



# ENMM20031 Condition Monitoring and Tribology

## Term 1 - 2021

Profile information current as at 05/07/2022 05:40 pm

All details in this unit profile for ENMM20031 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## General Information

### Overview

This unit is focused on the tribological principles to understand fundamentals of friction, wear and lubrication aspects of a machine. The knowledge of tribology will help student analysing root cause of failures and also in selecting an appropriate condition monitoring technique to predict failures. The unit will provide adequate knowledge to use condition monitoring as a maintenance strategy. Students will acquire adequate skills to select a suitable condition monitoring technique from a variety of techniques such as; sensory and function inspection; vibration monitoring; infrared thermography; oil analysis; acoustic emission; stress, strain, displacement; non-destructive testing/inspection; electrical equipment performance analysis; and performance monitoring in general.

### 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 & 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 1 - 2021

- 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 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. **Written Assessment**

Weighting: 20%

#### 3. **Presentation and Written Assessment**

Weighting: 60%

### 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**

All the study contents, the guiding notes, and the feedback were very good. The only improvement would be on recording the Zoom lectures.

**Recommendation**

Good teaching practices will be maintained. If the recording quality of the lecture is not good, old recordings will be uploaded on the Moodle website.

#### Feedback from Have your say

**Feedback**

Thanks to the lecturer, I enjoyed this module.

**Recommendation**

Good teaching practices will be maintained and the unit will be improved on a regular basis.

#### Feedback from Via Zoom Session

**Feedback**

This unit is very industry focused, it is worth doing Masters choosing a topic from this area.

**Recommendation**

Industry focus will be maintained and students will be encouraged to articulate to Masters studies.

## Unit Learning Outcomes

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

1. Identify the range of condition monitoring techniques suitable in a plant.
2. Establish tribological principles for deciding condition monitoring techniques.
3. Investigate the standards associated with condition monitoring techniques.
4. Justify the use of condition monitoring in a plant.

n/a



## 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 electronic copy on the Moodle website
- Online lecture sessions via Zoom
- Web Links of different topics

## Referencing Style

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

## Teaching Contacts

**Subhash Sharma** Unit Coordinator  
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**Muralitheran V Kanagarajoo** Unit Coordinator  
[m.kanagarajoo@cqu.edu.au](mailto:m.kanagarajoo@cqu.edu.au)

## Schedule

### Week 1 - 08 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Module 1	Introduction to Condition Monitoring and tribology	On line lecture schedule will be discussed by the lecturer in a zoom session. Visit Moodle webpage for further details. Call TASAC/ IT Help desk, at 1300 666 620 for setting up Zoom software link at least a week before the term starts. A tutorial day will be announced via moodle. <b>Zoom Lecture: Tuesday @ 6:00 pm. (Melbourne Time)</b>

### Week 2 - 15 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Module 2	Topic: Introduction to Tribology and Oil analysis	View power point slides on Tribology and Oil analysis and resources listed on the Moodle webpage: <b>Zoom Lecture: Monday @ 6:00 pm. (Melbourne Time)</b>

### Week 3 - 22 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
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Search for ASTM standards website before coming to the lecture.

Module 3

**Used Oil Analysis and ASTM Lubricant testing standards.**

**Zoom Lecture: Monday @ 6 pm , ask questions via zoom on demand or Phone tutorial.**

#### **Week 4 - 29 Mar 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Module 3	Oil cleanliness	Group and forum discussion. Your assignment is due next week, ask questions in the zoom session on demand or in the tutorial via phone. <b>Zoom Lecture: Monday @ 6:00 pm. (Melbourne Time)</b> <b>This week Tuesday is the Census Date, after this day you cannot drop this unit.</b>

