MODULE SPECIFICATION

Part 1: Information			
Module Title	Mathematical Modelling for Electronics and Robotics		
Module Code	UFMFFT-15-1	Level	Level 4
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: After successful completion of this module students will have the requisite mathematical knowledge and skill to model a variety of engineering problems that occur in electronic engineering and robotics. Areas of interest will include modelling and design of circuits and systems, signals and kinematics . 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. For example, students will be introduced to the modelling cycle with the phases of problem formulation and modelling, computer based implementation (e,g, via MATLAB) and verification.

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 level 4 modules.

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: Outline Syllabus:
Mathematical topics
Standard Engineering Functions, Solving Equations; analytical and numerical methods; Differentiation; rates of change and turning points; Integration –area, average value, root mean square values, linear constant coefficient differential equations; Matrices; Fourier series.

Engineering applications, modelling, implementation through software and verification.

Teaching and Learning Methods: The typical delivery follows a one or two week cycle with a one hour lecture used to introduce a problem of interest and then followed by a two hour workshop in a computer simulation lab where students will work either individually or in small groups on mathematical and engineering modelling problems.

Part 3: Assessment

The assessment is designed to allow students to build confidence in their mathematical abilities over time and to be able to demonstrate the use of computer based methods for implementing mathematical solutions to engineering problems.

Component B will involve a portfolio of e-assessments designed to provide regular and rapid feedback to students as to their progress.

Component A will consist of a two hour examination in a pc-lac where students will demonstrate that they can formulate a mathematical description of short engineering problems and then implement the solution using standard mathematical software (such as MATLAB).

Examinations are summative and assess the students' understanding of concepts and techniques, and their ability to apply them in relatively straightforward problems. The computer based tests help develop and assess competency of the mathematical methods taught in the course.

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

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	80 %	PC-based examination involving use of mathematical software (2 hours)
Online Assignment - Component B		20 %	A series of short e-assessments taken at regular intervals during the module.
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	80 %	PC-based examination involving use of mathematical software (2 hours)
Online Assignment - Component B		20 %	A series of short e-assessments taken at regular intervals during the module.

Part 4: Teaching and Learning Methods

Learning Outcomes

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

Module Learning Outcomes	Reference
Formulate, implement and validate an appropriately constructed mathematical model of an engineering problem	MO1
Select and apply appropriate techniques to the solution of mathematical problems encountered in engineering.	MO2
Use mathematical software to implement appropriate mathematical solutions and produce a clear presentation of results.	MO3

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	
Computer-based activities	24
Lectures	12
Total Scheduled Learning and Teaching Hours:	36
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://rl.talis.com/3/uwe/lists/5B1050B0-513C-8C2B-BE55-1E407E0FC3F3.html?lang=en-GB&login=1

Part 5: Contributes Towards

This module contributes towards the following programmes of study: