



Module Specification

Mechatronics

Version: 2023-24, v4.0, 15 Mar 2023

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Part 1: Information

Module title: Mechatronics

Module code: UFMFR9-15-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

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: The primary aim of this module is to enable the student to appreciate Mechatronics as a design philosophy with the objective of optimal integration of Mechanical, Electronics and Software Engineering to produce superior products, processes or systems.

Features: Not applicable

Educational aims: See Learning Outcomes.

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: Large group lecture, study time outside of contact hours will be spent on going through exercises and 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.

Contact: 36 hours

Assimilation and skill development: 63 hours

Coursework: 17 hours

Exam preparation: 34 hours

Total: 150 hours

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

MO1 Ability to apply quantitative methods and computer software relevant to Mechatronic systems and solve Mechatronic system problems

MO2 Identifying and Creating mathematical and computer aided models for simple mechatronics systems

MO3 Formulating test procedures for performance measurement of mechatronic systems

MO4 Selection of actuators, mechanical elements, control elements and software for the efficient performance of specific Mechatronic systems

MO5 Selection of sensors based on an understanding of their key characteristics

MO6 Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues. Use the modelling skills acquired in this module for investigation of mechatronic systems

MO7 Propose a 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 = 36 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: Assessed via a laboratory Course Work assessment based on practical work to encourage engagement, focus and demonstrate the challenges of integration outside idealised theoretical framework.

Assessment tasks:

Practical Skills Assessment (First Sit)

Description: Assessment for practical work and laboratory project

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7

Practical Skills Assessment (Resit)

Description: Assessment for practical work and laboratory project

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Automation and Robotics Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng
(Hons) 2021-22

Automation and Robotics Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng
(Hons) 2021-22

Aerospace Engineering (Systems) [Sep][PT][Frenchay][8yrs] - Not Running MEng
2020-21

Aerospace Engineering (Manufacturing) [Sep][PT][Frenchay][8yrs] - Not Running
MEng 2020-21

Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][PT][Frenchay][6yrs]
- Not Running BEng (Hons) 2020-21

Aerospace Engineering with Pilot Studies (Systems) [Sep][PT][Frenchay][6yrs] - Not
Running BEng (Hons) 2020-21

Aerospace Engineering [Sep][PT][Frenchay][8yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies [Sep][PT][Frenchay][6yrs] - Not Running
BEng (Hons) 2020-21