

Basic details

UID		Cohorts covered	
Long title	Mathematics for Engineers		
New code	ELEC50011	New short title	
Brief description of module (approx. 600 chars.)	Mathematics is the foundation of engineering sciences and has become increasingly relevant to disciplines that are driving technological developments in this digital age. In this module, we will build on the concepts taught in Year 1 to cover more advanced topics in mathematics that are relevant to both electrical and information engineering. The topics to be covered are divided in two parts: Part A: Complex Variables and Linear Algebra Part B: Probability and Statistics.		
Available as a standalone module/ short course?	N		

Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	5	10	N	
FHEQ level	Level 5			

Allocation of study hours

	Hours	
Lectures	32	
Group teaching	16	<i>problem classes</i>
Lab/ practical	0	<i>MATLAB</i>
Other scheduled		<i>Incl. project supervision, fieldwork, external visits.</i>
Independent study	77	<i>Incl. wider reading/ practice, follow-up work, completion of assess</i>
Placement		<i>Incl. work-based learning and study that occurs overseas.</i>
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed?	No
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Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term	Term 1	Other	

Ownership

Primary department	Electrical and Electronic Engineering
Additional teaching	

departments

Delivery campus **South Kensington**

Collaborative delivery

Collaborative delivery? **N**

External institution **N/A**
 External department **N/A**
 External campus **N/A**

Associated staff

Role	CID	Given name	Surname
Module Leader		Dan	Nucinkis
Module Leader		Stefan	Vlaski

Learning and teaching

Module description

Learning outcomes Upon successful completion of this module, you will be able to:

1. Use complex variables for conformal mapping and contour integration;
2. Understand the concepts of linear algebra and apply them in a mathematical framework;
3. Explain the concepts and techniques of probability and statistics and compute properties of random systems;
4. Use basic estimator and calculate the method of moment and the maximum likelihood estimator;
5. Demonstrate the mathematical techniques which will be used to solve technical problems in your other engineering modules.

Module content **Part A: Complex variables and linear algebra**

- Conformal mapping and contour integration
- Linear transformations, matrix decomposition and computation with matrices; singular value decomposition

Part B: Probability and Statistics

- Random variables, probability density function, cumulative distribution function, expectation and variance of a single and multiple discrete or continuous random variable(s), change of variables, moments, moment generating function, conditional expectation and variance
- Basic properties of estimators, method of moments and maximum likelihood estimators

Learning and Teaching Approach **Lectures**

The lectures will be taught in a large lecture theatre to the whole year group. These lectures will be recorded for revision purposes.

Classes

The problem classes will focus on applying the techniques covered in lectures to a variety of problems ranging from the easy to the difficult, with the chance to ask questions and get one-to-one help.

Problem classes will be held in medium groups, with lecturer and TAs answering questions one-to-one.

Both parts of the course will run concurrently in the Autumn term.

Assessment Strategy	There will be two exams separately covering part A and part B of the course early in the Spring term. There will be a mid-term test in the Autumn term.
Feedback	You will receive feedback on your progress during the classes. Feedback on the exams will come in the form of annotated example answers. The annotations will highlight where the student cohort did well and where general problems in understanding were observed.
Reading list	G. James: Advanced Modern Engineering Mathematics; Riley/Hobson/Bence: Mathematical Methods for Physics and Engineering
Required equipment/ software	NA

Quality assurance

Date of first approval	
Date of last revision	January 2023
Date of this approval	July 2025

Office use only

QA Lead	
Department staff	
Date of collection	

Module leader	Dan Nucinkis
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Date exported	
Date imported	

Notes/ comments	
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Template version

Assessment details

Grading method

Numeric

Pass mark

40%

Assessments

[illegible]

100%