



## **Module Specification**

### Signal Theory

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## Part 1: Information

**Module title:** Signal Theory

**Module code:** UFMFNT-15-2

**Level:** Level 5

**For implementation from:** 2024-25

**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:** Mathematical Modelling for Electronics and Robotics 2023-24

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

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

## Part 2: Description

**Overview:** This module will cover the fundamentals of signals and signal processing, in continuous and discrete time, and shall focus on their applications in robotics. Mathematical theory will be supplemented with computer-based tools and laboratory problems.

**Features:** Not applicable

**Educational aims:** This module equips students with the knowledge and skills necessary to solve a range of engineering, electronics and robotics problems which involve signals and signal processing.

**Outline syllabus:** This module will cover the following topics:

Introduction to Signals

Fourier Series

Continuous-time Fourier transform

Sampling Theorem and Reconstruction

Discrete-time Fourier transform (DTFT)

Laplace transform

Applications of signal processing techniques in robotics

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

**Teaching and learning methods:** This module will combine lectures, class-based tutorials/computer workshops to ensure that students develop an understanding of theory, analytical techniques and real applications in robotics.

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

**MO1** Apply mathematical concepts and principles to describe, analyse and solve problems arising in signal processing

**MO2** Evaluate the strengths and limitations of a variety of mathematical methods for solving signal theory problems

**MO3** Apply mathematical methods in order to understand the performance of systems

**MO4** Combining theory and engineering skills and the apply them to solve problems in signal processing

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 0

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmf19-15-2.html) via the following link <https://uwe.rl.talis.com/modules/ufmf19-15-2.html>

## **Part 4: Assessment**

**Assessment strategy:** The assessment for this module consists of:

A written examination that assesses the students' understanding of mathematical concepts and techniques as applied to problems in the field of signal theory. The examination provides an appropriate mechanism to assess mathematical concepts and techniques learned throughout the module.

A coursework assessment that is both formative and summative and consists of multiple computer-based assignments, which are completed periodically during the semester. These assessments are designed to test students' ability to solve mathematical problems related to signal theory. The periodic feedback obtained by completing these assessments also helps students build their confidence in mathematics and prepares them for the written examination.

Resit is the same as the first sit

**Assessment tasks:**

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

Description: Online, summative examination that assesses the students' understanding of mathematical concepts and techniques as applied to problems in the field of signals processing (2 hours exam, 2 hours submission)

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

**Online Assignment (First Sit)**

Description: Completion of a series of computer based assessments

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

**Online Assignment (Resit)**

Description: Completion of a series of computer based assessments

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

**Examination (Online) (Resit)**

Description: Online, summative examination that assesses the students' understanding of mathematical concepts and techniques as applied to problems in the field of signals processing (2 hours exam, 2 hours submission)

Weighting: 75 %

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:

Robotics [Frenchay] BEng (Hons) 2023-24

Robotics {Foundation} [Frenchay] BEng (Hons) 2022-23