

MODULE DESCRIPTOR

Module Title

Reliability and Life Cycle Analysis

| | | | |
|-----------|---------------|-------------|---------|
| Reference | ENM274 | Version | 1 |
| Created | February 2023 | SCQF Level | SCQF 11 |
| Approved | June 2023 | SCQF Points | 15 |
| Amended | | ECTS Points | 7.5 |

Aims of Module

To develop a good understanding of the variables affecting the acquisition, running and replacement of an asset, optimisation of the whole-life costs and provide the critical application of quality management theory.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Evaluate theoretical concepts of quality management with respect to organisational development and performance excellence.
- 2 Evaluate an asset throughout its life cycle.
- 3 Analyse how the application of whole-life costing techniques can reduce operating costs, improve performance and enhance value.
- 4 Appraise when an asset should be replaced or overhauled and how to prepare properly argued financial and technical papers for such course of action.

Indicative Module Content

Theoretical concepts of quality management, including contributions of, for example, Deming and Juran, and applications to organisational development and performance excellence. The importance of adopting a whole-life attitude in the design and management of physical assets. Historic and current developments of whole-life costing. The characteristics of long term financial decisions. Investment appraisal procedures. Whole-Life costing based decision-making rules and choice criteria. The principles of, and the procedures for, whole-life costing. Managing the difficulties facing the implementation of whole-life costing. Application of whole-life costing in design or purchasing physical assets. Application of whole-life costing to maintenance and replacement of physical assets. Extending the life-cycle framework to include non-financial attributes of assets. Whole-life costing tools: numerical methods, spreadsheets, computer software. Integrating various tools and techniques. Closing the feedback loop in the whole-life management of physical assets. Implementation models of whole-life costing. Industrial case studies, discussion groups and exercises with presentation.

Module Delivery

This module is delivered in both blended learning full-time and online learning part-time modes. For blended learning students, the module will use in-person lectures and tutorials. For online learning students, the module will use online lectures and tutorials. Both cohorts will engage in case study work and online activities such as forum discussions.

Indicative Student Workload

| | Full Time | Part Time |
|--|-----------|-----------|
| Contact Hours | 35 | 35 |
| Non-Contact Hours | 115 | 115 |
| Placement/Work-Based Learning Experience [Notional] Hours | N/A | N/A |
| TOTAL | 150 | 150 |
| <i>Actual Placement hours for professional, statutory or regulatory body</i> | | |

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

| | | | | | |
|--------------|---------------------------|------------|------|--------------------|------------|
| Type: | Examination | Weighting: | 100% | Outcomes Assessed: | 1, 2, 3, 4 |
| Description: | A closed book examination | | | | |

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

Component 1 comprises 100% of the module grade. A minimum of Grade D is required to pass the module.

| Module Grade | Minimum Requirements to achieve Module Grade: |
|--------------|--|
| A | A |
| B | B |
| C | C |
| D | D |
| E | E |
| F | F |
| NS | Non-submission of work by published deadline or non-attendance for examination |

Module Requirements

| | |
|--------------------------|-------|
| Prerequisites for Module | None. |
| Corequisites for module | None. |
| Precluded Modules | None. |

INDICATIVE BIBLIOGRAPHY

- 1 MONTGOMERY, D.C.,. 2019. Introduction to Statistical Quality Control. 8th ed. Wiley.
- 2 KIRAN, D. R., 2016. Total Quality Management: Key Concepts and Case Studies. Elsevier.
- 3 Shil, N. C. & Parviz, M., 2010. Cycle Costing: Techniques and Applications: Choosing the Most Economic Project. VDM Verlag Dr. Muller.
- 4 DALLA VALLE ANNA: Change management towards life cycle AE(C) practice 2021. Cham: Springer