Module Specification

Signals and Systems

Version: 2025-26, v7.0, Approved

Contents

Part 1: Information

Module title: Signals and Systems

Module code: UFMFMT-30-2

Level: Level 5

For implementation from: 2025-26

UWE credit rating: 30

ECTS credit rating: 15

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 2024-25, Mathematics for Electrical Engineers 2025-26

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module emphasises the fundamental concepts underlying information-bearing signals and the systems that process those signals. Signals and systems are modelled using common mathematical functions. System outputs are determined using time- and frequency-domain techniques. Fourier techniques are utilised for the analysis and synthesis of signals. Examples of multistage systems

such as communication and sampling systems are introduced and examined. Mathematical software is used for modelling and simulating signals and systems.

Features: Not applicable

Educational aims: This module aims to develop students' understanding of the concepts and principles for describing and analysing problems arising in circuits and systems, control systems and signal processing in both theory and practice. This is done via a combination of direct lecture, theoretical exercises and tutorials, and practical exercises in the laboratory.

Outline syllabus: Introduction to signals.

Fourier series

Laplace transform

Continuous time Fourier transform

Sampling theorem and reconstruction.

Introduction to discrete-time Fourier transform (DTFT).

Introduction to Z Transform

Matrix representation of systems and introduction to state space models

Introduction to feedback control systems

Part 3: Teaching and learning methods

Teaching and learning methods: This module will combine lectures, class-based tutorials/computer workshops and laboratory-based problem-solving work. Examples in workshops will be based on real electronic problems.

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 and electronic system analysis/design and evaluate their strengths and limitations

MO2 Combine theory and engineering skills and the apply them to solve practical problems in signal processing

MO3 Critically interpret technical literature to prepare technical reports.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Laboratory work = 72 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufmfmt-30-2.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 domain problems in the field of signals and systems.

A series of e-assessments. These formative and summative assessments are designed to test students' ability to solve mathematical problems related to signal and systems theory.

A group report focusing on the design and implementation of electronic systems for a device that has been developed during the practical sessions. This assesses the

ability of students of translating theoretical knowledge into simple electronic products.

The resit assessment will have the same format as the first sit assessment

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: No

Group work: No

Learning outcomes tested: MO1

Online Assignment (First Sit)

Description: E-Assessments

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Report (First Sit)

Description: Group report (1500 words)

Weighting: 25 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO2, MO3

Examination (Online) (Resit)

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

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Online Assignment (Resit)

Description: E-Assessments

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Report (Resit)

Description: Group report (1500 words)

Weighting: 25 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

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

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

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

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [GlosColl] BEng (Hons) 2023-24

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

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

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

Mechatronics {Apprenticeship-UCW} [UCW] FdSc 2024-25

Electrical and Electronic Engineering [Frenchay] BEng (Hons) 2024-25

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

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

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [GlosColl] BEng (Hons) 2023-24

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

Electrical and Electronic Engineering [Frenchay] BEng (Hons) 2024-25

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