ENAR12014 *Introduction to Mining Technology*
Term 1 - 2020

Profile information current as at 14/12/2025 05:29 pm

General Information

Overview
This unit introduces students to the improved sustainability, safety and productivity achieved in mining through the use of new technologies. You will learn about different types of sensors used to collect data from mining equipment and how that data can be collected and analysed. You will investigate the development and optimisation of mine designs using technology developed for Australian mining operations. There will be a particular focus on data collection and analysis, blast design and truck and shovel operations. You will use online forums, tutorials and learning journals to demonstrate effective and professional levels of collaboration and communication.

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
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 - 2020

- 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. **Written Assessment**
Weighting: 20%
2. **Written Assessment**
Weighting: 30%
3. **Report**
Weighting: 40%
4. **Portfolio**
Weighting: 10%

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 Have your say.

Feedback

Students found the content was good but would like the reading and lectures to align more closely with the assessment items.

Recommendation

Review reading material and lectures to align more closely with the assessment items. Review assessment items.

Unit Learning Outcomes

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

1. Evaluate the impact of technology on sustainability, safety and productivity in Australian mining
2. Investigate a data collection system for monitoring the performance of mining equipment
3. Apply given parameters to develop a drill and blast pattern for a coal or metalliferous deposit in a surface mining operation
4. Optimise truck and shovel operations in relation to surface mine layouts using appropriate software
5. Collaborate and communicate with lecturers and peers through the use of forums, learning journals and online tutorials.

Learning outcomes 1 and 2 have been specifically written to address the requirements of the Minerals Council of Australia. The council has asked for the inclusion of content that covers sustainability, data collection and analysis and automation as part of a course that will develop learning pathways to the modern mining sector.

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 - Written Assessment - 20%	•	•			
2 - Written Assessment - 30%			•		
3 - Report - 40%				•	
4 - Portfolio - 10%					•

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					

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Written Assessment - 20%	•	•	•	•			•		•	
2 - Written Assessment - 30%	•	•	•	•		•				
3 - Report - 40%	•	•	•	•		•				
4 - Portfolio - 10%	•		•	•	•		•	•		

Textbooks and Resources

Textbooks

ENAR12014

Prescribed

Introductory Mining Engineering
Edition: Second (2002)
Authors: Hartman, HL & Mutmansky, JM
John Wiley and Sons
Hoboken , New Jersey , USA
ISBN: 0-471-34851-1
Binding: Hardcover

Additional Textbook Information
Copies can be purchased from the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code)

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Word processing software (e.g. Microsoft Word)
- Zoom capacity (web cam and microphone)
- Excel spreadsheet software

Referencing Style

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

Teaching Contacts

Brendan Donnelly Unit Coordinator
b.donnelly@cqu.edu.au

Schedule

Week 1 Introduction to Mining - 09 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Mining	Hartman & Mutmansky Chapter 1: Introductory Mining Engineering, Reading in Week 1 Moodle Block	Weekly Zoom Tutorial Session - Course Introduction

Week 2 Mine Development - 16 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mine Development	Hartman & Mutmansky Chapter 4: Sections 4.1 to 4.6 Chapter 6: Sections 6.1 Reading in Week 2 Moodle Block	Weekly Zoom Tutorial Session - Mine Development

Week 3 Mining Methods - 23 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mining Methods	Hartman & Mutmansky Chapter 07: Sections 7.1 to 7.5 Chapter 08: All Chapter 09: Sections 9.1 to 9.5 Chapter 10: Sections 10.1 to 10.5 Chapter 11: Sections 11.1 to 11.5 Chapter 12: Sections 12.1 to 12.4 Reading in Week 3 Moodle Block	Weekly Zoom Tutorial Session - Mining Methods

Week 4 Mine Surveying - 30 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mine Surveying	Reading in Week 4 Moodle Block	Weekly Zoom Tutorial Session - Mine Surveying

Week 5 Mine Planning - 06 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mine Planning	Hartman & Mutmansky Chapter 06: Sections 6.2 to 6.5 Chapter 07: Sections 7.7 Chapter 09: Sections 9.6 Chapter 10: Sections 10.6 and 10.7 Chapter 11: Sections 11.1 to 11.6 Reading in Week 5 Moodle Block	Weekly Zoom Tutorial Session Session - Mine Planning **Assignment 1** Due: Week 5 Thursday (9 Apr 2020) 10:00 am AEST

Vacation Week - Non Teaching Week - 13 Apr 2020

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

Week 6 Blast Design - 20 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Blast Design	Reading in Week 6 Moodle Block	Weekly Zoom Tutorial Session - Blast Design

