IMPERIAL

Module Specification

Basic details

UID		Cohorts covered (Earliest cohort)	
Long title	Signal and Systems		
New code	ELEC50013	New short title	
Brief description of module *(approx. 600 chars.)*	This module begins by studying the fundamental properties of signals and linear time-invariant systems. The important aspects of sampling and convolution are discussed in the module. Subsequently, three different ways of representing systems and their input and output signals are studied. These involve using Laplace transform representations, Fourier transform representations and z-transform representations. The course ends with a look at linear filters. The module includes lectures with embedded examples and exercises, problem classes in which students are guided to work on the exercises, and a Matlab-based self-study lab with drop-in support sessions.		
Available as a standalone module/ short course?	N		

Statutory details

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

Allocation of study hours

	Hours	
Lectures	15	*15*
Group teaching	7	*probem classes*
Lab/ practical	9	*matlab based design*
Other scheduled		*Incl. project supervision, fieldwork, external visits.*
Independent study	94	*Incl. wider reading/ practice, follow-up work, completion of assess*
Placement		*Incl. work-based learning and study that occurs overseas.*
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed?	No

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term	Term 1	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		Stefan	Vlaski

Learning and teaching

Module description

Learning outcomes	Upon successful completion of this module, you will be able to: 1. Classify real-world data into different types of signals 2. Describe Linear Time-Invariant systems mathematically and in a way suitable for impementation in processing systems. 3. Explain and apply convolution for linear time-variant systems using transfer functions for continuous and discrete time systems. 4. Use the sampling theorem with the discrete Fourier Transform and the z-transform. 5. Model a data filtering problem as a transfer function and understand how to apply filters to signals.
Module content	Fundamentals of signals - Types of data and signals - Properties of Linear Time-Invariant Systems - Convolution - Sampling - Representing signals using Laplace transforms, Fourier transforms and Z-transforms - Design of filters.
Learning and Teaching Approach	The lectures will be taught either physically in a lecture theatre or else online, with video recording. Problem classes will be provided in two half-cohort groups and 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. 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 one computer-based mid-test during Autumn midterm week. This will assess the lab work and how it has helped understanding of the corresponding subtopics as presented in the lectures. The final exam in Summer Term will cover all the topics in the module.
Feedback	Feedback will be given in the exercise classes. The on-line test will generate automatic feedback. Feedback on the exams will be given in after the Supplementary Qualifying Tests have been given. This feedback 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	S. Hayin and B. Van Veen, "Signals and Systems", Wiley 2003.

Required equipment/ software	NA

Quality assurance

Date of first approval	
Date of last revision	June 2026
Date of this approval	June 2026
Module leader	Stefan Vlaski
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?
Examination	Autumn term midterm computer-based test	20%	40%	N
Examination	Exam at start of summer term	80%	40%	N
		100%		