



## **Module Specification**

### **Sensors, Transducers and Actuators**

Version: 2023-24, v5.0, 18 Sep 2023

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## Part 1: Information

**Module title:** Sensors, Transducers and Actuators

**Module code:** UFMFPK-15-2

**Level:** Level 5

**For implementation from:** 2023-24

**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:** Practical Electronics 2023-24

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** Not applicable

**Features:** Not applicable

**Educational aims:** This module is designed to introduce students to the basic working principles of electronic and electrical sensing, measuring and actuating devices with the aim of creating a sound fundamental knowledge of designing and operating engineering systems.

In addition to the Learning Outcomes, the educational experience may develop through practice but not formally discretely assess self-management skills and working with others.

**Outline syllabus:** The syllabus outline includes:

**Sensors:** working principles, characteristics, and types covering variety of applications such as motion, height, weight, volume, pressure, temperature, humidity, speed, angle, vibrations and flow rate. Interfacing, signal conditioning, display and recording.

**Transducers:** working principles and types, choice of transducers in controlling processes, behaviour and performance studies of transducers.

**Actuators:** types of actuators (includes all electrical actuation, pneumatic, rotatory), working principles, characteristics torque, speed, control, designing and modelling actuators and their derive systems.

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** The students will learn to model and analyse the performance of real-world engineering systems using a series of lectures, tutorials and simulation based laboratory work. The module also involves studying relevant literature on environmental and sustainability limits, ethical, health, safety, security and risk issues, and code of practice and standards issues.

In addition to 36 hours of scheduled contact, students will be expected to spend (typically) 72 hours in independent study, preparation for classes, assimilation of knowledge and skills development. The assessment strategy involving submitting a research based assignment and end of module examination will require (typically) 22 hours.

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

**MO1** Apply concepts and working principles of sensors transducers and actuators used in advance engineering processes [SM1p]

**MO2** Apply engineering and scientific principles of other disciplines to support real-world implementation of sensors and actuators [SM3p]

**MO3** Identify, classify and describe the performance of systems containing transducers and actuators through the use of analytical and modelling techniques [EA2p]

**MO4** Investigate and design engineering application with sensors and actuators by identifying constraints including environmental and sustainability limits, ethical, health, safety, security and risk issues, and code of practice and standards [D2p]

**MO5** Identify the commercial and economic and social context of engineering applications that integrate sensors and transducers [ET2p]

**MO6** Apply quality standards to the design of systems containing sensors and transducers [EP7p].

**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/ufmfpk-15-2.html) via the following link <https://uwe.rl.talis.com/modules/ufmfpk-15-2.html>

## **Part 4: Assessment**

**Assessment strategy:** The assessment consists of an end of module examination and group coursework assignment.

The strategy has been chosen to ensure that the engineering principles are assessed under controlled conditions, while a more open-ended research-based assignment is used to encourage wider engagement and reflection on this topic. There will be a controlled conditions written exam for component A and a coursework group assignment submission for component B.

The resit assessments will repeat the same pattern of the first sit assessments.

The group coursework assignment submission will be based on an investigation of recent research on one of the main topics (i.e., Sensors, Transducers and Actuators) and how these concepts and devices are used in designing engineering systems and applications. The output of this investigation will be a 15 page group report with an integrated individual member's contribution.

### **Assessment tasks:**

#### **Examination (Online) (First Sit)**

Description: Online Examination (2 hours + 2 hours for submission)

Weighting: 50 %

Final assessment: Yes

Group work: No

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

#### **Report (First Sit)**

Description: Group report

Weighting: 50 %

Final assessment: No

Group work: Yes

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

#### **Examination (Online) (Resit)**

Description: Online Examination (2 hours + 2 hours for submission)

Weighting: 50 %

Final assessment: Yes

Group work: No

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

### **Report (Resit)**

Description: Group report

Weighting: 50 %

Final assessment: No

Group work: Yes

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

## **Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Mechanical Engineering and Technology (Mechatronics) {Foundation}

[Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Mechatronics) {Foundation}

[Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

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

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

Electronic Engineering [Sep][PT][Frenchay][6yrs] - Not Running BEng (Hons) 2020-21

Instrumentation and Control Engineering {Foundation} [Feb][PT][GCET][8yrs] BEng (Hons) 2018-19

Instrumentation and Control Engineering {Foundation} [Oct][PT][GCET][8yrs] BEng (Hons) 2018-19

