# SCIE11023 *Scientific Research Fundamentals*
## Term 1 - 2023

Profile information current as at 12/10/2024 04:07 pm

All details in this unit profile for SCIE11023 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
In this unit, you will explore, synthesise and apply the fundamentals of the scientific method. You will develop skills in scientific communication beyond reading and writing - through a series of seminars, lectures and self-guided tasks students will learn appropriate manipulation of mathematical and statistical data as well as data presentation. You will enhance your knowledge and understanding of a range of fundamental scientific concepts and consider issues relating to ethics, experimentation and professional practice. Finally, through conducting your own research activity, you will learn how to develop a research framework and apply critical thinking to solve complex problems.

### Details
Career Level: *Undergraduate*
Unit Level: *Level 1*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

### Pre-requisites or Co-requisites
There are no requisites for this unit.
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

- Bundaberg
- Emerald
- Online
- Rockhampton

### 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. **Written Assessment**
Weighting: 15%
2. **Presentation**
Weighting: 35%
3. **Portfolio**
Weighting: 50%

### 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 SUTE feedback

**Feedback**

Student feedback pointed out the value of feedback from the teaching staff for helping them analyse and improve their practical experiment.

**Recommendation**

Continue to provide comprehensive and detailed feedback to students, ultimately facilitating their best possible performance in the unit.

#### Feedback from SUTE feedback & email correspondence

**Feedback**

Several students appreciated the step-by-step walk through of the mathematical elements of the unit, including the relevant examples provided.

**Recommendation**

Continue to provide clear and step-by-step explanations of the mathematical learning outcomes in the unit.

#### Feedback from Email correspondence & in-person

**Feedback**

Some students expressed a desire for faster assessment turn-around/marking time, to help them prepare for later assessments.

**Recommendation**

Staff to try and improve the marking time without compromising on assessment feedback quality. The ability to do this often depends on class size, with larger classes needing more time to mark.

## Unit Learning Outcomes

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

1. Explain and apply information and numerical literacy skills to communicate scientific knowledge and ideas clearly and coherently to a variety of audiences
2. Formulate a research hypothesis and research questions that include relevant ethical considerations
3. Conduct and manage a small research project using quantitative, qualitative or mixed methods research methodologies
4. Analyse, interpret and explain scientific data, resulting in the production of a research report appropriate for an e-portfolio.

## 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 |
| **1 - Written Assessment - 15%** | • | | | |

| Assessment Tasks | Learning Outcomes | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 2 - Presentation - 35% | • | • | • | |
| 3 - Portfolio - 50% | • | • | • | • |

## Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 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 - Written Assessment - 15% | • | • | • | • | | • | | • | | |
| 2 - Presentation - 35% | • | • | • | • | | • | | • | | |
| 3 - Portfolio - 50% | • | • | • | • | | • | | • | | |

## 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)
- Microsoft Word AND Excel or equivalent Mac or Open Source packages
- Citation management software such as EndNote or Zotero
- Zoom videoconferencing software. A Zoom account is available with your student credentials

## Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

## Teaching Contacts

**Emily Bryson** Unit Coordinator
e.bryson@cqu.edu.au

## Schedule

**Week 1 - 06 Mar 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Introduction, scientific method and hypotheses | See Moodle for readings and activities | |

**Week 2 - 13 Mar 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Ethics, risk assessment and research integrity | See Moodle for readings and activities | |

**Week 3 - 20 Mar 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Research methods - qualitative, quantitative and mixed methods | See Moodle for readings and activities | |

**Week 4 - 27 Mar 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Experimental design, planning and proposals | See Moodle for readings and activities | |

**Week 5 - 03 Apr 2023**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Managing research and conducting trials | See Moodle for readings and activities | **Research proposal** Due: Week 5 Friday (7 Apr 2023) 11:45 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** |
| Journal articles and scientific reports | See Moodle for readings and activities | |
| **Week 7 - 24 Apr 2023** | | |
| **Module/Topic** | **Chapter** | **Events and Submissions/Topic** |
| Stakeholder reports, technical notes and fact sheets | See Moodle for readings and activities | |
| **Week 8 - 01 May 2023** | | |
| **Module/Topic** | **Chapter** | **Events and Submissions/Topic** |
| Mathematics, statistics and excel | See Moodle for readings and activities | |
| **Week 9 - 08 May 2023** | | |
| **Module/Topic** | **Chapter** | **Events and Submissions/Topic** |
| Data analysis and presentation | See Moodle for readings and activities | **Research update video presentation** Due: Week 9 Monday (8 May 2023) 11:45 pm AEST |
| **Week 10 - 15 May 2023** | | |
| **Module/Topic** | **Chapter** | **Events and Submissions/Topic** |
| ePortfolios and enrolment management | See Moodle for readings and activities | |
| **Week 11 - 22 May 2023** | | |
| **Module/Topic** | **Chapter** | **Events and Submissions/Topic** |
| Citation management and finalising reports | See Moodle for readings and activities | |
| **Week 12 - 29 May 2023** | | |
| **Module/Topic** | **Chapter** | **Events and Submissions/Topic** |
| Unit wrap-up | See Moodle for readings and activities | **Research report** Due: Week 12 Friday (2 June 2023) 11:45 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

In addition to the lectures and theory presented in this unit, you are required to conceptualize, plan, conduct, and summarise your own scientific research project. The teaching staff are here to help guide you along your way, providing professional advice and feedback for you to consider. The assessment items are also conceptually linked, such that the feedback you receive from your first assessment should help to improve your second assessment, and likewise for the second to third assessment. Your research project will be done off campus (usually at your place of residence) according to your own schedule, as there is no residential school for this unit. As such, effective time management will be an important skill in order to complete your project on time and submit related assessment pieces of an acceptable quality. Communication with the teaching staff is often a critical part of this process, especially earlier in term when forumating your project design. The unit's Moodle page will be the central resource for advice, updates, and other important information throughout term.

