ENER14002 *Resource Systems Feasibility Project*
Term 1 - 2022

All details in this unit profile for ENER14002 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 capstone unit will allow you to apply knowledge of data sets, data analysis, environmental constraints and mine design to a feasibility study for a proposed mining operation. You will enhance your understanding of drilling and blasting operations and data analysis to optimise the safety and productivity of a proposed mining project. You will develop a stakeholder management plan that enhances the operation's social licence to operate. You will apply schedules to the project to optimise the rate of return on the project balancing capital expenditure against forecast revenues.

Details

Career Level: *Undergraduate*
Unit Level: *Level 4*
Credit Points: *12*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.25*

Pre-requisites or Co-requisites

Pre-requisites: ENAR12013 Mine Planning and Design COIT12209 Data Science ENEG11007 Engineering Industry Project Investigation
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 - 2022

- 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 12-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 25 hours of study per week, making a total of 300 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. **Portfolio**
Weighting: 20%
2. **Case Study**
Weighting: 20%
3. **Report**
Weighting: 40%
4. **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.

Unit Learning Outcomes

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

1. Research current environmental legislation related to resource systems
2. Apply data analysis to an existing data set to enhance the design of the proposed project
3. Schedule the project to optimise its safety, productivity and rate of return
4. Develop a stakeholder management plan to address community concerns and the operation's social licence to

operate
   5. Communicate the results of your feasibility study via a professional level of presentation and a written report.

The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

Intermediate

1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 2I 5I)

1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1I 2N 5I)

1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 3I 4N)

2.2 Fluent application of engineering techniques, tools and resources. (LO: 2I 3I)

3.1 Ethical conduct and professional accountability. (LO: 4I)

Advanced

1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 2A)

1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 2A)

1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 2I 4A 5I)

2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1A 2A 3I 4I)

2.3 Application of systematic engineering synthesis and design processes. (LO: 2A)

2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 1I 2A 3A 5A)

3.2 Effective oral and written communication in professional and lay domains. (LO: 2A 4A 5A)

3.3 Creative, innovative and pro-active demeanour. (LO: 1I 2I 3A)

3.4 Professional use and management of information. (LO: 1A 2I 5A)

3.5 Orderly management of self, and professional conduct. (LO: 2I 3I 4A 5A)

3.6 Effective team membership and team leadership. (LO: 4A 5A)

Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N – Introductory, I – Intermediate and A - Advanced.

Refer to the Engineering Undergraduate Course Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information https://moodle.cqu.edu.au/course/view.php?id=1511

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 - Presentation - 20%	●				
2 - Case Study - 20%		●			
3 - Portfolio - 20%	●	●	●	●	
4 - Report - 40%			●	●	●

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 - Aboriginal and Torres Strait Islander Cultures					

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)

Referencing Style

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

Teaching Contacts

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Schedule

Week 1 - 07 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to mine monitoring	Introduction to Mine Monitoring Big Data Management Big Data Analytics Artificial intelligence	

Week 2 - 14 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Machine learning algorithms	Introduction to Machine Learning Neural Networks Training and Test Data Types of Algorithms used in mining	

Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Programs used to work with big data	Python Java Matlab	

Week 4 - 28 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Mining activities that generate data	Drilling Fragmentation Truck and Shovel Operations Mineral Processing	

Week 5 - 04 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic

Module/Topic	Chapter	Events and Submissions/Topic
Environmental factors that impact mining activities	Rainfall Dust Temperature Humidity Ground conditions	**Case Study** Due: Week 5 Wednesday (6 Apr 2022) 11:55 pm AEST

Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Case study of mine related data project	Identify the workflow for the project. Outcomes • Decision making • Predictive analytics	

Week 7 - 25 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Case study of mine related data project	Identify stakeholders	

Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Case study of mine related data project	Risk assessment • principal hazards • artificial intelligence • automation • decision making	

Week 9 - 09 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Case study of Data Project Feasability	Sustainability • Economic • Environmental • Social	

Week 10 - 16 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Environmental legislation	Federal State and Local government responsibilities. Environmental protection and Biodiversity Conservation Act (EPBC) Matters of National Environmental Significance (MNES)	

Week 11 - 23 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Protected matter search tool	Apply the protected matters search tool to Define an area of interest Explore what is in the area and protected under the EPBC Act Generate a report	**Project Proposal** Due: Week 11 Wednesday (25 May 2022) 11:55 pm AEST

Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Presentation of data project proposal	Details will be found in moodle.	**Presentation on the use of big data in the mining industry** Due: Week 12 Wednesday (1 June 2022) 11:55 pm AEST

Review/Exam Week - 06 Jun 2022		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
		Learning Portfolio Due: Review/Exam Week Wednesday (8 June 2022) 11:55 am AEST

Exam Week - 13 Jun 2022		
Module/Topic	**Chapter**	**Events and Submissions/Topic**

Assessment Tasks

1 Learning Portfolio

Assessment Type
Portfolio

Task Description
Make regular weekly entries in a study journal of the work completed.
Write up reflections on what has been learnt from the work completed.
Record interactions that seem relevant to this unit. Interactions may be with the lecturer, other students and work colleagues. Interactions may include class or Zoom tutorial sessions, telephone conversations, emails, postings on blogs or, face to face meetings.
Collect and record evidence of how the learning outcomes for this unit have been met.

