ENMM20028 *Reliability, Availability, Maintainability and Safety*
Term 2 - 2020

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

General Information

Overview
This unit introduces the key concepts involved in the reliability, availability, maintainability and safety of fixed and mobile plant and equipment. Through this unit students will develop skills to analyse faults and failure data related to maintenance activities to achieve high plant integrity.

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

Pre-requisites or Co-requisites
Prerequisites: ENMM20023 and ENMM20025
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 - 2020

- Mixed Mode

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 Postgraduate 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. **Online Test**
Weighting: 10%
3. **Written Assessment**
Weighting: 70%

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 Student feedback survey

Feedback
Some links of the files in the Moodle need to be refreshed.

Recommendation
The reading materials in the Moodle will be checked and resolved if there is any broken link found.

Feedback from Student feedback survey

Feedback
Zoom caused interruption in the beginning of lecture session.

Recommendation
Need to consult with TaSAC and ensure robust solution so that the Zoom lecture can be conducted from any location without any interruption and full control given to the lecturer.

Feedback from Student feedback survey

Feedback
One of most interesting and high quality delivery with world latest software in RAMS practice throughout the diverse industry. Highly skilled and subject matter expert lecturer.

Recommendation
Will continue to deliver the quality learning and opportunity to develop skills and knowledge of the latest software in the field of practice.

Unit Learning Outcomes

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

1. Identify factors influencing the reliability and maintainability in plant operations.
2. Investigate operational safety and plant integrity in plant operations.
3. Apply reliability concepts, tools and techniques to achieve plant integrity.
4. Develop a safety and risk plan in a maintenance organisation.

n/a

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | • Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
1 - Written Assessment - 20%	•	•	•	•
2 - Online Test - 10%			•	•
3 - Written Assessment - 70%	•	•	•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
1 - Knowledge	◦	◦	◦	◦
2 - Communication	◦	◦	◦	◦
3 - Cognitive, technical and creative skills	◦	◦	◦	◦
4 - Research		◦	◦	◦
5 - Self-management		◦	◦	◦
6 - Ethical and Professional Responsibility		◦	◦	◦
7 - Leadership			◦	◦
8 - 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
1 - Written Assessment - 20%	◦	◦	◦					
2 - Online Test - 10%	◦	◦	◦	◦	◦	◦		
3 - Written Assessment - 70%	◦	◦	◦	◦	◦	◦	◦	

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)
- Study Guide in electronic form on the Moodle webpage - Reliability software
- Weekly online lectures via Zoom session
- Reliability 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

Md Uddin Unit Coordinator
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Schedule

Week 1 - 13 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Module 1 – Introduction to Reliability, Availability, Maintainability & Safety	Module 1: “All Sections”	Learning Exercises. Online lecture and tutorials schedule via Zoom sessions will be announced by the lecturer via Moodle website of this unit.

Week 2 - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Module 5 – RCA, FTA & ETA	Module 2: “All Sections”	Learning Exercises 5.9.7-1

Week 3 - 27 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Module 4 – RCA in the Workplace	Module 4 – RCA in the Workplace	

Week 4 - 03 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic

Module 2 – Failure Data & Weibull Analysis	Module 2: “All Sections”	Provide Moodle Blog Posts for Learning Exercises 2.2.3.1 Upload Assessment Essays and *.arca project file to Moodle. Written Assessment-1 (20%) **Census Date: Week 4 Tuesday 4th August. You cannot add or drop this unit after this date.** **Written Assessment-1** Due: Week 4 Friday (7 Aug 2020) 11:55 pm AEST
Week 5 - 10 Aug 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 3 – FMEA, FMECA, & RCM	Module 3: “All Sections”	Upload analysis files for learning exercises 3.2.2
Vacation Week - 17 Aug 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
VACATION		NO TEACHING IN THIS WEEK
Week 6 - 24 Aug 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 6 – Monte Carlo Simulation, Reliability Block Diagrams, LCC	Module 6: “All Sections”	Provide Moodle Blog Posts for Learning Exercises 6.2.1
Week 7 - 31 Aug 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 7 – ISO 55001	Module 7: “All Sections”	Preparation for next week Online Test
Week 8 - 07 Sep 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 8 – RCM Practical Project	Module 8: “All Sections”	On Line Test - Assessment 2- (10%) Upload Project file to Moodle for lecturer to check it. **Online Test** Due: Week 8 Friday (11 Sept 2020) 11:55 pm AEST
Week 9 - 14 Sep 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 9 – Return on Investment & OEE	Module 9: “All Sections”	Exercise 9.5.1
Week 10 - 21 Sep 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 10 – HAZOP, VAA, & Production Reliability	Module 10: “All Sections”	Provide Moodle Blog Posts for Learning Exercises 10.5
Week 11 - 28 Sep 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 11 –Safety and Reliability	Module 11: “All Sections”	Answer the short Moodle Quiz- Questions for Learning Activity 11.10.
Week 12 - 05 Oct 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Module 12 – Availability Prediction Practical Project	Module 12: “All Sections”	Final Project Week **Written Assessment** Due: Week 12 Friday (9 Oct 2020) 11:55 pm AEST

