



## **Module Specification**

### **Digital Signal Processing**

Version: 2021-22, v2.0, 07 Jun 2022

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## Part 1: Information

**Module title:** Digital Signal Processing

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

**Level:** Level 6

**For implementation from:** 2021-22

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**Faculty:** Faculty of Environment & Technology

**Department:** FET Dept of Engineering Design & Mathematics

**Partner institutions:** None

**Delivery locations:** Frenchay Campus, Global College of Engineering and Technology (GCET), Northshore College of Business and Technology, School for Higher and Professional Education

**Field:** Engineering, Design and Mathematics

**Module type:** Standard

**Pre-requisites:** None

**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:** See Learning Outcomes.

In addition, the educational experience may explore, develop, and practise but not formally discretely assess the following:

Develop competence in problem identification, analysis, design and implementation

Understanding of the need for a high level of professional and ethical conduct

**Outline syllabus:** The syllabus includes:

Theory:

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 and windowing), IIR design (Butterworth, Chebychev, impulse method etc.).

DSP chips.

Practical:

Consists of a series of lab-based exercises using appropriate software and hardware. The programming language adopted is C/C++. Aspects of Matlab programming are also introduced.

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

**Teaching and learning methods:** The module is presented as a combination of contact, which will include lectures and laboratories, and student directed learning. A study-guide is provided for the student, directing their reading and work. Relevant

ethical issues will be highlighted and students will be encouraged to consider these further through directed reading.

Contact Hours:

Activity:

Contact: 36 hours

Assimilation and skill development: 70 hours

Undertaking coursework: 20 hours

Exam preparation: 24 hours

Total: 150 hours

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

**MO1** An understanding of engineering principles as applied to digital systems and the ability to assess their performances

**MO2** The ability to use integrated development environments to describe, simulate, implement and verify the correctness of digital designs

**MO3** Competence in using specific Electronic Design Automation tools

**MO4** Competence in using technical literature and the ability to obtain documentation from various sources

**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/ufmfh8-15-3.html) via the following link <https://uwe.rl.talis.com/modules/ufmfh8-15-3.html>

## Part 4: Assessment

**Assessment strategy:** A formal exam that contributes 50% towards the final mark of the module. The examination is summative and assesses the students' understanding of concepts and techniques, and their ability to apply them in relatively straightforward problems.

A lab based coursework that contributes 50% towards the final mark of the module.

Formative assessment will be provided as oral feedback throughout the laboratory sessions particularly with respect to the lab exercises.

### Assessment components:

#### Examination (Online) - Component A (First Sit)

Description: Online Exam: 4 hours

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1

#### Project - Component B (First Sit)

Description: Small scale project

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

#### Examination (Online) - Component A (Resit)

Description: Online Exam: 4 hours

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

**Written Assignment - Component B (Resit)**

Description: Coursework

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested:

**Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Electrical and Electronic Engineering [May][FT][BIET][12months] BEng (Hons) 2021-22

Engineering {Top-Up}[Sep][PT][Frenchay][2yrs] BSc (Hons) 2021-22

Engineering {Top-Up}[Sep][FT][Frenchay][1yr] BSc (Hons) 2021-22

Electrical and Electronic Engineering [Oct][FT][BIET][12months] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Feb][FT][BIET][12months] BEng (Hons) 2021-22

Electronic and Computer Engineering {Top Up} [Aug][FT][SHAPE][1yr] BEng (Hons) 2021-22

Electronic and Computer Engineering {Top Up} [Aug][PT][SHAPE][2yrs] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Feb][FT][AustonSingapore][12months] BEng (Hons) 2021-22

Electrical and Electronic Engineering [May][FT][AustonSriLanka][12months] - Not Running BEng (Hons) 2021-22

Electrical and Electronic Engineering [May][FT][AustonSingapore][12months] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Oct][FT][AustonSingapore][12months] BEng (Hons) 2021-22

Electrical and Electronic Engineering [Oct][FT][AustonSriLanka][1yr] - Not Running BEng (Hons) 2021-22

Electrical and Electronic Engineering [Feb][FT][AustonSriLanka][12months] - Not Running BEng (Hons) 2021-22

Electrical and Electronic Engineering [Feb][PT][BIET][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [May][PT][AustonSriLanka][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Feb][PT][AustonSriLanka][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Feb][PT][AustonSingapore][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [May][PT][AustonSingapore][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Oct][PT][AustonSingapore][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Oct][PT][AustonSriLanka][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [May][PT][BIET][16months] BEng (Hons) 2020-21

Electrical and Electronic Engineering [Oct][PT][BIET][16months] BEng (Hons) 2020-21

Electronic and Computer Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Electronic Engineering [Sep][FT][Frenchay][4yrs] MEng 2019-20

Electronic Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Robotics [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2018-19

Electrical and Electronic Engineering [Sep][SW][Northshore][5yrs] MEng 2018-19

Automation and Robotics Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2018-19

Robotics {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Electronics and Telecommunication Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2018-19

Robotics [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Electronics and Telecommunication Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2018-19

Automation and Robotics Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2018-19

Instrumentation and Control Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2018-19

Electronic and Computer Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Electronic and Computer Engineering [Sep][PT][GlosColl][5yrs] BEng (Hons) 2018-19

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [Sep][FT][GlosColl][5yrs] BEng (Hons) 2018-19

Instrumentation and Control Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2018-19

Electronic Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Electronic Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19