COIT12213 *Applied Artificial Intelligence*
Term 1 - 2024

Profile information current as at 04/05/2024 03:21 am

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 - 2024

- Online

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.

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 Teaching Team

Feedback

Students feel overloaded with many new theoretical and practical concepts each week, making it difficult for some students to grasp key AI concepts.

Recommendation

Increase practical materials on important AI topics, such as image analysis, face recognition and deep learning models, while reducing some of the theory on less important topics.

Feedback from Head of Postgraduate ICT courses

Feedback

The Moodle site can be streamlined to make it more user-friendly and consistent to adhere with CQURenew guidelines.

Recommendation

Streamline the Moodle site to make it more consistent to adhere with CQURenew guidelines.

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	•	•	
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

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: American Psychological Association 7th Edition (APA 7th edition)
For further information, see the Assessment Tasks.

Teaching Contacts

Anwaar Ul-Haq Unit Coordinator
a.anwaarulhaq@cqu.edu.au

Schedule

Week 1 - 04 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Artificial Intelligence, History and Applications (A review of Python for AI Applications)	Chapter 1, Chapter 2	Class introductions, IDE Demo

Week 2 - 11 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Machine Learning Pipeline and Feature Engineering	Chapters 3 and 4	Exploratory Data Analytics -Hands-on Lab Activity

Week 3 - 18 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Regression Analysis and Predictive Models Overfitting and Regularization	Chapter 5	Regression-Hands-on Lab Activity

Week 4 - 25 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Perceptron, Gradient Descent and Backpropagation	Lecture Notes Only	Perceptron-Hands-on Lab Activity

Week 5 - 01 Apr 2024

Module/Topic	Chapter	Events and Submissions/Topic
Recognition with Computer Vision-CNN	Chapter 19 and 20	CNN-Hands-on Lab Activity Assessment 1 Due Friday, 05/04/2024, 11:45 pm **Online Quiz** Due: Week 5 Friday (5 Apr 2024) 11:45 pm AEST

Vacation Week - 08 Apr 2024

Module/Topic	Chapter	Events and Submissions/Topic
Session Break	Session Break	Session Break

Week 6 - 15 Apr 2024

Module/Topic	Chapter	Events and Submissions/Topic
Recognition with Computer Vision-Vision Transformer (ViT)	Lecture Notes Only	VIT-Hands-on Lab Activity

Week 7 - 22 Apr 2024

Module/Topic	Chapter	Events and Submissions/Topic
Natural Language Processing	Lecture Notes Only	NLP-Hands-on Lab Activity

Week 8 - 29 Apr 2024

Module/Topic	Chapter	Events and Submissions/Topic
Integrating Language and Vision	Lecture Notes Only	VLM-Hands-on Lab Activity

Week 9 - 06 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Generative AI - GANS	Lecture Notes Only	BigGANS-Hands-on Lab Activity Assessment 2 Due Friday, 10/05/2024 11:45 pm **Group Work** Due: Week 9 Friday (10 May 2024) 11:45 pm AEST

Week 10 - 13 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Robotics1: Agent Search Strategies and Robotics	Lecture Notes Only	Heuristic Search-Hands-on Lab Activity

Week 11 - 20 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Robotics2: Reinforcement Learning- Q Learning	Lecture Notes Only	Q-Learning-Hands-on Lab Activity

Week 12 - 27 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Ethical, Responsible and Explainable AI	Lecture Notes Only	Break-out Room Discussion Assessment 3 Due Friday, 31/05/2024 11:45 pm **Written Assessment** Due: Week 12 Friday (31 May 2024) 11:45 pm AEST

Review/Exam Week - 03 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
Review/Exam Week	Review/Exam Week	Review/Exam Week

Exam Week - 10 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
Exam Week	Exam Week	

Term Specific Information

Unit coordinator: Dr. Anwaar Ulhaq
email: a.anwaarulhaq@cqu.edu.au

Assessment Tasks

1 Online Quiz

Assessment Type
Online Quiz(zes)

Task Description
Assessment 1 consists of an online quiz based on Lectures 1-5. Students are allowed two attempts within a 1-hour time limit for each attempt. The grading method considers the average score across the attempts. This quiz aims to evaluate students' proficiency in applying AI techniques to real-world problems, specifically focusing on social innovation challenges.

Number of Quizzes

Frequency of Quizzes
Other

Assessment Due Date
Week 5 Friday (5 Apr 2024) 11:45 pm AEST

Return Date to Students
Week 5 Friday (5 Apr 2024)

Weighting
35%

Assessment Criteria
Assessment 1 will consist of 35 questions, primarily scenario-based multiple-choice questions (MCQs) that require critical thinking. The total marks for this assessment are 35. The questions are designed to evaluate your understanding of the topics covered in Lectures 1-5, with a specific focus on practical applications and problem-solving related to social innovation challenges.
Please review the relevant lecture materials to prepare for the assessment. For additional details or clarification, feel free to reach out to your unit coordinator. They will provide further guidance to ensure your readiness for this evaluation.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

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 Group Work

Assessment Type
Group Work

Task Description
Assignment 2 is a group project where students work together to write Python code for specific problem-solving tasks.

They are required to choose and justify the use of AI tools & techniques for these tasks. Details, including the project description, data, and sources, are provided on the Moodle site. The unit coordinator assigns groups with a maximum size of three. Individual contributions are assessed, and while group members may receive similar marks based on participation, each student's unique contribution is considered.
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 (10 May 2024) 11:45 pm AEST

Return Date to Students
Week 11 Friday (24 May 2024)

Weighting
30%

Assessment Criteria
A detailed rubric and marking criteria will be made available on Moodle as part of the comprehensive assessment description. This document will provide clear guidelines for the evaluation process, offering transparency on how assignments will be assessed and graded. Students are encouraged to refer to this resource for a thorough understanding of the expectations and criteria that will inform the assessment of their work.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

Submission
Online Group

Submission Instructions
Submit online via Moodle link.

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 Written Assessment

Assessment Type
Written Assessment

Task Description

Assignment 3 is an individual task where students develop a written artefact (document) on a topic specified by the unit coordinator. The selected topic will be the most recent and relevant AI application or one specific to the unit's focus. Students must apply the knowledge and skills acquired throughout the unit to prepare this document. 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 (31 May 2024) 11:45 pm AEST

Return Date to Students
Exam Week Friday (14 June 2024)
Upon grade certification

Weighting
35%

Assessment Criteria
A detailed rubric and marking criteria will be made available on Moodle as part of the comprehensive assessment description. This document will provide clear guidelines for the evaluation process, offering transparency on how assignments will be assessed and graded. Students are encouraged to refer to this resource for a thorough understanding of the expectations and criteria that will inform the assessment of their work.

Referencing Style

- American Psychological Association 7th Edition (APA 7th edition)

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