IMPERIAL

Module Specification

Basic details

UID		Cohorts covered (Earliest cohort)	
Long title	Mathematics 1B		
New code	ELEC40014	New short title	
Brief description of module *(approx. 600 chars.)*	Mathematics is the foundation of all engineering practices and therefore this mathematics module is the umbrella onto which many engineering modules are attached. The approach to the material comes in two ways. On the one hand, lectures cover rigorous mathematical principles to ensure depth of knowledge that is, on the other hand, closely related to the engineering applications where the fundamental mathematical principles are brought to life in an engineering context. These applications will form the direct link between what you learn in mathematics and what you apply in your other engineering modules. The module will be the first stage towards ensuring that you have the required		
Available as a standalone module/ short course?	N		

Statutory details

	ECTS	CATS	Non-credit	
Credit value	7.5	15	N	HECOS codes
FHEQ level	Level 4			

Allocation of study hours

	Hours	
Lectures	36	
Group teaching	18	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	0	
Other scheduled		*Incl. project supervision, fieldwork, external visits.*
Independent study	133.5	*Incl. wider reading/ practice, follow-up work, completion of assess*
Placement		*Incl. work-based learning and study that occurs overseas.*
Total hours	187.5	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed?	No

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term	Term 2	Other	

Ownership

Primary department	Electical 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		Daniel	Nucinkis

Learning and teaching

Module description

Learning outcomes	Upon successful completion of both parts of this module you will be able to: 1. apply the techniques of single-variable calculus from 1A and the concepts of complex number, functions, limits and series to perform, among others, Fourier Analysis of periodic and non-periodic functions. 2. use the techniques of vector and linear algebra to analyze and apply the correct solution method in a range of problems involving vectors, matrices and systems of equations. 3. identify and apply the correct approach to solving ordinary differential equations using Laplace transforms. 4. explain and apply the concepts and techniques of multivariable calculus and tackle problems in their appropriate context. 5. explain where and how the mathematical concepts are applied in engineering problems in electromagnetism, signal processing and communications.
Module content	Double Integration, Fourier Series, Fourier Transforms, Laplace Transforms, Multivariable Calculus part 2, Vectors, Linear Algebra. Where appropriate, maths examples will be linked to engineering applications and further reading is available on blackboard to extend insight and knowledge. The applications of several topics will be further explored in Topics in Electrical Engineering.
Learning and Teaching Approach	The lectures will be taught in a large lecture theatre to the whole year group using a classical blackboard and chalk approach and the visualiser. These lectures will be recorded for revision purposes. There will be two problem classes per week: one will be held in medium groups, with lecturer and TAs answeC93:G94ring questions one-to-one; in the other, the year group meets in a large lecture theatre and questions are answered by the lecturer at the board. The focus in problem classes will be on applying the techniques seen 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. In tutorial groups of 3-4 students you will have the opportunity to solve a selection of problems with your personal tutor.

Assessment Strategy	There will be a low-stake half-term tests in February. Areas where a larger number of students show a weakness in understanding of concepts will be identified and discussed during the drop-in sessions. The exam will be held in the first week of the summer term. This will cover material of the spring term, and material from the end of Autumn term as determined by the module lecturer.
Feedback	Feedback will be given after half-term tests. General problems will be discussed during the problem classes. The feedback on exams will be made available as written comments on the exam example answer sheets after the September examiners' meeting.
Reading list	G. James: Modern Engineering Mathematics; Riley/Hobson/Bence: Mathematical Methods for Physics and Engineering; K Stroud: Engineering Mathematics.
Required equipment/ software	NA

Quality assurance

Date of first approval	
Date of last revision	January 2025
Date of this approval	
Module leader	Daniel Nucinkis
Notes/ comments	

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
Date imported	

Template version

Assessment details

Grading method	Numeric	Pass mark	40%

Assessments

Assessment type	Assessment description	Weighting	Pass mark	Must pass?
Practical	Mid term test in Spring (Maths1B)	10%	40%	N
Examination	Start of Summer term exam (Maths1B)	90%	40%	N
		100%		