



Module Specification

Industrial Systems Validation

Version: 2026-27, v1.0, 19 Jun 2023

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Part 1: Information

Module title: Industrial Systems Validation

Module code: UFMF61-15-M

Level: Level 7

For implementation from: 2026-27

UWE credit rating: 15

ECTS credit rating: 7.5

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 course is an introduction to the modelling, verification and validation of mechatronic systems, which require integration of the mechanical and electrical engineering disciplines within a unified and standardised framework applied to real industrial applications. There are significant laboratory-based design experiences wherein the design theory, experimentation basics, integration principles, testing for verification and validation that will be taught. Students will use practical laboratory and workshop skills to research, design, develop and validate their solutions.

Features: Not applicable

Educational aims: The module will discuss systems modelling, control, implementation and validation of solutions with industrial partners principally. It may include but not be limited to the followings: using the myRIO with LabVIEW to implement closed-loop control, Open/Close loop control, Controllers PC and PLC and Embedded, Software for control, Programming Languages and Platforms, Real-time Control, Analog/Digital Feedback Systems, Electronic Scale, Brushless Motor Control. Examples of mechatronic/electromechanical systems may include Robots, Machine tools, Car Engine management systems, etc.

Outline syllabus: Introduction to ISO and British Standards

Testing Procedures for Validation

- Process Design

- Process Qualification

- Continued Process Validation

Introduction to Industrial Verification and Commissioning

- Preparation and Design

- Pre-Construction and Construction

- Commissioning of Engineering Services and Pre-Handover

- Initial Operation and Post-Operation Care

Introduction to Industrial Optimisation/Enhancement

- Equipment optimisation

- Optimisation of operating procedures

- Control optimisation

Part 3: Teaching and learning methods

Teaching and learning methods: A combination of lectures and lab demonstrations are used to present core topics from the syllabus. Laboratory sessions are used for familiarisation with simulation software, hardware use, solutions development and validation with the industrial partners.

Independent learning includes hours of essential reading and laboratory-based

development work outside the scheduled classes. Students will be expected to maintain a logbook of the work during practical sessions.

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

MO1 Formulate and analyse complex problems to reach substantiated conclusions. Then, apply appropriate techniques to design and develop mechatronics systems, discuss the techniques' limitations, and investigate industrial systems to undertake and validate their solutions within an industrial environment. [AHEP4: M2(F), PO1, PO3]

MO2 Design and implement industrial solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. [AHEP4: M5(F), M6(F); PO2, PO3, PO4]

MO3 Use practical laboratory and workshop skills to evaluate, investigate, and maintain records of mechatronics solutions and apply them to industrial systems. [AHEP4: M12(F), M15(F); PO4, PO7, PO8]

MO4 Use a risk management process to identify, evaluate and mitigate risks associated with mechatronics in the industrial environment. [AHEP4: M9(F); PO5, PO6]

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 via the following link

<https://rl.talis.com/3/uwe/items/17a4d283-357c-4227-b200-312101f9f7e3.html?lang=en&login=1>

Part 4: Assessment

Assessment strategy: Assessment of this module (for both sit and resit) consists of two tasks:

Task 1 will be a group project report (2500 words) in a scientific paper format covering the existing system background, the design process, the solution developed and its implementation following the industry standards for the design assignment. This will assess the students' work undertaken as a group, their understanding of the design and analytical techniques of mechatronics systems, and their integration within an industrial context for validation.

Task 2:

A group presentation of the students' solutions and how they worked with the industry partner to meet their requirements for the design assignment. The coursework assessment regime here has been devised to provide regular feedback and feed-forward to assist students' progression in order to complete their respective industrial endeavours.

Assessment tasks:

Report (First Sit)

Description: Group project report (2500 words)

Weighting: 60 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Practical Skills Assessment (First Sit)

Description: Group presentation of the students' solutions and how they worked with the industry partner to meet their requirements for the design assignment.

Weighting: 40 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO3, MO4

Report (Resit)

Description: A group project report (2500 words)

Weighting: 60 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Practical Skills Assessment (Resit)

Description: Group presentation of the students' solutions and how they worked with the industry partner to meet their requirements for the design assignment.

Weighting: 40 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechatronics Engineering [Frenchay] MEng 2023-24