Review/Exam Week - 12 Oct 2020		
Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 19 Oct 2020		
Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Written Assessment-1

Assessment Type
Written Assessment

Task Description
Please read all of modules 1 through 4 of the Learning Guide to attempt this assignment. It may require data/information from your own organization and you may need to refer to resources beyond the Learning Guide. The assignment is required (where noted) to be written in a report form; structure, formatting, language and referencing are important. If the information used is of confidential nature, the data should be scaled or given as a schematic or otherwise disguised.
Responsibility lies with the student.
The objectives of this assignment are to:
Identify factors influencing reliability and maintainability in plant operations. Apply reliability concepts, tools and techniques to achieve plant integrity. Develop multi-literacy skills through reflection, written communications (blogs) and referencing. Introduce the concept of a structured defect elimination process.
Develop a safety and risk pan in a maintenance organization. Word count applies for this assignment and is subject to penalty. (Blog word count excluded from word count provision) Further details are available on the Moodle Website of this unit.
Develop multi-literacy skills through reflection, written communications (blogs) and referencing. Introduce the concept of a structured defect elimination process.
Develop a safety and risk plan in a maintenance organization.

Assessment Due Date
Week 4 Friday (7 Aug 2020) 11:55 pm AEST

Use file name format: Example –Smith_J_ENMM20028_Ass1.doc

Return Date to Students
Week 6 Monday (24 Aug 2020)

Weighting
20%

Assessment Criteria
This is a criterion based assessment. Please note that it is highly recommended that you read beyond the unit materials to complete assessment items. Your submission(s) for this assessment will be evaluated by the following criteria:
Question 1 – 350 to 500 words
Question 2 – 500-550 Words
Question 3 – 1000 – 1200 Words
RCA Project file and Incident Report
20 Marks Total:
5 Marks Demonstration of knowledge and understanding of concepts.
3 Marks Evidence of research in Blogs beyond own experience and unit material.
3 Marks Clarity of Expression, including use of terminology, ease of reading, spelling, and grammar, orderly and logical presentation and use of diagrams to illustrate points.
3 Marks Quality of technical presentation including neatness, appropriate use of figures, tables and references in all submitted materials.
1 Mark Use of correct and accurate referencing.
5 Marks Strength and Completeness of Root cause Analysis Project Submission.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
When saving your assignments for submission on Moodle please ensure you use the suggested file format: example: John Smith_S000111_ENMM20020_Assignment_1.doc

Learning Outcomes Assessed

- Identify factors influencing the reliability and maintainability in plant operations.
- Investigate operational safety and plant integrity in plant operations.
- Apply reliability concepts, tools and techniques to achieve plant integrity.
- Develop a safety and risk plan in a maintenance organisation.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills

2 Online Test

Assessment Type
Online Test

Task Description
Please read all of modules 1 through 8 of the Learning Guide to attempt this assignment. It may require data/information from your own organization and you may need to refer to resources beyond the Learning Guide. This assessment is an 80 Question – Multiple Choice Test. Partial credit is given IF an answer is partially correct. The objectives of this assignment are to:
-Identify factors influencing reliability and maintainability in plant operations.
-Apply reliability concepts, tools and techniques to achieve plant integrity.
-Develop multi-literacy skills through reflection, written communications (blogs) and referencing.
-Introduce the concept of a structured defect elimination process.

Assessment Due Date
Week 8 Friday (11 Sept 2020) 11:55 pm AEST

Return Date to Students
Week 10 Friday (25 Sept 2020)

Weighting
10%

Assessment Criteria
This is a criterion based assessment. Please note that it is highly recommended that you read beyond the unit materials to complete assessment items. Your submission(s) for this assessment will be evaluated by the following criteria:
10 Marks Total
1/8 Mark for Correct Answer selected.
1/16 Mark for Partially correct Answer – where a partially correct answer exists in the choices.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Watch for the announcement one week before the test and follow the instructions.