Week 7 Mine Ventilation and Environmental Hazards - 27 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mine Ventilation and Environmental Hazards	Hartman & Mutmansky Chapter 12: Section 12.5 Reading in Week 7 Moodle Block	Weekly Zoom Tutorial Session Session - Mine Ventilation

Week 8 - 04 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mining and the Environment	Hartman & Mutmansky Chapter 2: Section 2.4 Reading in Week 8 Moodle Block	Weekly Zoom Tutorial Session - Mining and the Environment

Week 9 Health and Safety - 11 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Health and Safety	Hartman & Mutmansky Chapter 2: Section 2.3 Reading in Week 9 Moodle Block	Weekly Zoom Tutorial Session - Health and Safety **Assignment 2** Due: Week 9 Monday (11 May 2020) 10:00 am AEST

Week 10 Introduction to Mineral Processing - 18 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Mineral Processing	Reading in Week 10 Moodle Block	Weekly Zoom Tutorial Session - Introduction to Mineral Processing

Week 11 Metallurgical Processing - 25 May 2020

Module/Topic	Chapter	Events and Submissions/Topic

Metallurgical Processing	Reading in Week 11 Moodle Block	Weekly Zoom Tutorial Session - Metallurgical Processing

Week 12 Hydrometallurgical Processing - 01 Jun 2020

Module/Topic	Chapter	Events and Submissions/Topic
Hydrometallurgical Processing	Reading in Week 12 Moodle Block	Weekly Zoom Tutorial Session - Hydrometallurgical Processing **Learning Portfolio** Due: Week 12 Friday (5 June 2020) 5:00 pm AEST

Review/Exam Week - 08 Jun 2020

Module/Topic	Chapter	Events and Submissions/Topic
No module or topic for review week.	No reading required.	**Assignment 3** Due: Review/Exam Week Monday (8 June 2020) 10:00 am AEST

Exam Week - 15 Jun 2020

Module/Topic	Chapter	Events and Submissions/Topic
No module or topic for exam week. No exam.	No reading required.	No exam.

Term Specific Information

Please refer to the moodle website of this unit for further information.

Assessment Tasks

1 Assignment 1

Assessment Type
Written Assessment

Task Description
This assessment will strengthen understanding of the historical development of mining methods and their social, environmental and economic impacts on Australian society. Carefully review the material provided in Moodle and answer the questions in the assignment.
· Review the detailed assignment questions found in Moodle
· Review relevant literature including textbooks and government websites, to gain a broad understanding of costs, processes and procedures associated with mining.
· Research recent scientific journal articles from the last three years
· Complete the assignment questions making effective use of the available resources
Submit the assignment in an electronic format using Word, Excel and pdf documents. Submit the assignment through the assessment link on Moodle.
Note: All submissions are processed using the similarity detection software, Turnitin. CQU values academic integrity. Cite and reference reliable sources using the Harvard Referencing Style Guide.

Assessment Due Date
Week 5 Thursday (9 Apr 2020) 10:00 am AEST

Submit electronically via Moodle with your name, unit code and assignment number i.e. NAME_ENAR11001_Assignment 1

Return Date to Students
Week 6 Thursday (23 Apr 2020)

Assignments will be returned with feedback within two weeks.

Weighting
20%

Minimum mark or grade
50%

Assessment Criteria
Use clear, coherent sentences.
Where appropriate, include clearly labelled diagrams.
Ensure photographs, pictures and diagrams are correctly labelled, introduced and referred to within the text of the answer.
Ensure formulae and workings are shown in sufficient detail to clearly explain how the answer was derived.
Answers should show correct units of measure eg. (m, MN, m^2, tonnes, m^3, ^oC, etc).
Correctly cite and reference sources of information. Include a list of references at the end of the assignment.
Use mining and mineral processing terminology correctly.
Refer to assignment specific assessment criteria listed in Moodle for further details.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Use Turnitin and Moodle to submit assignments.

Learning Outcomes Assessed

- Evaluate the impact of technology on sustainability, safety and productivity in Australian mining
- Investigate a data collection system for monitoring the performance of mining equipment

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Cross Cultural Competence
- Social Innovation

2 Assignment 2

Assessment Type
Written Assessment

Task Description
This assessment will strengthen understanding of the technical aspects of mining associated with drilling and fragmentation, mining acts and regulations and ventilation. Carefully review the material provided in moodle and answer the questions in the assignment.· Review the detailed assignment questions found in Moodle
· Review relevant literature including textbooks and government websites, to gain a broad understanding of costs, processes and procedures associated with mining.
· Research recent scientific journal articles from the last three years
· Complete the assignment questions making effective use of the available resources
Submit the assignment in an electronic format using Word, Excel and pdf documents. Submit the assignment through the assessment link on Moodle.
Note: All submissions are processed using the similarity detection software, Turnitin. CQU values academic integrity. Cite and reference reliable sources using the Harvard Referencing Style Guide.

