



# ENAR12014 Introduction to Mining Technology and Mineral Processing

## Term 1 - 2017

Profile information current as at 30/04/2024 08:18 pm

All details in this unit profile for ENAR12014 have been officially approved by CQUUniversity 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 introduces students to the improved safety and productivity of mining methods from an historical perspective. Students will investigate the social, environmental and economic sustainability of Australian mining operations and the impact of Australian laws on coal and metalliferous, underground and surface mining, blast design, and mineral processing. During the unit students will be expected to demonstrate an effective and professional level of teamwork, communication and support for collaborative peer group learning through the use of forums, reflective journals and workbooks.

### 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 - 2017

- Distance

### 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: 35%

#### 3. **Written Assessment**

Weighting: 45%

#### 4. **Portfolio**

Weighting: Pass/Fail

### 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 Moodle evaluation

##### Feedback

I wish all the material including assignment, study guides etc, where up on the moodle site before week 1. Found it difficult to find resources in the library as a distance student the only reference material i found was in print form and there was just not enough time for it to get to me.

##### Recommendation

Make fewer changes to the course material. If possible ensure everything is available by week 1. This is difficult when conferences restrict my availability.

##### Action

Reduced changes to the course material. Study material was available before week 1.

## Unit Learning Outcomes

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

1. Analyse the historical development of mining methods to determine the key factors that have improved the safety and productivity of mining operations.
2. Assess the social, environmental and economic sustainability of Australian mining operations.
3. Outline the acts and regulations associated with Australian law that impact on blast design and mineral processing for surface, underground, coal and metalliferous mining.
4. Determine a suitable blast design for a coal or metalliferous deposit in a surface mining operation.
5. Evaluate suitable mineral processing methods for the extraction, separation and concentration of various coal and metalliferous products.
6. Demonstrate an effective and professional level of teamwork, communication and support for collaborative peer group learning through the use of forums, reflective journals and workbooks.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Written Assessment - 20%	•	•	•			
2 - Written Assessment - 35%		•	•	•		
3 - Written Assessment - 45%			•	•	•	
4 - Portfolio - 0%	•	•	•	•	•	•

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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 - 35%	•	•	•	•		•				
3 - Written Assessment - 45%	•	•	•	•		•				
4 - Portfolio - 0%	•		•	•	•	•	•	•		

## Textbooks and Resources

### Textbooks

ENAR12014

#### Prescribed

##### **Introductory Mining Engineering**

Edition: 2nd edn (2002)

Authors: Hartman, HL & Mutmanský, JM

John Wiley and Sons

Hoboken, NJ, USA

ISBN: 9780471348511

Binding: Hardcover

[View textbooks at the CQUniversity Bookshop](#)

### 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

**Brendan Donnelly** Unit Coordinator

[b.donnelly@cqu.edu.au](mailto:b.donnelly@cqu.edu.au)

## Schedule

### Week 1 - 06 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Mining	Chapter 1, Introductory Mining Engineering, Hartman & Mutmanský Reading in Week 1 Moodle Block	Blackboard Collaborate Session - Course Introduction

### Week 2 - 13 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Mine Development	Chapter 4, Introductory Mining Engineering, Hartman & Mutmanský, Sections 4.1 to 4.6 Chapter 6, Introductory Mining Engineering, Hartman & Mutmanský, Sections 6.1 Reading in Week 2 Moodle Block	Blackboard Collaborate Session - Mine Development

### Week 3 - 20 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
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Mining Methods	Chapter 7, Introductory Mining Engineering, Hartman & Mutmanský, Sections 7.1 to 7.5 Chapter 8, Introductory Mining Engineering, Hartman & Mutmanský Chapter 9, Introductory Mining Engineering, Hartman & Mutmanský, Sections 9.1 to 9.5 Chapter 10, Introductory Mining Engineering, Hartman & Mutmanský, Sections 10.1 to 10.5 Chapter 11, Introductory Mining Engineering, Hartman & Mutmanský, Sections 11.1 to 11.5 Chapter 12, Introductory Mining Engineering, Hartman & Mutmanský, Sections 12.1 to 12.4 Reading in Week 3 Moodle Block	Blackboard Collaborate Session - Mining Methods
<b>Week 4 - 27 Mar 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Mine Surveying	Reading in Week 4 Moodle Block	Blackboard Collaborate Session - Mine Surveying  <b>Assignment 1</b> Due: Week 4 Monday (27 Mar 2017) 8:00 am AEST
<b>Week 5 - 03 Apr 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Mine Planning	Chapter 6, Introductory Mining Engineering, Hartman & Mutmanský, Sections 6.2 to 6.5 Chapter 7, Introductory Mining Engineering, Hartman & Mutmanský, Sections 7.7 Chapter 9, Introductory Mining Engineering, Hartman & Mutmanský, Sections 9.6 Chapter 10, Introductory Mining Engineering, Hartman & Mutmanský, Sections 10.6 and 10.7 Chapter 11, Introductory Mining Engineering, Hartman & Mutmanský, Sections 4.1 to 4.6 Reading in Week 5 Moodle Block	Blackboard Collaborate Session - Mine Planning
<b>Vacation Week - 10 Apr 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
<b>Week 6 - 17 Apr 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Blast Design	Reading in Week 6 Moodle Block	Blackboard Collaborate Session - Blast Design
<b>Week 7 - 24 Apr 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Mine Ventilation and Mine Environmental Hazards	Chapter 12, Introductory Mining Engineering, Hartman & Mutmanský, Section 12.5 Reading in Week 7 Moodle Block	Blackboard Collaborate Session - Mine Ventilation
<b>Week 8 - 01 May 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>

