ENER14001 *Resource Systems Automation Project*
Term 2 - 2024

Profile information current as at 13/07/2025 05:50 pm

General Information

Overview

This capstone unit will allow you to apply knowledge in mine design, automation and social innovation to the conversion of a traditional mine site to an automated mine site. You will apply relevant legislation to an audit of the operation's design elements to ensure they are suitable for automation. Your review will particularly address signals and communications between automated equipment and central dispatching. You will prepare a stakeholder management plan to keep the local community fully advised of potential impacts and proposed socially innovative solutions.

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 ENEX13001 Instrumentation and Industrial Automation 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 2 - 2024

- 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. **Presentation**
Weighting: 20%
2. **Case Study**
Weighting: 20%
3. **Portfolio**
Weighting: 20%
4. **Report**
Weighting: 40%

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 Unit Coordinator's reflection

Feedback

Discussion sessions provided by industry experts helped students understand the practical aspects when implementing automation solutions.

Recommendation

Discussion sessions by industry experts should be continued.

Feedback from Unit Coordinator's reflection

Feedback

The unit's learning materials and resources require updates to align with industry best practices.

Recommendation

The teaching team should engage with industry experts to improve the learning resources.

Unit Learning Outcomes

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

1. Research current legislation related to automation of resource systems
2. Design changes to a mine site to meet the signals and communication constraints required for automation
3. Audit the design elements of an existing mining operation in terms of its compliance with safety, legislation and productivity
4. Develop a stakeholder management plan to address community concerns related to the automation of a current mining operation
5. Communicate the results of investigations via a professional level 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 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 2I) 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 2I) 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) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 2A) 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1I 2I 4A) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1I 2A 3A 4I) 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 2I 3A) 2.2 Fluent application of engineering techniques, tools and resources. (LO: 2I 3A) 2.3 Application of systematic engineering synthesis and design processes. (LO: 2A 3I) 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 2I 4N 5A) 3.2 Effective oral and written communication in professional and lay domains. (LO: 1A 2A 3A 4A 5A) 3.3 Creative, innovative and pro-active demeanour. (LO: 2A 3I 5I) 3.4 Professional use and management of information. (LO: 1A 2A 3I 4I 5A) 3.5 Orderly management of self, and professional conduct. (LO: 2I 3I 4A 5A) 3.6 Effective team membership and team leadership. (LO: 2A 5I)

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 informationhttps://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%		•	•		

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
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					

Alignment of Assessment Tasks to Graduate Attributes

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

Textbooks and Resources

Textbooks

There are no required textbooks.

Additional Textbook Information
NO

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- HAULSIM
- TELPAC

Referencing Style

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

Teaching Contacts

Muhammad Qureshi Unit Coordinator
m.qureshi@cqu.edu.au

Schedule

Week 1 - 08 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Research automation on mine sites.	Automated Drill Rigs - systems and safe operating procedures Incidents and accidents.	

Week 2 - 15 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Research automation on mine sites.	Automated Haul Trucks - systems and safe operating procedures Incidents and accidents.	Tutorial: Simulation overview

Week 3 - 22 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Research automation on mine sites.	Automated Drones - Surveying. Systems and safe operating procedures. Automated updates of mine plans and schedules. Incidents and accidents.	Tutorial: Simulation

Week 4 - 29 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic

Systems suitable for automation	Monitoring key systems - Mine Ventilation, Ground Conditions, Longwalls, Rope Shovels and Draglines. Review signals and communication systems used on mine sites to collect data and control automated mining equipment.	Submit initial learning portfolio

Week 5 - 05 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Legislation, standards and guidelines	Research legislation related to the automation of mining equipment. Research standards and guidelines for automated systems used on mine sites. Identify principal hazards on mine sites. Where can personnel be removed from exposure to principal hazards?	**Presentation of proposed automated system** Due: Week 5 Wednesday (7 Aug 2024) 10:00 am AEST

Vacation Week - 12 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 19 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Case study of mine automation system	Review the introduction of an automated system at a mine site, including • new hazards and controls • improved safety standards • improved productivity • data transmission and system redundancies • social impacts of significant changes to roles and responsibilities • training requirements	Start Case Study

Week 7 - 26 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Stakeholder management plan case study	Review the stakeholder management plan for introducing an automated system at a mine.	

Week 8 - 02 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Research major mining operations.	Research the safety and productivity of several major mining operations in Australia. Investigate drill and blast, earth moving, incidents and accidents, mine planning and design. Identify the systems most suitable for automation based on safety and productivity criteria.	Submit Case Study and updated learning portfolio **Case study of an automated system in mining** Due: Week 8 Friday (6 Sept 2024) 11:59 pm AEST

Week 9 - 09 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Automation Proposal	Develop a proposal for implementing an automated system at an existing mining operation, including, • Data collection and control systems • Equipment requirements • safe work procedures	Start preparing the Presentation and Report **Learning Portfolio** Due: Week 9 Friday (13 Sept 2024) 11:59 pm AEST

Week 10 - 16 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Stakeholder management plan	Develop a stakeholder management plan for a proposed automation system at an existing mining operation. Review the social impacts of significant changes to the roles and responsibilities of site personnel. Identify potential training requirements.	

Week 11 - 23 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Presentation of the proposed mine automation system		Present proposal

Week 12 - 30 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Report preparation and submission.	Guest Lecture - if available.	

Review/Exam Week - 07 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic
		Submit Report and final learning portfolio **Report on Proposed automated system in mining** Due: Review/Exam Week Friday (11 Oct 2024) 11:59 pm AEST

Exam Week - 14 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Presentation of proposed automated system

Assessment Type
Presentation

Task Description
Present a proposal for a new automated system at an established mine site. The proposal should cover equipment requirements, communications requirements, a stakeholder management plan and an implementation plan.

