

COIT12209 *Data Science*

Term 1 - 2026

Profile information current as at 08/06/2026 03:24 pm

All details in this unit profile for COIT12209 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

This unit focuses on the foundational concepts of data science. Digital data is growing at a very fast rate with data being the underlying driver of the knowledge economy. This unit will prepare you with foundational knowledge and practical skills about data collection, representation, storage, retrieval, management, analysis, and visualisation through the exploration of data-related challenges. You will also learn the impact of big data and business analytics on business performance to cater for the development of useful information and knowledge in an attempt to achieve data-driven decision making.

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

Prerequisite: COIT11226 Systems Analysis Co-requisite: COIT11237 Database Design & Implementation

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 - 2026

- Brisbane
- Melbourne
- Online
- Rockhampton
- 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. Practical Assessment

Weighting: 40%

2. Written Assessment

Weighting: 40%

3. Presentation

Weighting: 20%

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

Feedback

The lecture on Machine Learning System Design lacks practical components.

Recommendation

Update the lecture topic "An Overview of Machine Learning System Design" to include practical components to complement theory.

Feedback from Teaching team feedback

Feedback

The unit currently lacks a hands-on example of bias in data analysis, which is important to reinforce professional data science practices.

Recommendation

Integrate a hands-on example of bias in data analysis into one of the tutorials.

Unit Learning Outcomes

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

1. Discuss and demonstrate data science foundational concepts
2. Investigate and evaluate applications for data storage, management, retrieval, and analysis and visualisation
3. Apply knowledge to process data for data driven decision making
4. Analyse and generate solutions to solve data-related challenges
5. Demonstrate the knowledge required in using data science skills to solve business problems.

Australian Computer Society (ACS) recognises the Skills Framework for the Information Age (SFIA). SFIA is in use in over 100 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 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 Management (DATM)

Business Analysis (BUAN)

Data Analysis (DTAN)

IT Operation (ITOP)

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	4	5
1 - Practical Assessment - 40%	●	●			
2 - Written Assessment - 40%		●	●	●	●

Assessment Tasks

Learning Outcomes

1 2 3 4 5

3 - Presentation - 20%

• • •

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes

Learning Outcomes

1 2 3 4 5

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 - First Nations Knowledges

11 - Aboriginal and Torres Strait Islander Cultures

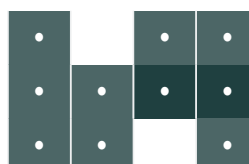
Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks

Graduate Attributes

1 2 3 4 5 6 7 8 9 10 11

1 - Practical Assessment - 40%



2 - Written Assessment - 40%



3 - Presentation - 20%



Textbooks and Resources

Textbooks

COIT12209

Supplementary

Data Science from Scratch: First Principles with Python

Edition: 2nd (2019)

Authors: Grus, Joel

O'Reilly

ISBN: 9781492041139

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Zoom capacity (webcam and microphone) will be required for online students
- Visual Studio Code (latest version)
- Anaconda Data Science Platform (Individual - Free Distribution)
- Python 3.10 (or higher)

Referencing Style

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

For further information, see the Assessment Tasks.

Teaching Contacts

Arjun Neupane Unit Coordinator

a.neupane@cqu.edu.au

Ahsan Morshed Unit Coordinator

a.morshed@cqu.edu.au

Schedule

Week 1 - 09 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Data Science: What is data science; data domination; innovation from internet giants; data science history; data science in modern enterprises; soft skills of a data scientist; data science project life cycle; types of data; big data; how is big data different.	Supplementary materials	

Week 2 - 16 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic
Identifying Data Problems: From business problems to data mining tasks; data mining tasks; data collection; business use cases; sampling; data mining process.	Supplementary materials	

Week 3 - 23 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Ethical and Professional Data Science Practices Supplementary materials

Week 4 - 30 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Data Presentation: Understand different ways of summarising data; choose the right table/ graph for the right data and audience; self explanatory graphics; attractive graphs and tables.	Supplementary materials	
---	-------------------------	--

Week 5 - 06 Apr 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Data Analytics: Why analytics; different types of analytics; delivery methods for the operational users; holistic approach to expand enterprise analytics; value of integration and data quality to analytics.	Supplementary materials	
--	-------------------------	--

Week 6 - 13 Apr 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Exploratory Analysis: trend analysis; Box plot; pairs plot; time series decomposition; geographical analysis.	Supplementary materials	Assessment 1 Practical Assessment Due: Week 6 Friday (17 Apr 2026) 11:45 pm AEST
---	-------------------------	---

Vacation Week - 20 Apr 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Week 7 - 27 Apr 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Data Discovery and Data Mining: Data driven decisions; enabling data driven innovations; knowledge discovery process; data cleaning; data integration; data selection; data transformation; knowledge based systems; data mining and its goals; data mining operation and process.	Supplementary materials	
--	-------------------------	--

Week 8 - 04 May 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Analytic Algorithms: clustering analysis; regression analysis; classifier analysis; association analysis; cohort analysis; graph analysis; traverse pattern analysis.	Supplementary materials	
---	-------------------------	--

Week 9 - 11 May 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Data Integration: Analytic data integration; challenges in data integration; technologies in data integration; data mapping; data staging; data extraction; data transformation; data loading; need for integration; data integration approaches.	Supplementary materials	
---	-------------------------	--

Week 10 - 18 May 2026

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Data Security and Privacy: protection of personal data; data collection and significant risks; challenges of big data for data protection; confidentiality; integrity; availability; middleware security concerns; built in database protection; privacy issues; data security and storage; identification and authentication.

