Module Specification

Mathematical Modelling for Electronics and Robotics

Version: 2024-25, v3.0, 17 Jul 2024

Contents

Part 1: Information

Module title: Mathematical Modelling for Electronics and Robotics

Module code: UFMFFT-15-1

Level: Level 4

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 Computing and Creative Technologies

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: After successful completion of this module students will have the requisite mathematical knowledge and skill to solve mathematical problems which arise in models of a variety of (electronic and robotics) engineering contexts. Areas of application will include signals and circuits. Students will be prepared for more advanced study encountered in signal processing and control.

In this module students will be introduced to a computer-based methodology for

solving mathematical problems and presenting numerically based information. The work will involve development of coding skills, but no prior knowledge is assumed. The module will integrate study of mathematics with engineering subjects studied in other level 4 modules.

Features: Not applicable

Educational aims: This module provides the initial underpinning for mathematical skills and analysis of engineering problems studied across electronic engineering and robotics programmes.

Outline syllabus: Standard engineering functions; solving equations; complex numbers; analytical and numerical methods; differentiation; rates of change and turning points; integration – area, average value, root mean square values; first order differential equations; matrices; introduction to Fourier series.

Engineering applications, modelling, implementation through software (MATLAB).

Part 3: Teaching and learning methods

Teaching and learning methods: The typical delivery includes study of pre-class materials, and weekly classes including a lecture (instructor-led), workshop (tutor-assisted individual or group work) and computer lab (tutor-assisted individual work).

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

MO1 Apply appropriate techniques to solve mathematical problems encompassing elementary functions, complex numbers, calculus and matrices.

MO2 Solve a problem phrased in terms of a mathematical model, and interpret the results in an applied/engineering context.

MO3 Use mathematical software to implement solution methods for mathematical and numerical questions.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Computer-based activities = 24 hours

Total = 0

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/5B1050B0-513C-8C2B-BE55-1E407E0FC3F3.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: The assessment strategy is designed to assess achievement of the learning outcomes.

The assessment consists of an end-of-module online (Dewis) examination, which assesses work covered throughout the module, including standard mathematical problems, applications and MATLAB computations. The resit assessment will be of the same format.

Students will have used the Dewis system during the term in formative assignments, which will provide feedback.

Assessment tasks:

Examination (First Sit)
Description: PC-based examination involving use of mathematical software (3 hours).

Exam will use the Dewis system, and students will require use of MATLAB.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)
Description: PC-based examination involving use of mathematical software (3 hours).

Exam will use the Dewis system, and students will require use of MATLAB.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, 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] BEng (Hons) 2023-24

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

Mechatronics Engineering {Foundation} [Frenchay] MEng 2023-24

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

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

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Mechatronics Engineering [Frenchay] MEng 2024-25

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

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

Robotics [Frenchay] BEng (Hons) 2024-25

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [GlosColl] BEng (Hons) 2024-25

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

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

Mechatronics Engineering [Frenchay] BEng (Hons) 2024-25

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

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

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

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

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [GlosColl] BEng (Hons) 2024-25

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

Mechatronics Engineering [Frenchay] MEng 2024-25

Mechatronics Engineering {Foundation} [Frenchay] MEng 2023-24

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

Mechatronics Engineering [Frenchay] BEng (Hons) 2024-25

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24