IMPERIAL

Module Specification

Basic details

UID:

Cohorts covered — Earliest cohort:

Long title: Microwave Technology

New code: ELEC60022

New short title:

Brief description of module *(approx. 600 chars.)*: This module will present you with fundamental principles behind practical microwave technologies used in modern applications.

Available as a standalone module/ short course? No

Statutory details

	ECTS	CATS	Non-credit
Credit value	5	10	N

HECOS codes

FHEQ level: L7

Allocation of study hours

	Hours	
Lectures	20	
Group teaching	9	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	2	
Other scheduled	0	*Incl. project supervision, fieldwork, external visits.*
Independent study	94	*Incl. wider reading/ practice, follow-up work, completion of assess*
Placement	0	*Incl. work-based learning and study that occurs overseas.*
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed? 0

Module delivery

Delivery mode: Taught/ Campus

Other:

Delivery term:

Other:

Ownership

Primary department: Department of Electrical and Electronic Engineering

Additional teaching departments: 0

Delivery campus: South Kensington

Collaborative delivery

Collaborative delivery? No

External institution	
External department	
External campus	

Associated staff

Role	CID	Given name	Surname
Module leader		Stepan	Lucyszyn
		0	0
		0	0
		0	0
		0	0
		0	0
		0	0
		0	0
		0	0
		0	0

Learning and teaching

Module description

Learning outcomes	Upon successful completion of this module, you will be able to: 1. Interpret electromagnetic wave propagation in various media; how guided-wave structures can be used as practical components, bridging the gap between radio and optical frequencies. 2. Understand scattering(S)-parameters and their use in simulations and experiments. 3. Analyse the fundamental physical limitations of materials and components. For example, why some materials are better than others and why surface mounted devices are generally not used at upper microwave frequencies. 4. Present aspects of commercial technologies in the design and manufacture of components and circuits. 5. Theoretical predictions and a practical demonstration of the microwave oven will be given at the end of the course to highlight a number of basic electromagnetic principle associated with cavity resonators.
Module content	Electromagnetic Spectrum; Applications of Microwaves and RF; S-parameters; Microwave Office; Vector Network Analyzer. Material Characterization; Metamaterials; Lumped Elements; RLC Resonators; Transmission Lines; Antennas and Propagation; Guided-waves and Cavity Resonators; Thermionic Valve Technologies and Heating Applications.
Learning support	
Pattern of learning and teaching	
Learning and Teaching Approach	The module is taught through lectures and exercise classes.

Assessment Strategy	This module is assessed by a 3-hour open book written exam. In addition there is one coursework assignment (CAD simulation).
Feedback	You will receive written comments on exam example answers and feedback in exercise classes.
Reading list	Supplementary Reading: [1] D. M. Pozar, Microwave engineering, 4th ed. Hoboken, N.J.: Wiley, 2012. Background Reading: [1] S. Lucyszyn, RFIC and MMIC design and technology. London :: London : Institution of Electrical Engineers, 2001. [2] S. Lucyszyn, Advanced RF MEMS. Cambridge :: Cambridge : Cambridge University Press, 2010.
Required equipment/ software	

Quality assurance

Date of first approval	
Date of last revision	July 2025
Date of this approval	
Module leader	Prof. Stepan Lucyszyn

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
Date imported	

Notes/ comments	

Template version

Assessment details

Grading method Numerical

Pass mark 40%

Assessments

Assessment type	Assessment description	Weighting	Pass mark	Must pass?
Examination	3 hour open book written examination	80%	40%	N
Practical	CAD Simulation Assignment	20%	40%	N
		0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
0	0	0%	0%	0.00
		100%		