

Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Machine Condition Monitoring and Fault Diagnosis
Unit ID:	MREGC5006
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	030799

Description of the Unit:

This unit 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 unit for students interested in practicing condition monitoring and good asset management.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	■	■	■	■	■	■
Intermediate	■	■	■	■	■	■
Advanced	■	■	■	■	✓	■

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.

Unit Content:

This unit 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:

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

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are to be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-

operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students at this level will demonstrate an advanced ability in a range of contexts to effectively communicate, interact and work with others both individually and in groups. Students will be required to display high level skills in-person and/or online in: <ul style="list-style-type: none"> • Using and demonstrating a high level of verbal and non-verbal communication • Demonstrating a mastery of listening for meaning and influencing via active listening • Demonstrating and showing empathy for others • High order skills in negotiating and conflict resolution skills • Demonstrating mastery of working respectfully in cross-cultural and diverse teams. 	Not applicable	Not applicable
FEDTASK 2 Leadership	Students at this level will demonstrate a mastery in professional skills and behaviours in leading others. <ul style="list-style-type: none"> • Creating and sustaining a collegial environment • Demonstrating a high level of self-awareness and the ability to self-reflect and justify decisions • Inspiring and initiating opportunities to lead others • Making informed professional decisions • Demonstrating initiative in new professional situations. 	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students at this level will demonstrate high level skills in working in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: <ul style="list-style-type: none"> • Reflecting critically to generate and consider complex ideas and concepts at an abstract level • Analysing complex and abstract ideas, concepts and information • Communicate alternative perspectives to justify complex ideas • Demonstrate a mastery of challenging conventional thinking to clarify complex concepts • Forming creative solutions in problem solving to new situations for further learning. 	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students at this level will demonstrate the ability to work competently across a wide range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: <ul style="list-style-type: none"> • Mastering, exploring, evaluating, managing, curating, organising and sharing digital information professionally • Collating, managing complex data, accessing and using digital data securely • Receiving and responding professionally to messages in a range of professional digital media • Contributing competently and professionally to digital teams and working groups • Participating at a high level in digital learning opportunities. 	Not applicable	Not applicable

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 5 sustainable and Ethical Mindset	Students at this level will demonstrate a mastery of considering and assessing the consequences and impact of ideas and actions in enacting professional ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> • Demonstrate informed judgment making that considers the impact of devising complex solutions in ambiguous global economic environmental and societal contexts • Professionally committing to the promulgation of social responsibility • Demonstrate the ability to evaluate ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Communicating lifelong, life-wide and life-deep learning to be open to the diverse professional others • Generating, leading and implementing required actions to foster sustainability in their professional and personal life 	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment 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)

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)