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Title: Availability, Reliability, Maintainability (ARM) Analysis
 Status: Definitive
 Code: **7538ENGRSK** (118838)
 Version Start Date: 01-08-2012

Owning School/Faculty: Engineering
 Teaching School/Faculty: Engineering

Team	Leader
Alan Wall	

Academic Level: FHEQ7 **Credit Value:** 10.00 **Total Delivered Hours:** 16.50
Total Learning Hours: 100 **Private Study:** 83

Delivery Options

Course typically offered: Runs Twice - S1 & S2

Component	Contact Hours
Lecture	8.000
Online	0.500
Tutorial	8.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	essay	An essay question comprising several component parts, based around a case study, up to 4,000 words long.	100.0	

Aims

To demonstrate expertise in Availability, Reliability and Maintainability (ARM) assessment methods and how to apply them to improve maintenance management, maintainability and reliability.

Learning Outcomes

After completing the module the student should be able to:

- LO1 Apply the analysis methodologies to systems and sub-systems including both design and operation restrictions to determine the Availability, Reliability and Maintainability of these Systems.
- LO2 Critically review and balance the requirements of the design for ARM and safety.
- LO3 Logically deduce how ARM results for a system may be improved.
- LO4 Categorise and determine ARM requirements / processes for a project.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

essay	LO	LO	LO	LO
	1	2	3	4

Outline Syllabus

Introduction to Availability, Reliability and Maintainability:

- * *Definition of Terms*
- * *Importance of ARM*
- * *Defining the Mission*
- * *ARM Targets and Target Apportionment*
- Availability and Safety – Potential Conflicts*
- * *Differences Between Safety and ARM* Claims on Repair*
- ARM Planning and Choice of Methodology*
- * *ARM Planning*
- * *Interpreting ARM Targets*
- * *Incorporating ARM Into the Design*
- * *Choice of Methodology*
- * *Dealing with ARM Shortfalls*
- ARM Assessment Methods – Deterministic*
- * *FMECAs*
- * *Categorising Component Failures*
- * *Limitations of FMECA*
- * *Functional Block Diagrams*
- Numerical ARM Assessment Techniques*
- * *Parts Counts*
- * *Fault Tree Analysis*
- * *Reliability Block Diagrams*
- Critical and Life Limited Items*
- * *Critical Items – Novel, Expensive, Difficult to Repair*
- * *Limited Life Items*
- Maintainability and Maintainability Demonstrations*
- * *Incorporation of Maintenance into Design*
- Reliability Centred Maintenance (RCM)*

- * *Definitions of RCM*
- * *Processes, Requirements and Limitations*
- * *Methods of Improving Reliability*

Learning Activities

A combination of lectures, exercises during the taught session, and supported self study.

References

Course Material	Book
Author	Stapleberg, R.F.
Publishing Year	2009
Title	Handbook of Reliability, Availability, Maintainability and Safety In Engineering Design
Subtitle	
Edition	
Publisher	First Edition Springer
ISBN	

Notes

The module aims to enable students to apply the appropriate ARM methodologies to a project to ensure that ARM is included within the design and that the ARM targets are met by the correct application of ARM assessment methodologies.

The module also illustrates how ARM activities should be planned, and targets set. It also discusses the concept of critical and life limited items and the use of reliability centred maintenance strategies to reduce maintenance costs.

Finally the module considers the trade-offs between ARM and safety requirements, as well as discussing how ARM shortfalls may be addressed.

Assessment is in the form of an essay.