



# COMP3160

## Artificial Intelligence

Session 2, Special circumstances 2021

*School of Computing*

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#### **Disclaimer**

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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

Convenor and Lecturer

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Tutor

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Credit points

10

Prerequisites

130cp at 1000 level or above including COMP2000 or COMP229 or COMP2010 or COMP225 or COMP2110 or COMP249 or COMP2160

Corequisites

Co-badged status

### Unit description

Artificial Intelligence (AI) is a well-established field that studies how computers and computer software capable of exhibiting intelligent behaviour can be designed. In this unit students will be exposed to fundamental concepts in AI such as agent architecture, knowledge representation, planning and search, as well as their application in some topical domains. Upon completion of this unit students will be able to apply problem-solving strategies that are required to build intelligent systems.

## 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:** Describe the roles of various search techniques in AI and use appropriate tools to implement them.

**ULO2:** Explain and implement basics of supervised machine learning algorithms

**ULO3:** Explain biologically inspired algorithms and their roles in AI, and implement some such algorithms in different contexts including adversarial games.

**ULO4:** Describe the role that uncertainty plays in AI, and demonstrate ability for sound reasoning of different sorts from uncertain knowledge.

## General Assessment Information

The assessment of this unit consists of one diagnostic test, two assignments and a final exam. The diagnostic test will be carried out online in iLearn. You will submit the solutions to the two assignments via iLearn by the due date. The form and date of the final examination will be announced later in the semester.

### 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 of the assignment 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 solutions have been posted.

### Supplementary Exam

In general, 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 Standards

COMP3160 will be assessed and graded according to the University assessment and grading policies.

The following general standards of achievement will be used to assess each of the assessment tasks with respect to the letter grades.

**Pass:** Can correctly reproduce facts and definitions across a breadth of concepts, but lacks depth of understanding. Can describe and/or employ search techniques in ways that are close to those discussed in lectures or notes. Can employ AI techniques to build a basic learning machine. Has basic understanding of biologically inspired algorithms and adversarial games. Has demonstrated some ability for sound reasoning in an uncertain domain.

**Credit/Distinction:** As for Pass plus: Exhibits breadth and depth of understanding of concepts. Can proficiently describe and/or employ search techniques going beyond how they were discussed in lectures or notes. Can employ AI techniques to a build very good learning machine. Has excellent understanding of biologically inspired algorithms and adversarial games, and can easily employ the former to develop strategies for the latter. Has excellent understanding of the role uncertainty plays in AI and demonstrated excellence for sound reasoning in uncertain domains.

**High Distinction:** As for Credit/Distinction plus: Is aware of the context in which the concepts are developed and their limitations. Can cogently describe in their own words and efficiently employ search techniques, going well beyond how they were discussed in lectures or notes. Can employ AI techniques to build an excellent learning machine. Has outstanding understanding of biologically inspired algorithms and adversarial games, and can easily employ the former to develop and evaluate strategies for the latter. Has excellent understanding of the role uncertainty plays in AI and has outstanding ability for sound reasoning in uncertain domains.

## Assessment Process

These assessment standards will be used to give a numeric mark to each assessment submission during marking. The mark will correspond to an appropriate letter grade when relevantly weighted. The final mark for the unit will be calculated by combining the marks for all assessment tasks according to the percentage weightings shown in the assessment summary.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Assignment 1</u></a>	20%	No	Week 8
<a href="#"><u>Final Examination</u></a>	55%	No	TBA

Name	Weighting	Hurdle	Due
<a href="#">Assignment 2</a>	20%	No	Week 13
<a href="#">Diagnostic Test</a>	5%	No	Week 4

## Assignment 1

Assessment Type <sup>1</sup>: Programming Task

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

Due: **Week 8**

Weighting: **20%**

The first assignment will require students to demonstrate their skills in employing their knowledge of machine learning, and programming in Python.

