



## **Module Specification**

### **Digital Signal Processing**

Version: 2025-26, v6.0, Approved

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## Part 1: Information

**Module title:** Digital Signal Processing

**Module code:** UFMFH8-15-3

**Level:** Level 6

**For implementation from:** 2025-26

**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:** Signal Theory 2024-25, Signals and Systems 2024-25

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

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

## Part 2: Description

**Overview:** This is an introductory course to linear digital signal processing (DSP).

The course provides the students with basic knowledge in the field by introducing the necessary theoretical concepts. For the students to see the advantages, but also the limitations, of techniques and methods, the theory is backed by a series of lab exercises using appropriate software and hardware.

**Features:** Not applicable

**Educational aims:** This module allows students to extend their knowledge in capturing real world signals for the design and development of digital signal processing tasks.

**Outline syllabus:** -Introduction and basic definitions

- Time domain analysis
  - Digital convolution
    - Definition
    - Signal shifting
    - Basic methods
- Frequency domain analysis
  - Fourier Theory
    - Definition
    - Discrete Fourier series
      - Discrete Fourier transform
      - Properties.
  - Z-transform
    - Definition
    - Properties
    - Z-transform vs. Fourier transform
    - Graphical approach
- Filter design
  - FIR filter design
    - Inverse Fourier transform
    - Windowing
  - IIR filter design
    - Butterworth
    - Chebyshev
    - Impulse response method

### Part 3: Teaching and learning methods

**Teaching and learning methods:** The module is delivered through a combination of lectures, laboratories, and student directed learning to ensure that students are able to integrate theoretical and practical analytical skills and also understand the wider context of the content.

A study-guide is provided and relevant ethical issues will be highlighted and students will be encouraged to consider these further through directed reading.

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

**MO1** Design, simulate, and analyse systems that process digital signals

**MO2** Apply advanced analytical techniques for signal and data processing applications

**MO3** Use technical literature and the ability to critically review ethics and documentation of a technical nature (P4)

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmfh8-15-3.html) via the following link <https://uwe.rl.talis.com/modules/ufmfh8-15-3.html>

## **Part 4: Assessment**

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

A project report submission and demonstration that contributes 50% towards the final mark of the module. The project assesses the students' ability to translate their theoretical knowledge to practice by implementing a Digital System Processing (DSP) system and testing its performance. Formative assessment will be provided

as oral feedback and feed forward throughout the laboratory sessions particularly with respect to the lab exercises. Guidance is given for report formatting. Students work in groups on the task but are expected to submit individual reports.

A written exam that contributes 50% towards the final mark of the module. The examination assesses the students' understanding of concepts and techniques, and their ability to apply them to DSP problems.

Resit strategy:

The resit will be the same as the first sit

Resit deliverable(s) will be scaled appropriately to group size and task complexity

**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

**Report (First Sit)**

Description: Report and demonstration (10 pages max)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

**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

**Report (Resit)**

Description: Report and demonstration (10 pages max)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

**Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Electronic and Computer Engineering [SHAPE] WITHDRAWN BEng (Hons) 2024-25

Electrical and Electronic Engineering [AustonSingapore] WITHDRAWN BEng (Hons)  
2025-26

Electrical and Electronic Engineering [BIET] BEng (Hons) 2025-26

Electrical and Electronic Engineering [Frenchay] BEng (Hons) 2023-24

Electronic Engineering [Frenchay] WITHDRAWN BEng (Hons) 2023-24

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

Robotics [Frenchay] BEng (Hons) 2023-24

Electronic and Computer Engineering [Frenchay] BEng (Hons) 2023-24

Electronic Engineering {Apprenticeship-UCW} {Top-Up} [Frenchay] BEng (Hons)  
2024-25

Electronic and Computer Engineering [Frenchay] BEng (Hons) 2023-24

Electrical and Electronic Engineering [Frenchay] BEng (Hons) 2023-24

Electronic Engineering {Apprenticeship-UCW} {Top-Up} [Frenchay] BEng (Hons)  
2024-25

Electronic Engineering [Sep][PT][Frenchay][6yrs] BEng (Hons) 2020-21

Electronic Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL}  
[Sep][FT][GlosColl][5yrs] BEng (Hons) 2021-22

Electronic and Computer Engineering [Sep][PT][GlosColl][5yrs] BEng (Hons) 2021-22

Robotics {Foundation}[Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Mechatronics Engineering [Frenchay] MEng 2023-24

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

Electronic Engineering [Frenchay] BEng (Hons) 2022-23

Electronic and Computer Engineering [Frenchay] BEng (Hons) 2022-23

Robotics [Frenchay] BEng (Hons) 2022-23

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