Assessment Due Date
Week 5 Wednesday (7 Aug 2024) 10:00 am AEST

The presentation will be held during class or online to allow students to receive feedback on their presentation prior to submission of the report.

Return Date to Students
Week 6 Friday (23 Aug 2024)

Marking and feedback will be completed using google docs on the day of the presentation.

Weighting
20%

Minimum mark or grade
50%

Assessment Criteria
The presentation assessment criteria will cover the following areas;

- Content Knowledge
- Safety and Risk Assessment
- Stakeholder management
- Presentation Skills
- Innovation and Creativity

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
The presentation will be held during class or online to allow students to receive feedback on their Presentation prior to submission of the report.

Learning Outcomes Assessed

- Research current legislation related to automation of resource systems

Graduate Attributes

- Communication
- Critical Thinking
- Information Literacy

2 Case study of an automated system in mining

Assessment Type
Case Study

Task Description
Undertake a case study of an existing automated mining system such as production drilling or mine haul trucks.
Your case study should include a literature review and address the following topics,

- how the mine implemented the system
- the social impact of the system
- required changes to equipment and communications
- the impact on productivity and safety

Identify what could have been improved in implementing the automated system at the mine.
This assessment is designed to strengthen your understanding of automated mining systems. You will need to research how a mining operation implements an automated system at a mining operation.
To achieve this, you will need to:

- review the detailed assignment question found in Moodle
- check the marking criteria sheet found in Moodle
- Review relevant literature and resources (textbooks, websites, etc.) to understand better the processes and procedures associated with automated systems.
- Research the primary literature to locate relevant current primary sources (scientific journal articles written in the last ten years)
- Complete the case study in your own words, using reliable sources of information effectively.

Your assignment should be produced electronically using word processing and spreadsheet software. Submit your work through the assessment link on Moodle.
Note: All submissions are processed through the similarity detection software Turnitin. You must ensure all the work is your own, per University requirements. Correctly reference all sources of information using the CQU Harvard referencing style guide.

Assessment Due Date
Week 8 Friday (6 Sept 2024) 11:59 pm AEST

Return Date to Students
Week 10 Friday (20 Sept 2024)

Within two weeks of submission.

Weighting
20%

Minimum mark or grade
50%

Assessment Criteria
A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for each component of the assignment.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Assignments must be submitted using Moodle and Turnitin anti-plagiarism software.

Learning Outcomes Assessed

- Design changes to a mine site to meet the signals and communication constraints required for automation
- Audit the design elements of an existing mining operation in terms of its compliance with safety, legislation and productivity

Graduate Attributes

- Problem Solving
- Critical Thinking
- Information Technology Competence

3 Learning Portfolio

Assessment Type
Portfolio

Task Description
The learning portfolio will allow students to reflect on and discuss their learning. It also allows them to record work and reading not presented for assessment as part of the submitted assignments. Crucially, students must record and demonstrate evidence of all the learning outcomes detailed for this unit. The learning portfolio will consist of two components,

i. a study diary, including reflections
ii. evidence of learning outcomes

The submission link on Moodle will have a learning portfolio template. Students are not expected to cite or reference work in this piece of assessment, as it is a workbook-style assessment that students will update weekly.

Assessment Due Date
Week 9 Friday (13 Sept 2024) 11:59 pm AEST

The initial learning portfolio will be submitted by 11:00 pm on Friday of week 4. Updates will be submitted with the Case Study and the Report.

Return Date to Students
Week 11 Friday (27 Sept 2024)

Within two weeks of submission.

Weighting
20%

Minimum mark or grade
50%

Assessment Criteria
A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for each component of the assignment.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submit an updated version of the learning portfolio with each piece of assessment.

Learning Outcomes Assessed

- Research current legislation related to automation of resource systems
- Design changes to a mine site to meet the signals and communication constraints required for automation
- Audit the design elements of an existing mining operation in terms of its compliance with safety, legislation and productivity
- Develop a stakeholder management plan to address community concerns related to the automation of a current mining operation
- Communicate the results of investigations via a professional level 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 Report on Proposed automated system in mining

Assessment Type
Report

Task Description
Write a report proposing a new automated mining system for an existing mining operation.
Your report should include a literature review and address the following topics,

- an implementation plan
- a stakeholder management plan
- proposed changes to equipment and communications
- forecast impact on productivity and safety

Identify how the proposed automated system will be integrated into existing systems at the mine.
This assessment is designed to strengthen your understanding of automated mining systems. Researching a mining operation and its potential for implementing a new automated system would be best.
To achieve this, you will need to:

- Review the resources found in Moodle.
- Check the marking criteria sheet found in Moodle.
- Review relevant literature and resources (textbooks, websites, etc.) to understand better the systems, processes and procedures used at the mine.
- Research the primary literature to locate relevant current primary sources (scientific journal articles written in the last ten years)
- Complete the report in your own words, using reliable sources of information effectively.

Your assignment should be produced electronically using word processing and spreadsheet software. Submit your work through the assessment link on Moodle.
Note: All submissions are processed through the similarity detection software Turnitin. You must ensure all the work is your own, per University requirements. Correctly reference all sources of information using the CQU Harvard referencing style guide.

Assessment Due Date
Review/Exam Week Friday (11 Oct 2024) 11:59 pm AEST

Return Date to Students
Exam Week Friday (18 Oct 2024)

Within two weeks of receiving the submission.

Weighting
40%

Minimum mark or grade
50%

Assessment Criteria
A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for each component of the assignment.

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Develop a stakeholder management plan to address community concerns related to the automation of a current mining operation
- Communicate the results of investigations via a professional level presentation and a written report.

Graduate Attributes

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

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