Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	BASIC QUANTITATIVE SKILLS FOR RELIABILITY ENGINEERING
Unit ID:	MREGC5101
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	030799

Description of the Unit:

This unit provides an introduction to reliability mathematics for a conceptual and quantitative understanding of reliability theories. It covers reliability data analysis using distributions such as Weibull analysis, Mean time to failures, Mean time between failures, Mean time to repair and their impacts on reliability, availability and maintainability. Topics will also include the analysis of failure data for reliability assessment and improvement, introduction to reliability software packages and its applications in reliability engineering for asset management and maintenance decisions. This is an important foundational unit for students interested in practicing reliability engineering.

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. Associate various mathematical concepts to calculation techniques for reliability problems.

K2. Distinguish where computer software can be used for studying problems in reliability.

K3. Outline the study of mathematical techniques for preventive replacement analysis.

Skills:

S1. Analyse reliability data, including burn-in, random and wear out failures, and how to take into account those items which have not failed.

S2. Estimate key parameters such as Mean Time Between Failures (MTBF) and the estimation of confidence limits.

S3. Determine preventive replacement policy.

S4. Evaluate reliability, availability and maintainability intervention options.

Application of knowledge and skills:

A1. Select and apply appropriate quantitative tools for analysing reliability problems.

A2. Evaluate the tools and techniques available for analysing failure data in reducing downtimes.

A3. Decide on interventions using underlying principles for maintenance planning and risk based decision-making.

Unit Content:

This unit covers failure data analysis for reliability, availability and maintainability.

Topics may include:
- Introduction to Reliability Statistics.
- Weibull Analysis and computer based models.
- Random Failures and confidence Limits.
- Preventive replacements and financial analysis of capital equipment.
- Reliability, maintainability, availability and repair pools.

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, S1, S2, S3, S4, A1, A2, A3	Analysis of failure data and report on preventive replacement policies.	Analysis and report.	10% - 40%
K1, S4, A1, A2, A3	Analysis of financial aspects and report on replacements of capital equipment.	Analysis and report.	10% - 40%
K1, K2, K3, S1, S2, S3, S4, A1, A2, A3	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](#)