



Module Specification

Electro-mechanical Systems

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Part 1: Information

Module title: Electro-mechanical Systems

Module code: UFME76-15-2

Level: Level 5

For implementation from: 2024-25

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: University Centre Weston

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: Aim of this module is to enable student to appreciate Electromechanical Systems as a design philosophy with the objective of optimal integration of Mechanical, Electronics and Software Engineering to produce superior products, processes and systems.

Features: Not applicable

Educational aims: Integrating theory and practice, the module will provide the knowledge and experience required, for the appreciation of Electromechanical Systems as a design philosophy.

Outline syllabus: The syllabus may include but not be limited to the following:

MECHANICAL ELEMENTS: Acceleration, Velocity, Torque, Inertia; Mechanical transmission; Gearboxes, pulley, belt and chains; Linear and Rotary bearings; Machine screws and Splined shafts.

SENSORS and SENSOR CHARACTERISTICS: Linearity, repeatability, resolution etc. for a range of sensors and principle of operation of various sensors.

SYSTEMS INTEGRATION: Rotary and linear electric motors, gearboxes and shafts integration.

SYSTEMS MODELLING and CONTROL: Open, close loop control; Novel controllers; System performance measures; Controllers PC and PLC and Embedded; Software for control, Languages and Platforms.

Examples of mechatronic systems may include: Robots, Machine tools; Car Engine management system etc.

Part 3: Teaching and learning methods

Teaching and learning methods: Group lecture, study time outside of contact hours will be spent on going through exercises, example problems and laboratory tasks.

Lab sessions (small groups) will provide experience of real systems with their nonlinearity's and will require further non-contact time or assignment preparation.

Scheduled learning includes lectures, lab sessions.

Independent learning includes hours engaged with essential reading, assignment preparation and completion and laboratory work.

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

MO1 Apply quantitative methods and computer software to identify and create mathematical and computer aided models, for simple electromechanical systems.

MO2 Demonstrate the ability to use selection criteria for sensors, actuators, mechanical and control elements, and formulate test procedures for the efficient performance of electromechanical systems.

MO3 Investigate electromechanical systems and identify environmental constraints, sustainability limitations, health and safety and risk assessment issues.

MO4 Propose a complete mechatronics solution for a simple electromechanical system.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 18 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmfr9-15-2.html) via the following link <https://uwe.rl.talis.com/modules/ufmfr9-15-2.html>

Part 4: Assessment

Assessment strategy: The module will be assessed through a laboratory-based group project. Working in groups, students will need to collaboratively demonstrate

the challenges of integration, outside idealised theoretical framework. The project scenario will focus on putting theory into practice, relating to the provide syllabus.

Assessment tasks:**Project (First Sit)**

Description: Group based laboratory project

Weighting: 100 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Project (Resit)

Description: Group based laboratory project

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electro-mechanical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2023-24