



# COIT20277 *Introduction to Artificial Intelligence*

## Term 2 - 2023

Profile information current as at 20/04/2024 06:25 am

All details in this unit profile for COIT20277 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## General Information

### Overview

Artificial intelligence is closely related to the field called soft computing which provides a foundation for the conception, design, and deployment of intelligent systems directed towards intelligence and autonomy. This unit introduces you to the fundamental concepts of artificial intelligence in the three prominent areas of fuzzy systems, artificial neural networks, and evolutionary computation. You will be introduced to topics of genetic algorithms, evolutionary programming, and genetic programming. You will also be introduced to the most commonly used neural network paradigms. You will learn the concepts of fuzzy sets and fuzzy logic, and approximate reasoning, as part of fuzzy systems. The theoretical concepts will be reinforced with hands-on experience during computer lab tutorials.

### Details

Career Level: *Postgraduate*

Unit Level: *Level 9*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

Pre-requisite: COIT20245 Introduction to Programming

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

### Offerings For Term 2 - 2023

- Brisbane
- Melbourne
- Online
- Sydney

### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Written Assessment**

Weighting: 30%

#### 2. **Written Assessment**

Weighting: 25%

#### 3. **Written Assessment**

Weighting: 45%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

#### Feedback from Student Feedback

##### Feedback

Some students find it difficult to understand Particle Swarm Optimisation (PSO) and genetic programming.

##### Recommendation

A use case with sample coding will be helpful.

#### Feedback from Unit Coordinator Reflection

##### Feedback

Python is a more appropriate industry-standard programming language to prepare industry-ready graduates in AI.

##### Recommendation

Introduce Python and Cloud Technology to Solve AI Problems as per unit update plan.

## Unit Learning Outcomes

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

1. Model internal representation, performance criteria, and computational components identifying elements of authentic problems to apply neural, fuzzy or evolutionary computation
2. Create effective and efficient computational intelligence solutions to authentic problems
3. Evaluate the solution to a computational intelligence problem, analysing the merits and demerits of the chosen approach
4. Investigate the potential to enhance the model using one or more computational intelligence techniques.

The Australian Computer Society (ACS) recognises the Skills Framework for the Information Age (SFIA). SFIA provides a consistent definition of ICT skills. SFIA is adopted by organisations, governments, and individuals in many countries and is increasingly used when developing job descriptions and role profiles.

ACS members can use the tool MySFIA to build a skills profile at

<https://www.acs.org.au/professionalrecognition/mysfia-b2c.html>.

This unit contributes to the following workplace skills as defined by SFIA. The SFIA code is included:

- Data modelling and design (DTAN)
- Software design (SWDN)
- Programming/Software Development (PROG)
- Testing (TEST)
- Application Support (ASUP)

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
<b>1 - Written Assessment - 30%</b>	•	•		

Assessment Tasks	Learning Outcomes			
	1	2	3	4
2 - Written Assessment - 25%		•	•	•
3 - Written Assessment - 45%	•		•	•

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
1 - Knowledge	○	○	○	○
2 - Communication	○	○	○	○
3 - Cognitive, technical and creative skills	○	○	○	○
4 - Research				○
5 - Self-management	○	○	○	○
6 - Ethical and Professional Responsibility				
7 - Leadership				
8 - Aboriginal and Torres Strait Islander Cultures				

### Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Written Assessment - 30%	○	○	○		○			
2 - Written Assessment - 25%	○	○	○		○			
3 - Written Assessment - 45%	○	○	○	○	○			

## Textbooks and Resources

### Textbooks

**There are no required textbooks.**

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Jupyter Notebook

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**MD Mamunur Rashid** Unit Coordinator  
[m.rashid@cqu.edu.au](mailto:m.rashid@cqu.edu.au)

## Schedule

### Week 1 - 10 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Introduction To Artificial Intelligence · Fundamental Use Cases for Artificial Intelligence	Chapter 1 and 2	

### Week 2 - 17 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Machine Learning Pipelines · Feature Selection and Feature Engineering	Chapter 3 and 4	

### Week 3 - 24 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Classification And Regression Using Supervised Learning · Predictive Analytics with Ensemble Learning	Chapter 5 and 6	

### Week 4 - 31 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Detecting Patterns with Unsupervised Learning · Building Recommender Systems	Chapter 7 and 8	

### Week 5 - 07 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Logic Programming
- Heuristic Search Techniques

Chapter 9 and 10

**Assessment 1** Submission: Due on Week 5 Friday (11 August 2023) 11:45 pm AEST

**Assignment 1** Due: Week 5 Friday (11 Aug 2023) 11:45 pm AEST

### Vacation Week - 14 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
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### Week 6 - 21 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Genetic Algorithms and Genetic Programming
- Artificial Intelligence on The Cloud

Chapter 11 and 12

### Week 7 - 28 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Building Games with Artificial Intelligence
- Building A Speech Recognizer

Chapter 13 and 14

### Week 8 - 04 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Natural Language Processing
- Chatbots

Chapter 15 and 16

**Assessment 2** Submission: Due on Week 8 Friday (8 September 2023) 11:45 pm AEST

**Assignment 2** Due: Week 8 Friday (8 Sept 2023) 11:45 pm AEST

### Week 9 - 11 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Sequential Data and Time Series Analysis
- Image Recognition

Chapter 17 and 18

### Week 10 - 18 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Neural Networks
- Deep Learning with Convolutional Neural Networks

Chapter 19 and 20

### Week 11 - 25 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
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- Recurrent Neural Networks and Other Deep Learning Model
- Creating Intelligent Agents with Reinforcement learning

