Module Specification

Mathematics for Electrical Engineers

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Contents

Part 1: Information

Module title: Mathematics for Electrical Engineers

Module code: UFMEAV-30-1

Level: Level 4

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: 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 apply mathematical methods towards the solution and analysis of a variety of engineering problems that occur in electrical engineering models. Application areas of interest will include modelling and design of circuits, signals and systems. Students will be prepared for more advanced study encountered in signal processing and control.

Features: Not applicable

Educational aims: This module provides the initial underpinning for mathematical skills and analysis of engineering problems studied in the electrical engineering programme.

Outline syllabus: Standard Engineering Functions
Solving linear and non-linear equations
Parametric Equations
Differentiation of polynomials, trigonometric, and exponential equations
Rate of change
Turning points

Integration of polynomials, trigonometric, and exponential equations:
Area under curve
Average
RMS

Complex Numbers:
Conversion between different representations
Application to Engineering Problems

First-order differential equations:
General solution
Solution applied to Engineering Problems
Second-order differential equations
General solution
Initial and final values

Solutions applied to Engineering Problems:
Linear Algebra
Vectors

Matrices:
Vector and Scalar Product
Determinants

Applications to Engineering Problems

Approximation:
Sequences
Infinite series and tests for convergence
Power series and intervals of convergence
Taylor series

Probability and Statistics:
Numerical summaries of data
Visual representation of data
Discrete and continuous probability distributions
Appropriate use of data samples
Data analysis

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, matrices, approximation and statistics.

MO2 Apply problem solving skills to mathematical models of engineering concepts and interpret the results in an applied context.

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

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

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/F0AB8705-A6C2-895D-64D3-159242F449E4.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: 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.

Students will complete a series of formative individually tailored e-assessments throughout the year that address the individual topics following the syllabus. These use mathematcial software and are designed to give students immediate feedback about their advances in learning and provide scaffolding for the summative assessments.
The summative assessment tasks consist of a timed examination at the end of each semester with individual questions to prohibit plagiarism. The timing assures scaffolding to assessment tasks in the math-intensive modules in Year 2.

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

Assessment tasks:

Examination (First Sit)
Description: Examination 1 (2 hours)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Examination (First Sit)

Description: Examination 2 (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)

Description: Examination 1 (2 hours)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)

Description: Examination 2 (2 hours)

Weighting: 50 %

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) 2025-26

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