#### **Week 5 - 05 Apr 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Module 4	Vibration Analysis	<b>Zoom Lecture: Monday @ 6:00 pm. (Melbourne Time) Discussion on the first assignment ask questions via zoom or phone.</b> <b>Self study Vibration Analysis slides and study guide and prepare questions in advance that you may like to ask the guest lecturer/ industry expert in the next lecture class.</b>  <b>Written Assessment-1 Due: Week 5 Friday (9 Apr 2021) 11:45 pm AEST</b>

#### **Vacation Week - 12 Apr 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
		<b>NO LECTURE THIS WEEK</b>

#### **Week 6 - 19 Apr 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Module 4	Vibration Monitoring	<b>GUEST LECTURE by Industry Vibration expert: It is an Important lecture, as it includes tips for solving Assignment 2 questions. Don't miss this lecture.</b> <b>Zoom Lecture: Monday @ 6:00 pm. (Melbourne Time)</b>

#### **Week 7 - 26 Apr 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Module 5	Vibration Monitoring	No Lecture this week, ask questions in the Tutorial class to be announced via Moodle or direct email to the guest lecturer.

#### **Week 8 - 03 May 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Module 6	Causes of Vibration	<b>No Lecture this week. Attend forum activities and submit assignment on Friday this week.</b>

#### **Week 9 - 10 May 2021**

<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
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Module 2

Parameters and symptoms limits. and Non Destructive Testing.

Visit suggested web links for the Non Destructive testing  
Next week a specialist lecture by a guest lecturer on **Internet of Things (IOT) with possible application to Condition monitoring.**

**Written Assessment-2** Due: Week 9  
Monday (10 May 2021) 11:45 pm AEST

#### Week 10 - 17 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Advanced Condition Monitoring	Advanced Condition monitoring techniques and current trends.	<b>Zoom Lecture: Monday @ 6:00 pm. (Melbourne Time)</b> Visit the following website: <b>Attend this Important Guest Lecture on Internet Of Things (IOT)</b>

#### Week 11 - 24 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Financial Aspects of Condition Motoring	Return on investment- lecture slides and study guide	<b>Zoom Lecture: Monday @ 6 pm , discuss assignment 3.</b> Discussion on Assignment 3, ask questions on Assignment 3 via phone or pre-booked zoom session.

#### Week 12 - 31 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Revision	Mini-project queries	Your assignment is due on Monday next week, ask questions via phone or or in the zoom session. <b>Finalize Mini-project</b>

#### Review/Exam Week - 07 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic
	Assignment submission	Assignment due on Monday <b>Presentation and Written Assessment - 3</b> Due: Review/Exam Week Monday (7 June 2021) 11:45 pm AEST

#### Exam Week - 14 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic
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## Assessment Tasks

### 1 Written Assessment-1

#### Assessment Type

Written Assessment

#### Task Description

The written assessment will cover introduction of condition monitoring principles and fundamentals of Tribology (friction, wear and lubrication) connecting with used oil analysis. Students must have good knowledge of ASTM standards for oil testing. Details of the assessment will be available in the question sheet posted on the Moodle web page of this unit. The

assignment will be based on information gathered from your industry reports or interviews. Your interpretation of the information will demonstrate your knowledge of oil analysis practiced in industries and understanding of tribology principles in machines working around you. The resources required for this assignment are not limited to the Learning Guide only, company reports, information from websites and books will be necessary.

### **Assessment Due Date**

Week 5 Friday (9 Apr 2021) 11:45 pm AEST

Use standard file name format Please see the unit moodle webpage for the assessment criteria. A rubric will be available to explain the assessment criteria explicitly. Proper referencing is essential, use diagrams tables and charts as much as you can to beat the word count limit. Plan your assessment before writing so that it meets the assessment criteria and no part of the question is left unanswered. Quality of the contents carry marks.

### **Return Date to Students**

Week 7 Monday (26 Apr 2021)

It is expected that marked assignments will be returned within 2 weeks of the due date of submission when submitted on time.

