



Course Outline (Higher Education)

School:	School of Engineering, Information Technology and Physical Sciences
Course Title:	MACHINE CONDITION MONITORING AND FAULT DIAGNOSIS
Course ID:	MREGC5006
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	030799

Description of the Course :

This course provides a range of advanced topics on condition monitoring for engineering assets. It covers an understanding of condition monitoring, its benefits and techniques, visual inspection techniques, non-destructive testing, analysis techniques for wear debris/contaminants in lubricants, condition monitoring of electrical machines and vibration analysis. It also covers how to identify fault diagnosis techniques applied to condition assessment activities for systems and components. This is an elective course for students interested in practicing condition monitoring and good asset management.

Grade Scheme: Graded (HD, D, C, etc.)

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:**Knowledge:**

- K1.** Compare and describe use of visual inspection techniques, non-destructive testing, wear particle contaminant analysis for condition monitoring of assets or components.
- K2.** Apply and demonstrate effective use of performance and vibration analysis for condition monitoring of systems or components
- K3.** Develop plan and illustrate how machine condition monitoring techniques can be applied to system or components for fault assessments and alert level prediction of potential failures.
- K4.** Defend and justify investment in condition monitoring for systems or components through use of criticality ranking and estimation of benefits.

Skills:

- S1.** Demonstrate the ability to use condition monitoring on common plant items in industry, using the technologies of vibration analysis, performance analysis and visual inspection.
- S2.** Prepare and apply detailed plan for Non-Destructive Testing, wear debris analysis and electrical plant tests for the purpose of condition monitoring of systems or components.

Application of knowledge and skills:

- A1.** Apply condition monitoring to systems or components to monitor performance and trigger alert levels for maintenance actions.

Course Content:

This course covers an understanding of condition monitoring, its benefits and techniques, visual inspection techniques, non-destructive testing, analysis techniques for wear debris/contaminants in lubricants, condition monitoring of electrical machines and vibration analysis.

Topics may include:

- Introduction to condition monitoring.
- Three machine condition monitoring techniques covering Visual Inspection & Non-Destructive Testing.
- Performance analysis of assets.
- Vibration analysis.
- Data collection and analysis of vibration phase angle.
- Developing and implementing condition monitoring program.

Values:

- V1.** Be confident in condition monitoring and condition assessment for informed decisions on maintenance interventions.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each**

program

Graduate attribute and descriptor		Development and acquisition of GAs in the course			
		Learning Outcomes (KSA)	Code A. Direct B. Indirect N/A Not addressed	Assessment task (AT#)	Code A. Certain B. Likely C. Possible N/A Not likely
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1, K2, K3, K4, S1, S2, A1	A	AT1, AT2	A
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	? K1, K2, K3, K4, S1, S2, A1	B	AT1, AT2	B
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	K1, K2, K3, K4, S1, S2, A1	B	AT2	B
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	? K1, K2, K3, K4, S1, S2, A1	A	AT1, AT2	A
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	K1, K2, K3, K4, S1, S2, A1	B	AT1, AT2	B

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S2, A1	Analysis and report on Condition Monitoring techniques and applications.	Analysis and report	20% - 40%
K1, K2, K3, K4, S1, S2, A1	Analysis of degradation and condition monitoring report of engineering system or component.	Analysis and report	20% - 40%
K1, K2, K3, K4, S1, S2, A1	Examination or online test	Examination or online test	60% - 40%

Adopted Reference Style:

Other (IEEE)