Assessment Due Date
Week 9 Monday (11 May 2020) 10:00 am AEST

Submit electronically via Moodle with your name, unit code and assignment number i.e. NAME_ENAR11001_Assignment_2

Return Date to Students
Week 11 Monday (25 May 2020)

Assignments will be returned with feedback within two weeks.

Weighting
30%

Minimum mark or grade
50%

Assessment Criteria
Use clear, coherent sentences.
Where appropriate, include clearly labelled diagrams.
Ensure photographs, pictures and diagrams are correctly labelled, introduced and referred to within the text of the answer.
Ensure formulae and workings are shown in sufficient detail to clearly explain how the answer was derived.
Answers should show correct units of measure eg. (m, MN, m^2, tonnes, m^3, ^oC, etc).
Correctly cite and reference sources of information. Include a list of references at the end of the assignment.
Use mining and mineral processing terminology correctly.
Refer to assignment specific assessment criteria listed in Moodle for further details.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Use Turnitin and Moodle to submit assignments.

Learning Outcomes Assessed

- Apply given parameters to develop a drill and blast pattern for a coal or metalliferous deposit in a surface mining operation

Graduate Attributes

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

3 Assignment 3

Assessment Type
Report

Task Description
This assessment will strengthen understanding of the technical aspects of mining and mineral processing. Carefully review the material provided in Moodle and answer the questions in the assignment.

- Review relevant literature including textbooks and government websites, to gain a broad understanding of costs, processes and procedures associated with mining.
- Research recent scientific journal articles from the last three years
- Complete the assignment questions making effective use of the available resources

Submit the assignment in an electronic format using Word, Excel and pdf documents. Submit the assignment through the assessment link on Moodle.
Note: All submissions are processed using the similarity detection software, Turnitin. CQU values academic integrity. Cite and reference reliable sources using the Harvard Referencing Style Guide.

Assessment Due Date
Review/Exam Week Monday (8 June 2020) 10:00 am AEST

Submit electronically via Moodle with your name, unit code and assignment number i.e. NAME_ENAR11001_Assignment_3

Return Date to Students
Exam Week Monday (15 June 2020)

Assignments will be returned with feedback within two weeks.

Weighting
40%

Minimum mark or grade
50%

Assessment Criteria
Use clear, coherent sentences.
Where appropriate, include clearly labelled diagrams.
Ensure photographs, pictures and diagrams are correctly labelled, introduced and referred to within the text of the answer.
Ensure formulae and workings are shown in sufficient detail to clearly explain how the answer was derived.
Answers should show correct units of measure eg. (m, MN, m^2, tonnes, m^3, ^oC, etc).
Correctly cite and reference sources of information. Include a list of references at the end of the assignment.
Use mining and mineral processing terminology correctly.
Refer to assignment specific assessment criteria listed in Moodle for further details.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Use Turnitin and Moodle to submit assignments.

Learning Outcomes Assessed

- Optimise truck and shovel operations in relation to surface mine layouts using appropriate software

Graduate Attributes

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

4 Learning Portfolio

Assessment Type
Portfolio

Task Description
The "Learning Portfolio" provides an opportunity to reflect on learning. The Learning Portfolio records any work and reading that is relevant to the learning outcomes detailed in the course profile. Record and demonstrate evidence of all of the learning outcomes detailed for this unit, particularly teamwork, cultural sensitivity and ethical values. The Learning Portfolio provides an opportunity to discuss learning experiences online. It is also a record of websites, texts and journal articles that may be useful for future reference.
There are three sections to the Learning Portfolio:
1. Study Diary
2. Learning Reflections
3. Interactions
This assessment does not require a high-quality presentation. It just needs to demonstrate evidence of work undertaken towards weekly completion of the unit.

Assessment Due Date
Week 12 Friday (5 June 2020) 5:00 pm AEST

Submit electronically via Moodle with your name, unit code and assignment number i.e. NAME_ENAR11001_Learning_Portfolio

Return Date to Students
Review/Exam Week Friday (12 June 2020)

Assignments will be returned with feedback within two weeks.

Weighting
10%

Assessment Criteria
Weekly submissions in each section.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Turnitin will be used to check submissions. Avoid academic integrity issues. Use the link in moodle to submit assignments.

Learning Outcomes Assessed

- Collaborate and communicate with lecturers and peers through the use of forums, learning journals and online tutorials.

Graduate Attributes

- Communication
- Critical Thinking
- Information Literacy
- Team Work
- Cross Cultural 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