Mining and the Environment	Chapter 2, Introductory Mining Engineering, Hartman & Mutmansky, Section 2.4 Reading in Week 8 Moodle Block	Blackboard Collaborate Session - Mining and the Environment  <b>Assignment 2</b> Due: Week 8 Monday (1 May 2017) 8:00 am AEST
<b>Week 9 - 08 May 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Health and Safety	Chapter 2, Introductory Mining Engineering, Hartman & Mutmansky, Section 2.3 Reading in Week 9 Moodle Block	Blackboard Collaborate Session - Health and Safety
<b>Week 10 - 15 May 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Introduction to Mineral Processing	Reading in Week 10 Moodle Block	Blackboard Collaborate Session - Introduction to Mineral Processing
<b>Week 11 - 22 May 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Metallurgical Processing	Reading in Week 11 Moodle Block	Blackboard Collaborate Session - Metallurgical Processing
<b>Week 12 - 29 May 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Hydrometallurgical Processing	Reading in Week 12 Moodle Block	Blackboard Collaborate Session - Hydrometallurgical Processing
<b>Review/Exam Week - 05 Jun 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
		<b>Assignment 3</b> Due: Review/Exam Week Monday (5 June 2017) 8:00 am AEST
<b>Exam Week - 12 Jun 2017</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

This assessment is designed to strengthen your understanding of the historical development of mining methods and their social, environmental and economic impacts on Australian society. You will need to carefully review the material provided in moodle and to answer the questions in the assignment.

In order to achieve this you will need to:

- review the detailed assignment questions found in Moodle
- review relevant literature (textbooks, websites, etc) to gain a broad understanding of costs, processes and procedures associated with sampling and testing rocks.
- research the primary literature to locate relevant current primary sources (scientific journal articles written in the last 3 years)
- complete the assignment questions in your own words that makes effective use of the sources of information

Your assignment should be produced in an electronic format using word, excel and pdf documents. Submit your assignment through the assessment link on Moodle.

Note: All submissions are processed through the similarity detection software (called Turnitin), hence the requirement to submit the documents as pdf files. You must ensure that all of the work is your own, in line with University requirements.

**Assessment Due Date**

Week 4 Monday (27 Mar 2017) 8:00 am AEST

**Return Date to Students**

Monday (17 Apr 2017)

**Weighting**

20%

**Minimum mark or grade**

40%

**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<sup>2</sup>, tonnes, m<sup>3</sup>, °C, 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

**Learning Outcomes Assessed**

- Analyse the historical development of mining methods to determine the key factors that have improved the safety and productivity of mining operations.
- Assess the social, environmental and economic sustainability of Australian mining operations.
- Outline the acts and regulations associated with Australian law that impact on blast design and mineral processing for surface, underground, coal and metalliferous mining.

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Cross Cultural Competence
- Ethical practice

## 2 Assignment 2

**Assessment Type**

Written Assessment

**Task Description**

This assessment is designed to strengthen your understanding of the technical aspects of mining associated with drilling and fragmentation, mining acts and regulations and ventilation. You will need to carefully review the material provided in moodle and to answer the questions in the assignment.

In order to achieve this you will need to:

- review the detailed assignment questions found in Moodle
- review relevant literature (textbooks, websites, etc) to gain a broad understanding of costs, processes and procedures associated with sampling and testing rocks.
- research the primary literature to locate relevant current primary sources (scientific journal articles written in the last 3 years)
- complete the assignment questions in your own words that makes effective use of the sources of information

Your assignment should be produced in an electronic format using word, excel and pdf documents. Submit your assignment through the assessment link on Moodle.

Note: All submissions are processed through the similarity detection software (called Turnitin), hence the requirement to submit the documents as pdf files. You must ensure that all of the work is your own, in line with University requirements.