Supplementary materials

Week 11 - 25 May 2026

Module/Topic

Chapter

Events and Submissions/Topic
Assessment 2

System Design: An overview of ML systems in the real world

Supplementary materials

Written Assessment Due: Week 11
Friday (29 May 2026) 11:45 pm AEST

Week 12 - 01 Jun 2026

Module/Topic

Chapter

Events and Submissions/Topic
Assessment 3

Cloud Computing for Data Processing

Supplementary materials

Presentation Due: Week 12 Monday (1
June 2026) 11:45 pm AEST

Exam Week - 08 Jun 2026

Module/Topic

Chapter

Events and Submissions/Topic

Vacation/Exam Week - 15 Jun 2026

Module/Topic

Chapter

Events and Submissions/Topic

Term Specific Information

Unit Coordinator: Dr Arjun Neupane, Building 30/G.09, Rockhampton Campus Email: a.neupane@cqu.edu.au (Preferred Contact) Telephone: (07) 49309558

Assessment Tasks

1 Practical Assessment

Assessment Type

Practical Assessment

Task Description

This assessment is designed to reinforce the contents taught in Week 1 to Week 5. This assessment relates to Learning Outcomes 1 and 2. This assessment is an individual assessment. This task will help to build your knowledge of data formats, retrieval, and analysis techniques. This assessment contributes to 40% of the total marks.

AI ASSESSMENT SCALE - AI PLANNING

You may use AI for planning, idea development, and research. Your final submission should show how you have developed and refined these ideas.

Assessment Due Date

Week 6 Friday (17 Apr 2026) 11:45 pm AEST

Return Date to Students

Within two weeks of submission

Weighting

40%

Assessment Criteria

The assessment will be marked based on the following criteria:

Quality of source code

Submitted screen shot of outputs
Analysis presented on the generated output
Well-structured and coherent report
More details will be available on the Moodle site.

Referencing Style

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

Submission

Online

Submission Instructions

All files must be submitted to Moodle for marking by the due date.

Learning Outcomes Assessed

- Discuss and demonstrate data science foundational concepts
- Investigate and evaluate applications for data storage, management, retrieval, and analysis and visualisation

Graduate Attributes

- Communication
- Critical Thinking
- Information Literacy
- Information Technology Competence

2 Written Assessment

Assessment Type

Written Assessment

Task Description

This assessment is based on a case study to be provided to you in teaching Week 6. You are required to write a report of 2000 words. This is an individual assessment and contributes to Learning Outcomes 2, 3, 4 and 5. This report will follow a standard business report format. You will investigate and advise an organisation, whose details are given in the case study, on data storage, retrieval, and analysis mechanisms. This assessment contributes to 40% of the total marks.

AI ASSESSMENT SCALE - AI PLANNING

You may use AI for planning, idea development, and research. Your final submission should show how you have developed and refined these ideas.

Assessment Due Date

Week 11 Friday (29 May 2026) 11:45 pm AEST

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

40%

Assessment Criteria

The assessment will be marked based on the following criteria:

Report formatting (font, header and footer, table of contents, numbering, referencing)

Professional communication (correct spelling, grammar, formal business language used)

Executive summary

Report introduction

Data collection and storage

Data in action

Model design and implementation

Conclusion and recommendations

More details will be available on the Moodle site.

Referencing Style

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

Submission

Online

Submission Instructions

The assignment must be submitted to Moodle for marking by the due date.

Learning Outcomes Assessed

- Investigate and evaluate applications for data storage, management, retrieval, and analysis and visualisation

- Apply knowledge to process data for data driven decision making
- Analyse and generate solutions to solve data-related challenges
- Demonstrate the knowledge required in using data science skills to solve business problems.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice
- Social Innovation

3 Presentation

Assessment Type

Presentation

Task Description

This assessment contributes to the Learning Outcomes 3, 4 and 5. This is an individual recorded presentation. The presentation topic is based on your report from assignment 2 and learning outcomes from this unit. You will need to record and submit a 5-7 minutes video presentation explaining the key concepts. Your recorded video should include both the presenter and your desktop within the frame. Please ensure you adhere to appropriate and professional dress codes for your presentation.

AI ASSESSMENT SCALE - AI PLANNING

You may use AI for planning, idea development, and research. Your final submission should show how you have developed and refined these ideas.

Assessment Due Date

Week 12 Monday (1 June 2026) 11:45 pm AEST

The 5-7 minutes video presentation must be submitted by the due date before the in-class presentation to be held on Week 12 tutorial times.

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

20%

Assessment Criteria

The assessment will be marked based on the following criteria:

Presentation structure (Introduction, body, conclusion)

Delivery

Presentation slides

More details including a sample marksheet will be available on the Moodle site.

Referencing Style

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

Submission

Online

Submission Instructions

The presentation file must be submitted to Moodle by the due date.

Learning Outcomes Assessed

- Apply knowledge to process data for data driven decision making
- Analyse and generate solutions to solve data-related challenges
- Demonstrate the knowledge required in using data science skills to solve business problems.

Graduate Attributes

- Communication
- Problem Solving
- Information Literacy

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