



COMP3010

Algorithm Theory and Design

Session 2, Special circumstances 2021

Department of Computing

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).

Visit the [MQ COVID-19 information page](#) for more detail.

General Information

Unit convenor and teaching staff

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Credit points

10

Prerequisites

130cp at 1000 level or above including (COMP2010 or COMP225) and (MATH2907 or DMTH237)

Corequisites

Co-badged status

Unit description

This unit covers general issues of the theory of computation and algorithm design, including computability and complexity. The general principles are illustrated by designing several very efficient algorithms with applications in telecommunication networks, cryptography and other important fields.

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: Solve concrete problems and provide adapted algorithmic solutions using advanced algorithmic knowledge.

ULO2: Design and implement algorithms to satisfy specified problem constraints.

ULO3: Communicate clearly and effectively the relevant aspects of algorithms and their performance.

ULO4: Work collaboratively in a small team to design and implement advanced algorithms.

General Assessment Information

Late Submission

No extensions will be granted without an approved application for Special Consideration. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. For example, 25 hours late in submission for an assignment worth 10 marks – 20% penalty or 2 marks deducted from the total. No submission will be accepted after the solutions have been posted.

Supplementary Exam

If you receive [Special Consideration](#) for the final exam, a supplementary exam will be scheduled after the normal exam period, following the release of marks. By making a special consideration application for the final exam you are declaring yourself available for a resit during the 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. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Final Examination	35%	No	Examination period.
Weekly exercises	10%	No	Weeks 1--12
Assignments	40%	No	Week 6 and Week 12
In-term tests	15%	No	Week 10

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 15 hours

Due: **Examination period.**

Weighting: **35%**

The final examination will be a written (closed book) examination held during the usual University examination period and will cover all topics.

On successful completion you will be able to:

- Solve concrete problems and provide adapted algorithmic solutions using advanced

algorithmic knowledge.

- Communicate clearly and effectively the relevant aspects of algorithms and their performance.

Weekly exercises

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 10 hours

Due: **Weeks 1--12**

Weighting: **10%**

A set of exercises will be made available online every week to be discussed during the workshop, starting from Week 1. You will be expected to attempt and submit a selection of questions for your homework each week.

For each submission, a mark of out of 1 will be given, and your total mark for this assessment will be the total sum of your submission marks to a maximum of 10 (there may be more than 10 submissions throughout the semester).

On successful completion you will be able to:

- Solve concrete problems and provide adapted algorithmic solutions using advanced algorithmic knowledge.
- Design and implement algorithms to satisfy specified problem constraints.
- Work collaboratively in a small team to design and implement advanced algorithms.

Assignments

Assessment Type ¹: Project

Indicative Time on Task ²: 32 hours

Due: **Week 6 and Week 12**

Weighting: **40%**

There will be two assignments that assess students' ability to design, implement and understand the algorithms covered during the session.

On successful completion you will be able to:

- Solve concrete problems and provide adapted algorithmic solutions using advanced algorithmic knowledge.

- Design and implement algorithms to satisfy specified problem constraints.
- Communicate clearly and effectively the relevant aspects of algorithms and their performance.
- Work collaboratively in a small team to design and implement advanced algorithms.

In-term tests

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **Week 10**

Weighting: **15%**

There will be one short in-term test to assess the understanding of the course material from the preceding weeks. The questions should be similar in nature to the ones that will be discussed during the workshops.

On successful completion you will be able to:

- Solve concrete problems and provide adapted algorithmic solutions using advanced algorithmic knowledge.

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 [Learning Skills Unit](#) 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

Materials for COMP3010 will be mainly presented through online lectures. The lectures introduce the weekly topic at a more general level and present an opportunity to have live discussions on the content.

Each week, there will also be a two-hour workshop class where you should attempt a set of questions based on the week's topic under the guidance of the tutor. The workshop also gives you a chance to discuss any course-related problem you may have with the tutor and your peers.

A submission question will also be made available every week which must be handed in on the Sunday following your workshop. It is important that you keep up with the problems in your workshop classes as doing so will help you understand the material in the unit and prepare you for your assignments, tests and final exam.

Textbooks

The following textbooks are not required for COMP3010, but are highly recommended as we will use them as the basis for most of the course.

- **(CLRS)** T. H. Cormen, C. E. Leiserson, R. L. Rivest, & C. Stein, Introduction to Algorithms (MIT Press) 3rd edition. ISBN 0-262-53305-7.
- **(Skiena)** S. S. Skiena, The Algorithm Design Manual, Springer, 2nd edition, 2008, ISBN: 978-1-84800-069-8.

Both textbooks are available online via the library website.

Technology

The coding component for this course will be presented using the Java programming language using Eclipse IDE as the recommended development environment. You may be expected to use git version control for parts of the course.

Unit Schedule

Week	Topic	Reading
1	Algorithm Design and Analysis (1)	CLRS Chapter 1-3, Skiena Chapter 1-2, 10
2	Algorithm Design and Analysis (2)	CLRS Chapter 1-3, Skiena Chapter 1-2, 10
3	Algorithm Correctness	CLRS Chapter 16
4	Greedy Algorithms	Chap 15
5	Divide-and-Conquer Algorithms	CLRS Chapter 4
6	Dynamic Programming	CLRS Chapter 15, Skiena Chapter 8
7	Probabilistic Algorithms	CLRS Chap 5
8	String algorithms	Skiena Chap 18
9	Graph algorithms (1)	Skiena Chaps 5,6
10	Graph algorithms (2)	CLRS topics from Part (V1)
11	Topics in Computational complexity (1)	Skiena Chap 9
12	Topics in Computational complexity (2)	CLRS Chap 34
13	Revision	

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 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 Enquiry Service

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

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/.

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

There are two assignments (rather than four short assignments).