**Assessment Due Date**

Week 8 Monday (1 May 2017) 8:00 am AEST

**Return Date to Students**

Monday (15 May 2017)

**Weighting**

35%

**Minimum mark or grade**

40%

**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<sup>2</sup>, tonnes, m<sup>3</sup>, °C, 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

**Learning Outcomes Assessed**

- Assess the social, environmental and economic sustainability of Australian mining operations.
- Outline the acts and regulations associated with Australian law that impact on blast design and mineral processing for surface, underground, coal and metalliferous mining.
- Determine a suitable blast design 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**

Written Assessment

**Task Description**

This assessment is designed to strengthen your understanding of the technical aspects of mining and mineral processing. You will need to carefully review the material provided in moodle and to answer the questions in the assignment.

In order to achieve this you will need to:

- review the detailed assignment questions found in Moodle
- review relevant literature (textbooks, websites, etc) to gain a broad understanding of costs, processes and procedures associated with sampling and testing rocks.
- research the primary literature to locate relevant current primary sources (scientific journal articles written in the last 3 years)
- complete the assignment questions in your own words that makes effective use of the sources of information

Your assignment should be produced in an electronic format using word, excel and pdf documents. Submit your assignment through the assessment link on Moodle.

Note: All submissions are processed through the similarity detection software (called Turnitin), hence the requirement to submit the documents as pdf files. You must ensure that all of the work is your own, in line with University requirements.

**Assessment Due Date**

Review/Exam Week Monday (5 June 2017) 8:00 am AEST

**Return Date to Students**

Exam Week Friday (16 June 2017)

**Weighting**

45%

**Minimum mark or grade**

40%

**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<sup>2</sup>, tonnes, m<sup>3</sup>, °C, 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

**Learning Outcomes Assessed**

- Outline the acts and regulations associated with Australian law that impact on blast design and mineral processing for surface, underground, coal and metalliferous mining.
- Determine a suitable blast design for a coal or metalliferous deposit in a surface mining operation.
- Evaluate suitable mineral processing methods for the extraction, separation and concentration of various coal and metalliferous products.

**Graduate Attributes**

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

## 4 Learning Portfolio

**Assessment Type**

Portfolio

**Task Description**

The learning portfolio provides you with an opportunity to reflect on what you are learning. You will record in the learning portfolio, notes on any work and reading that is relevant to the learning outcomes detailed in the course profile. You will record and demonstrate evidence of all of the learning outcomes detailed for this course, particularly teamwork, cultural sensitivity and ethical values. The learning portfolio provides you with an opportunity to discuss your learning experiences online. It is also a record of websites, texts and journal articles that may be useful for future reference in your career in mining.

With each assignment submitted you will also submit an updated version of your learning portfolio. There are three elements to the portfolio,

1. Study Diary
2. Learning Reflections
3. Interactions

Each element should contain updates when submitted with an assignment.

Maintain a learning journal while you are working on this course. Spend the last 5 minutes of any study session updating your learning journal.

Reflect on your learning and record what you have been working on. Record your work and background reading that is completed as part of the preparation for submitting an assignment.

Record your online discussions and interactions and map them to the learning outcomes for this course.

Record and demonstrate evidence of all of the learning outcomes detailed for this course, particularly teamwork, cultural

sensitivity and ethical values.

### **Assessment Due Date**

A copy of your updated learning portfolio should be submitted with each assignment submission.

### **Return Date to Students**

Your Learning Portfolio will be returned with comments with your marked assignments.

### **Weighting**

Pass/Fail

### **Assessment Criteria**

With each assignment submitted you will also submit an updated version of your learning portfolio. There are three elements to the portfolio,

1. Study Diary
2. Learning Reflections
3. Interactions

Each element should contain updates when submitted with an assignment.

Maintain a learning journal while you are working on this course. Spend the last 5 minutes of any study session updating your learning journal.

Reflect on your learning and record what you have been working on. Record your work and background reading that is completed as part of the preparation for submitting an assignment.

Record your online discussions and interactions and map them to the learning outcomes for this course.

Record and demonstrate evidence of all of the learning outcomes detailed for this course, particularly teamwork, cultural sensitivity and ethical values.

### **Referencing Style**

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

### **Submission**

Online

### **Learning Outcomes Assessed**

- Analyse the historical development of mining methods to determine the key factors that have improved the safety and productivity of mining operations.
- Assess the social, environmental and economic sustainability of Australian mining operations.
- Outline the acts and regulations associated with Australian law that impact on blast design and mineral processing for surface, underground, coal and metalliferous mining.
- Determine a suitable blast design for a coal or metalliferous deposit in a surface mining operation.
- Evaluate suitable mineral processing methods for the extraction, separation and concentration of various coal and metalliferous products.
- Demonstrate an effective and professional level of teamwork, communication and support for collaborative peer group learning through the use of forums, reflective journals and workbooks.

### **Graduate Attributes**

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