Module Specification

Electromechanical Systems Analysis

Version: 2027-28, v2.0, Approved

Contents

Part 1: Information

Module title: Electromechanical Systems Analysis

Module code: UFMFWP-30-2

Level: Level 5

For implementation from: 2027-28

UWE credit rating: 30

ECTS credit rating: 15

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module provides a thorough grounding in the analysis of electronic processing systems for nuclear detection, mechanical vibration behaviour and non-destructive evaluation techniques, equipping students to model and test electromechanical systems in a nuclear context.

Features: Not applicable

Educational aims: To develop theoretical understanding and analytical proficiency in electromechanical systems, covering electronic detection electronics, vibration analysis (including Laplace and Z-transform methods) and non-destructive evaluation.

Outline syllabus: The topics covered in this module are likely to include, but not limited to:

Electronic Systems Analysis:
Nuclear Detection Electronics Systems.
Classification.
Microprocessing.
Control System Response.

Mechanical System Analysis:
Simple System Vibration.
Vibration Transmission.
Continuous System Vibration.

Non-Destructive Evaluation:
Visual.
Electrical.
Sonic.
Other NDE Techniques.
Condition Monitoring.

In this module the following mathematical topics will be introduced and developed:
Laplace Transforms.
Systems of Linear Differential Equations.
Z transforms.

Part 3: Teaching and learning methods

Teaching and learning methods: The Electromechanical Systems and Design module introduces principles of electronic systems, vibration analysis and non-destructive evaluation methods in the nuclear industry. Learners will gain a through theoretical and practical basis to analyse electromechanical systems.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Conduct electromechanical systems analysis calculations.

MO2 Analyse electronic processing systems for nuclear detection applications.

MO3 Analyse mechanical vibration systems for equipment protection purposes.

MO4 Evaluate electromechanical systems using non-destructive techniques.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/DAEA100E-5596-080C-1D61-23DCB5E8D654.html?lang=en-GB

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

Examination (2 hours): This exam will assess the learners' understanding of advanced concepts of Electromechanical Systems analysis. It will also assess the learners' mathematical analysis skills of electromechanical systems calculations.

Seminar Presentation: The presentation will assess the learners' ability to evaluate non-destructive evaluation techniques. Learners will analyse electronic processing systems and mechanical vibration systems and represent their findings to an

audience of experts and peers using methods such as posters.

Resit assessment will be the same as the first sit.

Assessment tasks:

Examination (First Sit)
Description: Examination(2 hours)
Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1

Presentation (First Sit)
Description: Poster Presentation (20 mins)
Weighting: 75 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3, MO4

Examination (Resit)
Description: Examination (2 hours)
Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1

Presentation (Resit)
Description: Poster Presentation (20 mins)
Weighting: 75 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering with Nuclear {Apprenticeship-UCS} [UCS] BEng (Hons) 2025-26

Electrical, Electronic and Control Engineering with Nuclear {Apprenticeship-UCS} [UCS] BEng (Hons) 2025-26

Electrical, Electronic and Control Engineering with Nuclear [UCS] BEng (Hons) 2026-27

Electrical, Electronic and Control Engineering with Nuclear [UCS] BEng (Hons) 2026-27

Electrical, Electronic and Control Engineering with Nuclear {Apprenticeship-UCS} [UCS] BEng (Hons) 2026-27

Electromechanical Engineering (Nuclear) [UCS] FdSc 2026-27

Electromechanical Engineering (Nuclear) {Apprenticeship-UCS} [UCS] FdSc 2026-27

Mechanical Engineering with Nuclear [UCS] BEng (Hons) 2026-27

Mechanical Engineering with Nuclear [UCS] BEng (Hons) 2026-27

Mechanical Engineering with Nuclear {Apprenticeship-UCS} [UCS] BEng (Hons) 2026-27

Electrical, Electronic and Control Engineering with Nuclear [UCS] BEng (Hons) 2026-27

Electrical, Electronic and Control Engineering with Nuclear {Apprenticeship-UCS} [UCS] BEng (Hons) 2026-27

Electromechanical Engineering (Nuclear) [UCS] FdSc 2026-27

Electromechanical Engineering (Nuclear) {Apprenticeship-UCS} [UCS] FdSc 2026-27

Mechanical Engineering with Nuclear [UCS] BEng (Hons) 2026-27

Mechanical Engineering with Nuclear {Apprenticeship-UCS} [UCS] BEng (Hons) 2026-27