

Module Information

2022.01, Approved

Summary Information

Module Code	7577RTC
Formal Module Title	Availability, Reliability, Maintainability (ARM) Analysis
Owning School	Engineering
Career	Postgraduate Taught
Credits	10
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	8
Online	1
Tutorial	8

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	To demonstrate expertise in Availability, Reliability and Maintainability (ARM) assessment methods and how to apply them to improve maintenance management, maintainability and reliability.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Identify and 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.
MLO2	2	Critically review and balance the requirements of the design for ARM and safety.
MLO3	3	Logically deduce how ARM results for a system may be improved.

Module Content

Outline Syllabus	Introduction to Availability, Reliability and Maintainability (ARM):-Definition of Terms-Importance of ARM-Defining the Mission-ARM Targets and Target ApportionmentAvailability and Safety – Potential Conflicts-Differences Between Safety and ARM-Claims on RepairARM Planning and Choice of Methodology-ARM Planning-Interpreting ARM Targets-Incorporating ARM Into the Design-Choice of Methodology-Dealing with ARM ShortfallsARM Assessment Methods – Deterministic-Failure Modes, Effects and Criticality Analysis (FMECAs)-Categorising Component Failures-Limitations of FMECA-Functional Block DiagramsNumerical ARM Assessment Techniques-Parts Counts-Fault Tree Analysis-Reliability Block DiagramsCritical and Life Limited Items-Critical Items – Novel, Expensive, Difficult to Repair-Limited Life ItemsMaintainability and Maintainability Demonstrations-Incorporation of Maintenance into DesignReliability Centred Maintenance (RCM)-Definitions of RCM-Processes, Requirements and LimitationsMethods of Improving Reliability
Module Overview	
Additional Information	The module aims to enable students to apply correctly the appropriate ARM methodologies to a project to ensure that ARM is included within the design and that the ARM targets are met.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 combined with activities (e.g. exercises, discussions, etc.).The module is delivered via distance learning, described as follows:Lecture (using slides and slide notes): Online self-studyTutorial/Activities (Exercises and reviews): Online activities with teacher feedback, and virtual classroomsTutor-supported Online: Tutor feedback for activities, virtual classrooms and email support

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Essay	95	0	MLO1, MLO2
Test	Test	5	0	MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Ben Matellini	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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