Module Specification

Signal Processing and Control

Version: 2024-25, v1.0, 14 Jun 2023

Contents

Part 1: Information

Module title: Signal Processing and Control

Module code: UFME63-30-2

Level: Level 5

For implementation from: 2024-25

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: University Centre Weston

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Fundamentals of Electrical and Electronics Principles 2023-24, Fundamentals of Engineering Mathematics and Modelling 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 provide students with the requisite knowledge of signal processing and control of analogue and digital signals.

Features: Not applicable

Educational aims: This module covers the necessary concepts and principles for describing and analysing problems arising in circuits and signal processing and

control, in both theory and practice. It also includes the analysis of problems, and design and implementation of solutions, involving signal-system interaction.

Outline syllabus: Theory:
Introduction to signals, Laplace transform, Fourier series, Continuous time Fourier transform, Discrete-time Fourier transform (DTFT), Z Transform, Matrix representation of systems and introduction to state space models, Introduction to block diagrams and feedback control systems.
Simulation Software:
Circuit Design in Multisim, Design of a Feedback Controller in Simulink

Laboratory Practice:
Non-Ideal characteristics of Operational Amplifiers, Design of an Analogue to Digital converter, Small-scale project of analogue filters with the use of Operational Amplifiers

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 systems analysis/design.

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

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 = 48 hours

Total = 300

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 is designed to allow students to build confidence in their mathematical abilities over time, as applied to domain problems in the field of signal processing and test their ability to solve problems related to signal processing and control. The laboratory element of the module will focus on the design and implementation of electronic systems and will assess the ability of students of translating theoretical knowledge into simple electronic products.

Assessment details:

Assessment 1: This task consists of a series of 4 e-assessments. assessments are designed to test students' ability to solve mathematical problems related to signal processing theory. Students must pass all 4 assessments, with a total of 3 attempts.

Assessment 2: Group technical lab report and demonstration of the electronic device that has been developed during the practical sessions (1500 words).

Assessment 3: 4 hours online exam held at the end of the year. This will assess students' understanding of mathematical concepts and techniques, as applied to domain problems in the field of signals processing and control.

The resit assessment will follow the same format as the first sit assessment profile and will be comparable.

Assessment tasks:

Examination (Online) (First Sit)
Description: 4 hours online exam.
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO2

Online Assignment (First Sit)
Description: Series of 4 e-assessments solving mathematical problems (pass/fail)
Weighting:
Final assessment: No
Group work: No
Learning outcomes tested: MO1

Laboratory Report (First Sit)
Description: 1500 word group technical lab report.
Weighting: 50 %
Final assessment: No
Group work: Yes
Learning outcomes tested: MO3

Examination (Online) (Resit)
Description: 4 hours online exam.
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO2

Online Assignment (Resit)
Description: Series of 4 e-assessments solving mathematical problems (pass/fail)
Weighting:
Final assessment: No
Group work: No
Learning outcomes tested: MO1

Laboratory Report (Resit)

Description: 1500 word group technical lab report.

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electro-mechanical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2023-24

Electro-mechanical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2023-24