On successful completion you will be able to:

- Describe the roles of various search techniques in AI and use appropriate tools to implement them.
- Explain and implement basics of supervised machine learning algorithms

## Final Examination

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

Indicative Time on Task <sup>2</sup>: 35 hours

Due: **TBA**

Weighting: **55%**

The final examination will assess all the four learning outcomes. With regards to learning outcomes #1, #2 and #3, it allows to accurately assess the appreciation of good programming and problem solving skills. With regards to learning outcome #2, #3 and #4, it will assess students' understanding of fundamental concepts such as different types of search, games and inferences.

On successful completion you will be able to:

- Describe the roles of various search techniques in AI and use appropriate tools to implement them.
- Explain and implement basics of supervised machine learning algorithms

- Explain biologically inspired algorithms and their roles in AI, and implement some such algorithms in different contexts including adversarial games.
- Describe the role that uncertainty plays in AI, and demonstrate ability for sound reasoning of different sorts from uncertain knowledge.

## Assignment 2

Assessment Type <sup>1</sup>: Programming Task

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

Due: **Week 13**

Weighting: **20%**

This assignment will require students to demonstrate their skills in employing their knowledge of biologically inspired algorithms to develop strategies for adversarial games (#3), and programming in Python (#1).

On successful completion you will be able to:

- Describe the roles of various search techniques in AI and use appropriate tools to implement them.
- Explain biologically inspired algorithms and their roles in AI, and implement some such algorithms in different contexts including adversarial games.

## Diagnostic Test

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

Indicative Time on Task <sup>2</sup>: 5 hours

Due: **Week 4**

Weighting: **5%**

This diagnostic test will give early feedback on students' understanding of basic AI concepts (in particular search) and Python programming skills (#1).

On successful completion you will be able to:

- Describe the roles of various search techniques in AI and use appropriate tools to implement them.

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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 [Writing Centre](#) 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

Each week you should attend three hours of lectures, a tutorial class and a practical session. For details of days, times and rooms consult the timetables webpage. Students are urged to actively participate in the tutorials; this helps enhancing the understanding by students.

Note that practicals and tutorials commence in week 2. You should have selected a practical session and a tutorial session during enrolment. You should attend the sessions you are enrolled in.

### Texts

There is no set textbook for the unit. The following are recommended readings. Lecturers may recommend other references.

S. Russell and P. Norvig. Artificial Intelligence: A Modern Approach, Prentice-Hall, 2009.

Poole, D. and Mackworth, AK. Artificial Intelligence - Foundations of Computational Agents. Cambridge University Press 2017. (Available free of charge at: <https://artint.info/2e/html/ArtInt2e.html> under a Creative Commons Attribution-Noncommercial-No Derivative Works 2.5 Canada License.)

For some parts of learning, the necessary reading (book chapters, software documentation, papers, etc.) will be made available on iLearn.

### Unit Webpage and Technology Used and Required

COMP3160 uses [iLearn](#) for delivery of class materials, discussion boards, submission of assessment tasks and access to marks and comments. Students should check the iLearn site regularly for unit updates.

Questions that are of potential interest to other students in this unit, such as queries regarding the content of this unit, its tutorials or practicals, should be posted on discussion forum on iLearn.

The practical work in this unit mostly involves programming in Python3, and will require some packages purpose packages relevant to AI. Instructions will be provided on how to use Python3 and these packages on the laboratory machines and how to download them for use on your own

machines

## Unit Schedule

### Tentative Schedule

Week	Topic	Reading Material
1	Unit Organisation and Introduction to AI	Lecturer Supplied
2-4	Search in AI	Lecturer Supplied
5-6	Supervised Machine Learning	Lecturer Supplied
7-8	Evolutionary Algorithms	Lecturer Supplied
9-10	Adversarial Games and Multi-Agent Systems	Lecturer Supplied
11-12	Uncertainty in AI	Lecturer Supplied
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](http://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 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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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 duration of the Final Exam will be 2 hours. There does not seem to be a proper place to mention it...