

# WM9I1-15 Quality, Reliability and Asset Management

27/28

**Department**

WMG

**Level**

Taught Postgraduate Level

**Module leader**

Jane Marshall

**Credit value**

15

**Module duration**

4 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

Asset Management is a coordinated activity within an organisation to realise value from its assets and is a critical driver of business success, contributing to enhanced customer satisfaction, reduced cycle times and life cycle costs. Its main focus is ensuring physical assets deliver required performance reliably, safely, sustainably and cost-effectively across their full lifecycle. In an increasingly digital and data-driven environment, organisations rely on management systems and emerging technologies to improve profitability and maintain competitiveness. Quality management theories and practice underpin the organisational culture and aid longevity and sustainability in business. The concepts of quality and asset management enable business excellence.

This module provides an opportunity to explore contemporary quality management and asset management theories alongside technology-enabled practices. Students will develop practical skills in applying key quality and reliability tools and techniques supported by modern technologies to identify and mitigate risk and measure quality and reliability performance. The module also expands student knowledge of maintenance methodologies by introducing predictive and prescriptive maintenance concepts powered by Industrial Internet of Things (IIoT) devices, condition monitoring systems, and reliability-centred maintenance (RCM) frameworks. By examining digital asset management platforms, students will learn how organisations optimise

equipment availability, improve system quality and reliability, and manage physical assets through integrated, technology-driven approaches.

## Module aims

To provide students with the means to evaluate technological risks associated with managing equipment assets and propose mitigating actions to create high quality, reliable and available systems. Where this module is delivered at an overseas centre the module will be delivered over 1 week.

## Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Introduction to Quality Management philosophies, Equipment Asset Management and ISO55000  
Application of Quality Tools – SPC and Root Cause Analysis  
Application of Reliability tools and testing - FMEA, FTA, RBD, ALT, HALT, ESS, HASS  
Measuring quality and reliability using process capability, MTBF and Weibull analysis.  
Maintenance Methods and applications including RCM, TPM and CBM  
Lifecycle cost modelling methods  
Application of asset management concepts

## Learning outcomes

By the end of the module, students should be able to:

- Develop a critical understanding of Quality Management theories (AHEP M4)
- Investigate the role of physical asset management and maintenance in an engineering business (AHEP M2, M3 and M4)
- Critically evaluate techniques and methods that affect system quality and reliability (AHEP M2, M3 and M4)
- Analyse lifetime data using statistical models to measure and enhance system availability (AHEP M2)
- Reflect on the ethical, sustainability and financial implications of asset-related decisions (AHEP M7)

## Indicative reading list

[Reading lists can be found in Talis](#)

[Specific reading list for the module](#)

## Subject specific skills

Knowledge of the evolution of quality management and emerging theories, practice and standards.  
Concepts and use of equipment asset management and application asset management standards

such as ISO55000.

Use and apply quality techniques such as Statistical Process Control (SPC) and Six-Sigma to diagnose process performance and capability.

Analyse the potential technological risks using reliability tools and testing.

Perform analysis of lifetime data using statistical methods.

Knowledge, critique and practical application of maintenance methods .

knowledge and application of Lifecycle cost modelling techniques.

## Transferable skills

Verbal and written communication, presentation, teamwork, reflective practice, adaptability, leadership, terminology literacy. problem solving and analytical skills.

Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.

Advance knowledge and understanding, by developing new technical skills.

Independent learning ability required for continuing professional development.

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## Study

### Study time

| Type                                 | Required                    |
|--------------------------------------|-----------------------------|
| Lectures                             | 6 sessions of 1 hour (4%)   |
| Seminars                             | 22 sessions of 1 hour (15%) |
| Online learning (scheduled sessions) | 2 sessions of 1 hour (1%)   |
| Online learning (independent)        | 20 sessions of 1 hour (13%) |
| Private study                        | 40 hours (27%)              |
| Assessment                           | 60 hours (40%)              |
| Total                                | 150 hours                   |

### Private study description

work on recorded lectures and exercises provided by tutor. Connect with key texts and literature in the subject to deepen learning.

### Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

## Assessment group A

|                                                                                                                                                                                                                                                                                                                                                                                 | Weighting | Study time | Eligible for self-certification |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------------------------------|
| Assessment component                                                                                                                                                                                                                                                                                                                                                            |           |            |                                 |
| Essay and problem set                                                                                                                                                                                                                                                                                                                                                           | 70%       | 42 hours   | Yes (extension)                 |
| Create an asset management plan by critically reviewing key quality, reliability and maintenance tools within a specific context. Consider life cycle costing when developing the asset management plan. Lifetime data analysis by fitting data to an appropriate distribution and interpreting the results with respect to the bath-tub curve and the context of the question. |           |            |                                 |
| Reassessment component                                                                                                                                                                                                                                                                                                                                                          |           |            |                                 |
| Essay and problem set                                                                                                                                                                                                                                                                                                                                                           |           |            | No                              |
| Data analysis problem and asset management plan.                                                                                                                                                                                                                                                                                                                                |           |            |                                 |
| Assessment component                                                                                                                                                                                                                                                                                                                                                            |           |            |                                 |
| Reflection on module and personal learning development                                                                                                                                                                                                                                                                                                                          | 10%       | 6 hours    | Yes (extension)                 |
| Reflection of the module learning developed throughout the module. Access to Reflective blog is available on moodle for each week of the module. Students are encouraged to reflect weekly and compile and review for submission after the module.                                                                                                                              |           |            |                                 |
| Reassessment component                                                                                                                                                                                                                                                                                                                                                          |           |            |                                 |
| Reflection on personal learning development of the topic                                                                                                                                                                                                                                                                                                                        |           |            | No                              |
| Reflection on personal learning development and growth throughout the module.                                                                                                                                                                                                                                                                                                   |           |            |                                 |
| Assessment component                                                                                                                                                                                                                                                                                                                                                            |           |            |                                 |
| Critical review of Quality Management Theories                                                                                                                                                                                                                                                                                                                                  | 20%       | 12 hours   | Yes (extension)                 |
| Following module sessions students will create an individual review of Quality Management theories.                                                                                                                                                                                                                                                                             |           |            |                                 |

|                                                                    | Weighting | Study time | Eligible for self-certification |
|--------------------------------------------------------------------|-----------|------------|---------------------------------|
| Reassessment component                                             |           |            |                                 |
| Critical review of Quality Management Theories                     |           |            | No                              |
| Critical review of the development of Quality Management Theories. |           |            |                                 |

## Feedback on assessment

Written feedback

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## Availability

There is currently no information about the courses for which this module is core or optional.