Assessment Due Date
Review/Exam Week Wednesday (8 June 2022) 11:55 am AEST
There will be opportunities to submit progress reports on this assignment to ask for feedback before the final submission.

Return Date to Students
Week 12 Wednesday (1 June 2022)
Feedback will be provided within two weeks of submission.

Weighting
20%

Minimum mark or grade
40%

Assessment Criteria
The learning portfolio will be well organised, using professional formatting with page headers and footers.
There will be evidence of regular submissions in the learning journal for all three aspects of the assessment.

1. Work journal and record of interactions.
2. Evidence against learning outcomes.
3. Learning reflections (weekly).

Referencing Style

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

Submission
Online

Submission Instructions
An updated version of your Learning Journal will be submitted with each assignment.

Learning Outcomes Assessed

- Research current environmental legislation related to resource systems
- Apply data analysis to an existing data set to enhance the design of the proposed project
- Schedule the project to optimise its safety, productivity and rate of return
- Develop a stakeholder management plan to address community concerns and the operation's social licence to operate

Graduate Attributes

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

2 Case Study

Assessment Type
Case Study

Task Description
Apply to a mining company to review a large set of data to increase mine safety and productivity.
You will attempt the following steps,

1. Import the data
2. Clean the data
3. Split the data into training and test sets
4. Create a model
5. Train the model
6. Make predictions
7. Evaluate and improve the model

You will include a report detailing issues and successes.
You will also develop a schedule for a proposed project which will reflect the issues and successes encountered in the case study.

Assessment Due Date
Week 5 Wednesday (6 Apr 2022) 11:55 pm AEST
Refer to moodle for detailed submission requirements.

Return Date to Students
Week 6 Wednesday (20 Apr 2022)

Weighting
20%

Minimum mark or grade
40%

Assessment Criteria
Application to mining company reflects a professional level of communication.
Any issues are clearly stated and evidence of attempted resolutions is included in the report.
Evidence of problem-solving is included in the report.
All of the steps in the assignment have been attempted.
The schedule reflects issues and success in terms of timing and resources.

Referencing Style

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

Submission
Online

Submission Instructions
Refer to moodle for detailed submission requirements.

Learning Outcomes Assessed

- Apply data analysis to an existing data set to enhance the design of the proposed project

Graduate Attributes

- Problem Solving
- Critical Thinking

- Information Technology Competence

3 Project Proposal

Assessment Type
Report

Task Description
Write a project proposal for a mining operation that will address the use of big data to improve safety and productivity on site.
Your proposal will build on the work that has been completed in the case study.
It will be completed to a professional standard, suitable for submission to a mine technical services manager.
Further details and structure will be provided on the moodle site for this unit.

Assessment Due Date
Week 11 Wednesday (25 May 2022) 11:55 pm AEST

Return Date to Students
Exam Week Wednesday (15 June 2022)

Weighting
40%

Minimum mark or grade
40%

Assessment Criteria
Accuracy and clarity of project proposal.
Appropriateness of project proposal for improving mine safety and productivity.
Performance guidelines for the assessment criteria are available in Moodle.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Refer to moodle for detailed submission requirements.

Learning Outcomes Assessed

- Schedule the project to optimise its safety, productivity and rate of return
- Develop a stakeholder management plan to address community concerns and the operation's social licence to operate
- Communicate the results of your feasibility study via a professional level of presentation and a written report.

Graduate Attributes

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

4 Presentation on the use of big data in the mining industry

Assessment Type
Presentation

Task Description
Review a big data project related to a mining operation to identify,

- the aims and objectives of the project
- the workflow required for such a project
- the outcomes that were achieved

Critically assess where the project did well and where it could have been improved.
Identify potential development of the project that could improve safety and productivity for the mining operation.
Present your findings as a recording or an in-class presentation, depending on available resources.

Assessment Due Date
Week 12 Wednesday (1 June 2022) 11:55 pm AEST
This assessment may be submitted online or on-campus depending on availability of resources.

Return Date to Students
Review/Exam Week Wednesday (8 June 2022)

Weighting
20%

Minimum mark or grade
40%

Assessment Criteria
The need for the project is stated convincingly.
The aim and objectives of the project are clear and concise.
The workflow for the big data project is clearly articulated.
The outcomes of the reviewed project are clearly presented using available graphics.
Identified further development of the project with the potential to improve safety and productivity.
Presentation slides use legible text and sensible precision for values.
A critical assessment of the reviewed project is clearly communicated, identifying what was done well and what could be improved.
Professional standard of delivery.
Presented within the required time frame and time was used wisely.
Answers to questions demonstrate deeper knowledge of the project.

Referencing Style

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

Submission
No submission method provided.

Submission Instructions
This assessment may be submitted online or on-campus depending on availability of resources. Refer to moodle for detailed submission requirements.

Learning Outcomes Assessed

- Research current environmental legislation related to resource systems

Graduate Attributes

- Communication
- 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