

Basic details

UID		Cohorts covered	
Long title	Control Engineering		
New code	ELEC60008	New short title	
Brief description of module (approx. 600 chars.)	This module aims to introduce you to state-space methods for the analysis and design of control systems. You will learn how to obtain state-space models from transfer functions and vice versa. You will assess the stability properties of dynamical systems and structural properties such as reachability and observability. Finally, you will design feedback controllers in a systematic way to modify the behaviour of the system.		
Available as a standalone module/ short course?	No		

Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	5	10	N	
FHEQ level	6			

Allocation of study hours

	Hours	
Lectures	20	
Group teaching	0	<i>Incl. seminars, tutorials, problem classes.</i>
Lab/ practical	0	
Other scheduled	2	<i>Incl. project supervision, fieldwork, external visits.</i>
Independent study	103	<i>Incl. wider reading/ practice, follow-up work, completion of assess</i>
Placement	0	<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	1	Other	

Ownership

Primary department	Department of Electrical and Electronic Engineering
Additional teaching departments	

Delivery campus **South Kensington**

Collaborative delivery

Collaborative delivery? **No**

External institution
External department
External campus

Associated staff

Role	CID	Given name	Surname
Module leader		Giordano	Scarciotti

Learning and teaching

Module description

Learning outcomes	Upon successful completion of this module, you will be able to: 1. Construct models of dynamical systems using differential and difference equations 2. Compute a state-space representation from a given transfer function and vice versa, and quantify difference between the two representations 3. Assess stability properties of dynamical systems and structural properties 4. Devise feedback controllers in a systematic way to modify the behaviour of dynamical systems 5. Assess a priori what behaviour can and cannot be achieved in a dynamical system
Module content	Abstract dynamical systems; Differential and difference equations; State space models; Lyapunov stability; Structural properties (controllability and observability); Kalman decomposition; Pole placement via state feedback and dynamic output feedback; Observer design.
Learning and Teaching Approach	This module is taught as a traditional module with theoretical lectures supported by exercises and examples. The lectures cover the topics from a theoretical point of view. Concepts, problems and solution methods are explained and justified from a theoretical and intuitive point of view.
Assessment Strategy	The module is assessed by a 3-hour, closed book, written examination.
Feedback	You will be provided with written comments on exam example answer sheets.
Reading list	Antsaklis, P.J., & Michel, A.N.: Linear Systems Primer, a, Springer, 2007

Quality assurance

Office use only

Date of first approval

QA Lead

Date of last revision April 2024
Date of this approval July 2025

Department staff
Date of collection

Module leader Giordano Scarciotti

Date exported
Date imported

Notes/ comments

Template version

Assessment details

Grading method

Numerical

Pass mark

40%

Assessments

[illegible]

100%