines and Turing Machines	Quiz
10 (9 May)		Counting	Module Exam 2, Quiz
11 (16 May)		Recurrence relations	Quiz
12 (23 May)		Generating functions	Assignment 2, Quiz
13 (30 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). 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). 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) 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 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.