



Module Specification

Fundamental Mechatronics Principles

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Part 1: Information

Module title: Fundamental Mechatronics Principles

Module code: UFMEU1-30-1

Level: Level 4

For implementation from: 2023-24

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: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module introduces students to the fundamental principles of modern mechatronics engineering. Students will study the three main components of mechatronics engineering: the mechanical systems component, the electronic systems component, and the computer systems component. Students will use practical laboratory and workshop skills to design, develop, investigate, and evaluate mechatronics systems.

Features: Not applicable

Educational aims: This module aims to equip students with the knowledge and understanding of theories, principles and applications of mechatronics systems. This module also aims to help students develop their competencies in innovative, critical and systems thinking.

Outline syllabus: 1Introduction to mechatronics components:

oMechanical Systems component

oElectronic Systems component

oComputer Systems component

2Principles of mechatronics; mechanical/electronic/computer systems integration

3Introduction to sensing technology and sensors

4Introduction to actuating technology and actuators

5Introduction to computer technology and computers (including microprocessors and microcontrollers)

6Introduction to design models and process (for example, the V design model)

7Introduction and control and automation theories and practices

8Introduction of artificial intelligence in mechatronics systems

9Introduction to risk analysis and control in mechatronics systems

Part 3: Teaching and learning methods

Teaching and learning methods: The module will be taught through a combination of lectures, hands-on exercises, and real-world projects.

Lectures will provide students with a foundation of knowledge on the basics of Mechatronics systems. These lectures will be supplemented with slides, demos, and other multimedia materials to help students better understand the material.

Hands-on exercises will give students the opportunity to apply what they have learned in a practical setting. These exercises may include working with sample data sets, building and testing mechatronics systems, and analysing the results.

Real-world projects will allow students to work on mechatronics problems and projects that are relevant to the industry. These projects will provide students with the opportunity to apply their knowledge and skills in a practical setting, and to gain experience working on real-world problems.

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

MO1 Apply appropriate techniques to design and develop intelligent mechatronics systems, and discuss the techniques' limitations.

[AHEP4: M3] [PO1, PO3]

MO2 Apply a systems approach to identify and integrate different components of mechatronics systems and evaluate their associated risks.

[AHEP4: M6, M9] [PO2, PO4, PO8]

MO3 Maintain and write a record of experimental notes and findings from individual and team work that are commensurate with industrial practice.

[AHEP4: M15] [PO7]

MO4 Use practical laboratory and workshop skills to evaluate and investigate mechatronics systems.

[AHEP4: M12] [PO4]

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link

<https://ri.talis.com/3/uwe/items/4b801d84-b994-49ce-a4db-441d432c0ec0.html?lang=en&login=1>

Part 4: Assessment

Assessment strategy: Assessment of this module consists of three assessments:

- A 2-hour online examination that assesses the student's understanding of analytical techniques applied to mechatronics systems.

- A written assignment consists of a portfolio of multiple laboratory assignments carried out periodically during the study of the module. This is used to assess competency in the technical aspects taught during the module. This assessment is devised to provide regular feedback and feed-forward to assist students' progression in fundamental mechatronics principles and to prepare them for the examination
- A presentation of the work completed by the students during the lab sessions.

Resit Strategy:

The resit assessment will have the same structure as the first sit.

Assessment tasks:**Examination (Online) (First Sit)**

Description: Written Examination (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Presentation (First Sit)

Description: Group Presentation of a Mechatronics System Design

Weighting: 25 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Written Assignment (First Sit)

Description: Group Report (2500 words) concerning the integration of techniques for mechatronics components developed in semester 1. Expanding on the design process covered in Engineering Practice 1.

Weighting: 25 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Examination (Online) (Resit)

Description: Written Examination (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Presentation (Resit)

Description: Group Presentation of a Mechatronics System Design

Weighting: 25 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Written Assignment (Resit)

Description: Group Report (maximum 1000 words per group member) where this could be an individual task concerning the design and integration of a mechatronics system.

Weighting: 25 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechatronics Engineering [Frenchay] MEng 2023-24

Mechatronics Engineering [Frenchay] BEng (Hons) 2023-24