### **Weighting**

20%

### **Assessment Criteria**

The assessment criteria for this assignment is based on the clarity of the problem definition and quality of the contents. Provide overall clarity of expression, by using figures and tables, use them as a picture to control the word count limit. For other information such as, marking criteria, assignment question and the marking scheme for each question please visit the moodle web page of this unit.

### **Referencing Style**

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

### **Submission**

Online

### **Submission Instructions**

Submit your assignment electronically in "MSWord" format NOT pdf, Ensure filename is formatted as (example): John Smith\_S000111\_ENMM20031\_Assignment\_1.doc

### **Learning Outcomes Assessed**

- Identify the range of condition monitoring techniques suitable in a plant.
- Establish tribological principles for deciding condition monitoring techniques.
- Investigate the standards associated with condition monitoring techniques.
- Justify the use of condition monitoring in a plant.

### **Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research

## **2 Written Assessment-2**

### **Assessment Type**

Written Assessment

### **Task Description**

Assessment deals with the basic principles of vibration monitoring , vibration data collection and its analysis. Assignment questions will be posted on the Moodle Web page of this unit. Question may require theoretical answers or based on the data that you collect from your work place. Students are expected to research resources listed on the Moodle web page, interviews and company reports. Please note that reading will not be limited to the Study Guide only.

### **Assessment Due Date**

Week 9 Monday (10 May 2021) 11:45 pm AEST

### **Return Date to Students**

Week 11 Monday (24 May 2021)

It is expected that marked assessment will be returned within 2 weeks of the due date when submitted on time

### **Weighting**

20%



**Assessment Criteria**

The assessment criteria will be explained in the Assignment Question sheet posted on the Moodle web page. Marks will be assigned for each question in the question sheet. Each part of the question must be answered, part answered question will result in lower grade.

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Submit your assignment electronically in "MSWord" format NOT pdf, Ensure filename is formatted as (example): John Smith\_S000111\_ENMM20031\_Assignment\_2.doc.

**Learning Outcomes Assessed**

- Identify the range of condition monitoring techniques suitable in a plant.
- Establish tribological principles for deciding condition monitoring techniques.
- Investigate the standards associated with condition monitoring techniques.
- Justify the use of condition monitoring in a plant.

**Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management

## 3 Presentation and Written Assessment - 3

**Assessment Type**

Presentation and Written Assessment

**Task Description**

This assessment is a mini-project report where the project will be based on a condition monitoring plan that can be applied to establish a new CM system or to upgrade the existing condition monitoring practices at your own workplace. You may be required to use CMMS data from your company, interview stake holders, collect information from CMMS or information available in books and websites. In case the data is confidential, inflate it or deflate it, as CQU does not take responsibility of the data security. Make use of tables and charts as a picture to minimize the word count as limit applies. You will be required to present less than 10 power point slides on a problem related to advanced technologies practiced in CM.

**Assessment Due Date**

Review/Exam Week Monday (7 June 2021) 11:45 pm AEST

**Return Date to Students**

Exam Week Friday (18 June 2021)

Marks posted in the grade book for this assignment may be delayed, marks are also subjected to change due to moderation process.

**Weighting**

60%

**Assessment Criteria**

The assessment criteria will be explained in the question sheet available on the Moodle web page. In this assignment a word count limit will apply. A rubric will be provided in the moodle webpage to explain the marking criteria explicitly. Proper referencing is essential. Answers should be short but to the point highlighting your own interpretation to reflect the workplace experience. Plan your assessment before writing so that it meets the assessment criteria and no part of the questions asked is left unanswered. Quality of the contents is important to score high marks.

**Referencing Style**

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

**Submission**

Online

### **Submission Instructions**

Submit your assignment electronically in "MSWord" format NOT pdf, Ensure filename is formatted as (example): John Smith\_S000111\_ENMM20031\_Assignment\_3.doc.

### **Learning Outcomes Assessed**

- Investigate the standards associated with condition monitoring techniques.
- Justify the use of condition monitoring in a plant.

### **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