## Assessment Tasks

# 1 Research proposal

**Assessment Type**
Written Assessment

**Task Description**
Complete a short research proposal detailing the research project you will complete during this unit. The research proposal is a document that outlines the reason/justification for your project (often by way of a short background section), presents your aims, objectives, and hypotheses, and describes how you're going to do the experiment and collect the data. Examples will be discussed in class, with additional information, resources, and assessment instructions provided on the unit Moodle site during term.

**Assessment Due Date**
Week 5 Friday (7 Apr 2023) 11:45 pm AEST

Please submit your work as a Word document via Moodle.

**Return Date to Students**
Week 7 Friday (28 Apr 2023)

Your marked work with feedback will be returned to you through Moodle.

**Weighting**
15%

**Minimum mark or grade**
50 %

**Assessment Criteria**
The proposal you submit for assessment will require you to provide:

- An overview and justification supporting your proposed project.
- Aims, objectives and hypotheses of your research.
- A description of the planned methodology and experimental design.
- Template(s) for data collection.
- Proposal length: 1000 words (+/- 10 %).
- Minimum of four (4) references (no web pages unless of the data repository type).

Additional details will be available on the Moodle page during term.

**Referencing Style**

- Harvard (author-date)

**Submission**
Online

**Submission Instructions**
Please submit your work as a Word document via Moodle.

**assessmentOutcome**

- Explain and apply information and numerical literacy skills to communicate scientific knowledge and ideas clearly and coherently to a variety of audiences

**assessmentGradAttribute**

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

# 2 Research update video presentation

**Assessment Type**
Presentation

**Task Description**
Prepare a three minute video providing an update on the status of your research project. This video presentation should

be considered an update that would be provided to key industry stakeholders, or funding partners. Typically, such an update includes a brief description of the reason for the project, the aims/objectives/hypothesis, a summary of the methodology, and the presentation of any results or insights to date.
Additional information, resources, and assessment instructions will be provided on the unit's Moodle site during term.

**Assessment Due Date**
Week 9 Monday (8 May 2023) 11:45 pm AEST

Please submit your video recording via the Moodle site.

**Return Date to Students**
Week 11 Monday (22 May 2023)

Marks and feedback for your update video will be provided via the Moodle site.

**Weighting**
35%

**Minimum mark or grade**
50 %

**Assessment Criteria**
The three minute video you submit for assessment will require you to provide:

- An explanation to the background on your research.
- Aims, objectives and hypotheses of your research.
- A brief description of your methodology and experimental design.
- An update on the status of the research.
- A brief summary of any results available.
- Minimum of four (4) references (no web pages unless of the data repository type).

Further detail will be provided on the Moodle site during term.

**Referencing Style**

- Harvard (author-date)

**Submission**
Online

**Submission Instructions**
Please submit your video recording via the Moodle site.

**assessmentOutcome**

- Explain and apply information and numerical literacy skills to communicate scientific knowledge and ideas clearly and coherently to a variety of audiences
- Formulate a research hypothesis and research questions that include relevant ethical considerations
- Conduct and manage a small research project using quantitative, qualitative or mixed methods research methodologies

**assessmentGradAttribute**

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

## 3 Research report

**Assessment Type**
Portfolio

**Task Description**
This final assessment task requires you to complete a written report summarising your research project. Your research report format is generally based on a typical scientific paper or report (to be discussed in lecture), and must include an introduction/background section (including your hypothesis), a description of the methods used, a results section that describes, presents, and analyses your data, and a summary discussion that describes what the results mean and what

contribution to knowledge they make.
Additional information, resources, and assessment instructions will be provided on the unit Moodle site during term.

**Assessment Due Date**
Week 12 Friday (2 June 2023) 11:45 pm AEST

Please submit your report as a Word document through the Moodle page.

**Return Date to Students**
Exam Week Friday (16 June 2023)

Your marked report with feedback will be returned to you through the Moodle page.

**Weighting**
50%

**Minimum mark or grade**
50 %

**Assessment Criteria**
The report you submit for assessment will require you to provide:

- A literature review and background description of the rationale for doing the research project.
- A description of the methodology used.
- An analysis, interpretation and explanation of results obtained.
- A summary discussion of the results obtained, placed in the context of current literature.
- Expectation of 2500 words (+/- 10 %).
- Minimum of eight (8) references (no web pages unless of the data repository type).

Further detail will be provided on the Moodle site during term.

**Referencing Style**

- Harvard (author-date)

**Submission**
Online

**Submission Instructions**
Please submit your report as a Word document through the Moodle page.

**assessmentOutcome**

- Explain and apply information and numerical literacy skills to communicate scientific knowledge and ideas clearly and coherently to a variety of audiences
- Formulate a research hypothesis and research questions that include relevant ethical considerations
- Conduct and manage a small research project using quantitative, qualitative or mixed methods research methodologies
- Analyse, interpret and explain scientific data, resulting in the production of a research report appropriate for an e-portfolio.

**assessmentGradAttribute**

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

## 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