COIT12213 *Applied Artificial Intelligence*
Term 1 - 2023

All details in this unit profile for COIT12213 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 (AI) involves developing systems that are autonomous and intelligent. This unit introduces you to contemporary and emerging AI technologies to address problems such as medical diagnosis, manufacturing optimisation and transport scheduling. You will investigate the application of AI technologies in areas such as computer vision, machine learning and deep learning. Fundamental AI concepts will be considered, including artificial neural networks and model validation techniques. You will develop AI systems using industry tools and learn to develop a business case for an AI system.

Details

Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

Pre-requisite: COIT11222 Programming Fundamentals
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 1 - 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 Undergraduate 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. **Online Quiz(zes)**
Weighting: 35%
2. **Group Work**
Weighting: 30%
3. **Written Assessment**
Weighting: 35%

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.

Unit Learning Outcomes

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

1. Select Artificial Intelligence (AI) techniques to solve authentic problems including social innovation challenges
2. Apply industry tools to solve AI problems
3. Critique business cases for AI systems against social and ethical frameworks.

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

This unit contributes to the following workplace skills as defined by SFIA 7 (the SFIA code is included)

- Analytics (INAN)
- Systems design (DESN)
- Data modelling and design (DTAN)
- Programming/Software Development (PROG)

Alignment of Learning Outcomes, Assessment and Graduate Attributes

| — N/A Level | Introductory Level | Intermediate Level | Graduate Level | Professional Level | Advanced Level |

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes		
	1	2	3
1 - Online Quiz(zes) - 35%	•		
2 - Group Work - 30%		•	•
3 - Written Assessment - 35%	•	•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes		
	1	2	3
1 - Communication	•	•	•
2 - Problem Solving	•	•	•
3 - Critical Thinking	•	•	
4 - Information Literacy	•	•	

Graduate Attributes	Learning Outcomes		
	1	2	3
5 - Team Work		•	•
6 - Information Technology Competence	•	•	
7 - Cross Cultural Competence			•
8 - Ethical practice		•	•
9 - Social Innovation			•
10 - 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	9	10
1 - Online Quiz(zes) - 35%		•	•	•		•				
2 - Group Work - 30%	•	•	•	•	•	•	•	•	•	
3 - Written Assessment - 35%	•	•	•	•		•	•	•	•	

Textbooks and Resources

Textbooks
COIT12213

Prescribed

Artificial Intelligence with Python
second edition (2020)
Authors: Artificial Intelligence with Python
ISBN: 9781839219535
Binding: Website Link

Additional Textbook Information
The prescribed textbook can be accessed online at the CQUniversity Library website. Access may be limited. If you would prefer your own copy, purchase either paper or eBook versions at the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code)

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

Nahina Islam Unit Coordinator
n.islam@cqu.edu.au

Schedule

Week 1 - 06 Mar 2023

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

Week 2 - 13 Mar 2023

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

Week 3 - 20 Mar 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 - 27 Mar 2023

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

Week 5 - 03 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Logic Programming · Heuristic Search Techniques	Chapter 9 and 10	**Assignment 1** Due: Week 5 Friday (7 Apr 2023) 11:55 pm AEST

Vacation Week - 10 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 17 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Genetic Algorithms and Genetic Programming · Artificial Intelligence on The Cloud	Chapter 11 and 12	

Week 7 - 24 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
• Building Games with Artificial Intelligence • Building A Speech Recognizer	Chapter 13 and 14	

Week 8 - 01 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
• Natural Language Processing • Chatbots	Chapter 15 and 16	

Week 9 - 08 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
• Sequential Data and Time Series Analysis • Image Recognition	Chapter 17 and 18	**Assignment 2** Due: Week 9 Friday (12 May 2023) 11:55 pm AEST

Week 10 - 15 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
· Neural Networks · Deep Learning with Convolutional Neural Networks	Chapter 19 and 20	

Week 11 - 22 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
• Recurrent Neural Networks and Other Deep Learning Model • Creating Intelligent Agents with Reinforcement learning	Chapter 21 and 22	

Week 12 - 29 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
Artificial Intelligence with Big Data	Chapter 23	**Assignment 3** Due: Week 12 Friday (2 June 2023) 11:55 pm AEST

Review/Exam Week - 05 Jun 2023

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 12 Jun 2023

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

Unit coordinator: Dr. Nahina Islam
email: n.islam@cqu.edu.au

Assessment Tasks

1 Assignment 1

Assessment Type
Online Quiz(zes)

Task Description
Assessment 1 is an online quiz which is based on contents from Lecture 1-5. Through this assessment students will demonstrate their ability to select Artificial Intelligence (AI) techniques to solve authentic problems including social innovation challenges. You will get 3 attempts to try the online quiz before the due date. The highest score will be considered.

Number of Quizzes

Frequency of Quizzes

Assessment Due Date
Week 5 Friday (7 Apr 2023) 11:55 pm AEST
Online

Return Date to Students

Marks will be displayed immediately after due date

Weighting
35%

Assessment Criteria
The students will be marked based on their ability to specifically answer the questions in the online quiz.

Referencing Style

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

Submission
Online

Submission Instructions
Submit via Moodle link

Learning Outcomes Assessed

- Select Artificial Intelligence (AI) techniques to solve authentic problems including social innovation challenges

Graduate Attributes

- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

2 Assignment 2

Assessment Type
Group Work

Task Description
Assignment-2 is a group work where 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 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 9 Friday (12 May 2023) 11:55 pm AEST
Submit online via Moodle link

Return Date to Students
Week 11 Friday (26 May 2023)
Online

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.

Referencing Style

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

Submission
Online Group

Submission Instructions
Only one member from the group should submit

Learning Outcomes Assessed

- Apply industry tools to solve AI problems

- Critique business cases for AI systems against social and ethical frameworks.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice
- Social Innovation

3 Assignment 3

Assessment Type
Written Assessment

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 (2 June 2023) 11:55 pm AEST
Submit online via the Moodle link

Return Date to Students

On certification of grade

Weighting
35%

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.

Referencing Style

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

Submission
Online

Submission Instructions
Submit online via Moodle link

Learning Outcomes Assessed

- Select Artificial Intelligence (AI) techniques to solve authentic problems including social innovation challenges
- Apply industry tools to solve AI problems
- Critique business cases for AI systems against social and ethical frameworks.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence

- Ethical practice
- Social Innovation

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