Learning Outcomes Assessed

- Apply reliability concepts, tools and techniques to achieve plant integrity.
- Develop a safety and risk plan in a maintenance organisation.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills

- Research
- Self-management
- Ethical and Professional Responsibility

3 Written Assessment

Assessment Type
Written Assessment

Task Description
Please read all of modules 1 through 8 of the Learning Guide to attempt this assignment. It may require data/information from your own organization and you may need to refer to resources beyond the Learning Guide. The assignment is required (were noted) to be written in a report form; structure, formatting, language and referencing are important. If the information used is of confidential nature, the data should be scaled or given as a schematic or otherwise disguised. Responsibility lies with the student.
Question 1 – 350 to 400 words
Question 2 – 1000-1200 Words
Question 3 – 1000 – 1500 Words
+ Project File
70 Marks Total
Questions 1 & 2 Marks = 30 total
20 Marks Demonstration of knowledge and understanding of concepts.
3 Marks Evidence of research beyond own experience and unit material.
3 Marks Clarity of expression, including use of terminology, ease of reading, spelling and grammar, orderly and logical presentation and use of diagrams to illustrate points.
1 Marks Quality of technical presentation including neatness, appropriate use of figures and tables and references.
3 Marks Use of correct and accurate referencing.
Question 3 - Availability Modeling and Report Marks = 40 total
10 Marks Demonstration of knowledge and understanding of concepts.
3 Marks Evidence of research beyond own experience and unit material.
3 Marks Clarity of expression, including use of terminology, ease of reading, spelling and grammar, orderly and logical presentation and use of diagrams to illustrate points.
1 Marks Quality of technical presentation including neatness, appropriate use of figures and tables and references.
3 Marks Use of correct and accurate referencing.
10 Marks Completeness of System Boundary, and Demonstration of knowledge of Availability Simulation
3 Marks Strength and completeness of Labor, Spares, and Equipment tables and use.
3 Marks Clarity of expression including use of sub system models.
1 Marks Quality of technical presentation including neatness, appropriate use of figures and tables and references and reports.
3 Marks Use of correct modeling techniques.
The objectives of this assignment are to:
Identify factors influencing reliability and maintainability in plant operations.
Apply reliability concepts, tools and techniques to achieve plant integrity.
Develop multi-literacy skills through reflection, written communications (blogs) and referencing.
Introduce the concept of a structured defect elimination process.
Develop a safety and risk plan in a maintenance organization.

Assessment Due Date
Week 12 Friday (9 Oct 2020) 11:55 pm AEST

Use file name format: Example –Smith_J_ENMM20018_Ass3.doc

Return Date to Students

Assessment feedback and mark will be available after unit moderation meeting

Weighting
70%

Assessment Criteria
This is a criterion-based assessment item.
Please note that it is highly recommended that you read beyond the course materials to complete assessment items. Your submission for this assessment will be evaluated by the following criteria:
Question 1 – 350 to 500 words
Question 2 – 500-550 Words

Question 3 – 1000 – 1200 Words
RCM/AVSIM Project file (NOTE: It may be required to email the project file If Moodle does not accept the .awbx file type.)

70 Marks Total

Questions 1 & 2 + Blogs Marks = 30 total
Ø 20 Marks Demonstration of knowledge and understanding of concepts.
Ø 3 Marks Evidence of research beyond own experience and course material.
Ø 3 Marks Clarity of expression, including use of terminology, ease of reading, spelling and
Ø grammar, orderly and logical presentation and use of diagrams to illustrate points.
Ø 1 Marks Quality of technical presentation including neatness, appropriate use of figures and
Ø tables and references.
Ø 3 Marks Use of correct and accurate referencing.

Question 3 - Availability Modeling Report Marks = 20 total
Ø 10 Marks Demonstration of knowledge and understanding of concepts.
Ø 3 Marks Evidence of research beyond own experience and course material.
Ø 3 Marks Clarity of expression, including use of terminology, ease of reading, spelling and
Ø grammar, orderly and logical presentation and use of diagrams to illustrate points.
Ø 1 Marks Quality of technical presentation including neatness, appropriate use of figures and
Ø tables and references.
Ø 3 Marks Use of correct and accurate referencing.

Availability Simulation Model = 20 Marks
Ø 10 Marks Completeness of System Boundary, and Demonstration of knowledge of Availability
Ø Simulation
Ø 3 Marks Strength and completeness of Labor, Spares, and Equipment tables and use.
Ø 3 Marks Clarity of expression including use of sub system models.
Ø 1 Marks Quality of technical presentation including neatness, appropriate use of figures and
Ø tables and references and reports.
Ø 3 Marks Use of correct modeling techniques.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Use file name format: Example –Smith_J_ENMM20018_Ass3.doc

Learning Outcomes Assessed

- Identify factors influencing the reliability and maintainability in plant operations.
- Investigate operational safety and plant integrity in plant operations.
- Apply reliability concepts, tools and techniques to achieve plant integrity.
- Develop a safety and risk plan in a maintenance organisation.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

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