

Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	QUANTITATIVE TECHNIQUES FOR ASSET MANAGEMENT
Unit ID:	MREGC5005
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	(MREGC5101)
ASCED:	039999

Description of the Unit:

This unit covers quantitative techniques and tools applied to asset management and risk based asset management decisions. This unit includes core topics of engineering systems, system diagrams, quantitative risk analysis techniques and reliability analysis methods (system and reliability block diagrams and hazard rate analysis for systems and components and active, parallel / standby redundancy). It also covers reliability statistics (Weibull analysis, reliability growth analysis, repairable and non-repairable systems) and maintenance optimisation models (replacement, inspections, maintenance resources requirement).

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

Work Experience:

No work experience: Student is not undertaking work experience in industry.

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:

On successful completion of the unit the students are expected to be able to:

Knowledge:

- K1.** Interpret systems drawing, quantitative risk analysis, event trees and fault tree analysis.
- K2.** Detailed and critical explanations of reliability analysis methods including system diagram, reliability block diagram, hazard rates at system & component level, MooN system, active, parallel and stand-by redundancy.
- K3.** Provide comprehensive overviews of reliability related statistical processes.
- K4.** Classify and annotate maintenance decision models.

Skills:

- S1.** Analyse asset maintenance and asset performance data to conduct quantitative risk analyses.
- S2.** Develop models to analyse asset management options and recommend decisions based on maintenance optimisation techniques.

Application of knowledge and skills:

- A1.** Identify opportunities for improvement using reliability engineering techniques and analysing maintenance and asset performance data.
- A2.** Construct models and apply reliability engineering and statistical techniques to optimise maintenance decisions.

Unit Content:

This unit covers engineering systems, system diagrams, quantitative risk analysis techniques and reliability analysis methods (system and reliability block diagrams and hazard rate analysis for systems and components and active, parallel / standby redundancy).

Topics may include:

- Engineering Systems and Quantifiable Risk Analysis.
- Reliability Analysis for components and systems.
- Failure data and statistical analysis for reliability.
- Maintenance Optimisation Models.

Learning Task and Assessment:

This 15 CP online unit at postgraduate level requires a minimum time commitment of 150 hours of study. Assessments need to be submitted online in assessment submission area allocated for each assessment.

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K2-K3-K4-S1-S2-A1-A2	Analysis and report of faults using failure data.	Analysis and report	10% - 30%
K1-K2-K3-S1-S2-A1-A2	Analysis of failure data for life prediction and improve reliability.	Analysis and report	20% - 40%
K1-K2-K3-k4-S1-S2-A1-A2	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](#)