Chapter 21 and 22

### Week 12 - 02 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic
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Review and Assignment Completion

**Assessment 3** Submission: Due on Week 12 Friday (6 October 2023) 11:45 pm AEST

**Assignment 3** Due: Week 12 Friday (6 Oct 2023) 11:45 pm AEST

### Review/Exam Week - 09 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic
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Module/Topic	Chapter	Events and Submissions/Topic
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## Term Specific Information

Unit coordinator:

Dr. Md Mamunur Rashid

School of Engineering & Technology

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**Textbooks: Prescribed**

Artificial Intelligence with Python second edition (2020) Authors: Artificial Intelligence with Python ISBN:

9781839219535

## Assessment Tasks

### 1 Assignment 1

**Assessment Type**

Written Assessment

**Task Description**

#### **TASK DESCRIPTION**

**Assignment 1 is designed to reinforce the contents taught in Week 1 to Week 4. Assignment 1 is an individual assessment and should be submitted in Week 5. In this assessment students have to write python code to solve the given problem(s). Students have to choose specific AI tool(s) to solve the problem(s) and have to justify the reason of choosing the specific AI tool(s). This assessment contributes to 35% of the total marks. This assessment will address the following unit learning outcomes: Apply industry tools to solve AI problems and critique business cases for AI systems against social and ethical frameworks.**

**Assessment Due Date**

Week 5 Friday (11 Aug 2023) 11:45 pm AEST

Submit online via Moodle link

**Return Date to Students**

Week 7 Friday (1 Sept 2023)

Within two weeks of submission

**Weighting**

30%

**Assessment Criteria**

The students will be marked based on their ability to:

- Choose the correct AI tool and justifying the reason of this choice
- Writing the correct Python code
- Apply industry tools to solve AI problems
- Critique business cases for AI systems against social and ethical frameworks

The detailed marking criteria can be accessed on the unit Moodle. Please make sure to read through the marking criteria carefully before submitting your work.

## Referencing Style

- [Harvard \(author-date\)](#)

## Submission

Online

## Submission Instructions

Submit online via the Moodle link

## Learning Outcomes Assessed

- Model internal representation, performance criteria, and computational components identifying elements of authentic problems to apply neural, fuzzy or evolutionary computation
- Create effective and efficient computational intelligence solutions to authentic problems

## Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Self-management

## 2 Assignment 2

### Assessment Type

Written Assessment

### Task Description

## TASK DESCRIPTION

Assignment 2 is designed to reinforce the contents taught in Week 5 to Week 7. Assignment 1 is an individual assessment and should be submitted in Week 8. In this assessment students have to write python code to solve the given problem(s). Students have to choose specific AI tool(s) to solve the problem(s) and have to justify the reason of choosing the specific AI tool(s). This assessment contributes to 25% of the total marks. This assessment will address the following unit learning outcomes: Apply industry tools to solve AI problems and critique business cases for AI systems against social and ethical frameworks.

### Assessment Due Date

Week 8 Friday (8 Sept 2023) 11:45 pm AEST

Submit online via the Moodle link

### Return Date to Students

Week 10 Friday (22 Sept 2023)

Within two weeks of submission

### Weighting

25%

### Assessment Criteria

The students will be marked based on their ability to:

- Choose the correct AI tool and justifying the reason of this choice
- Writing the correct Python code
- Apply industry tools to solve AI problems
- Critique business cases for AI systems against social and ethical frameworks

The detailed marking criteria can be accessed on the unit Moodle. Please make sure to read through the marking criteria carefully before submitting your work.

## Referencing Style

- [Harvard \(author-date\)](#)

## Submission

Online



**Submission Instructions**

Submit online via Moodle link

**Learning Outcomes Assessed**

- Create effective and efficient computational intelligence solutions to authentic problems
- Evaluate the solution to a computational intelligence problem, analysing the merits and demerits of the chosen approach
- Investigate the potential to enhance the model using one or more computational intelligence techniques.

**Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Self-management

## 3 Assignment 3

**Assessment Type**

Written Assessment

**Task Description**

### TASK DESCRIPTION

Assignment 3 is an individual task where students have to develop python code to solve the given real-world problem(s). Students have to choose specific AI tool to solve the given problem and have to justify the reason of choosing the specific AI tool. This assessment will address the following unit learning outcomes: select Artificial Intelligence (AI) techniques to solve authentic problems including social innovation challenges; apply industry tools to solve AI problems and critique business cases for AI systems against social and ethical frameworks.

**Assessment Due Date**

Week 12 Friday (6 Oct 2023) 11:45 pm AEST

Submit online via the Moodle link

**Return Date to Students**

Feedback and marks for this assessment will be released after the certification date as this unit does not have an exam.

**Weighting**

45%

**Assessment Criteria**

The students will be marked based on their ability to:

- Ability to choose Artificial Intelligence (AI) techniques to solve authentic problems including social innovation challenges
- Justifying the reason of this choice
- Develop the correct Python code
- Apply industry tools to solve AI problems
- Critique business cases for AI systems against social and ethical frameworks

The detailed marking criteria can be accessed on the unit Moodle. Please make sure to read through the marking criteria carefully before submitting your work.

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

## Learning Outcomes Assessed

- Model internal representation, performance criteria, and computational components identifying elements of authentic problems to apply neural, fuzzy or evolutionary computation
- Evaluate the solution to a computational intelligence problem, analysing the merits and demerits of the chosen approach
- Investigate the potential to enhance the model using one or more computational intelligence techniques.

## Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



### **Be Honest**

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



### **Seek Help**

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



### **Produce Original Work**

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem