

Basic details

UID		Cohorts covered	Earliest cohort	Latest c
Long title	High Performance Analogue Electronics			
New code	ELEC70013	New short title		
Brief description of module (approx. 600 chars.)	This module is concerned with the design and implementation of high performance analogue integrated circuits and systems, with emphasis on the design of high-frequency circuits for wireless receivers. Circuit and system-level issues determining the performance of wireless receivers will be discussed, and transistor-level techniques to implement high performance, fully-integrated wireless receivers will be introduced.			
				420 characters
Available as a standalone module/ short course?	No			

Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	5	10	N	
FHEQ level	L7			

Allocation of study hours

	Hours	
Lectures	20	
Group teaching	0	<i>Incl. seminars, tutorials, problem classes.</i>
Lab/ practical	0	
Other scheduled	0	<i>Incl. project supervision, fieldwork, external visits.</i>
Independent study	105	<i>Incl. wider reading/ practice, follow-up work, completion of assessments</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	Term 2	Other	

Ownership

Primary department	Department of Electrical and Electronic Engineering
Additional teaching departments	0

Delivery campus **South Kensington**

Collaborative delivery

Collaborative delivery? **0**

External institution
External department
External campus

Associated staff

Role	CID	Given name	Surname
Lecturer		Esther	Rodriguez Villegas
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Learning and teaching

Module description

Learning outcomes

On succesful completion of the module you will be able to:

1. Formulate an integrated circuit design problem following both, a top to bottom and a bottom to top approach, specifically in the context of receivers, transconductors, mixers and filters
2. Consider different trade-offs that play a role in the process of design, and put those within the context of both, the circuit and the application. Receivers, transconductors, mixers and filters will be used as case studies.
3. Argue the need of following different paths in the design problem as a function of the chosen design trade-offs.
4. Evaluate trade-offs as a function of a number of typical design specification.
5. Judge visually the basic behaviour of circuits and systems topologies, including a number of receivers, mixers, transconductors and filters; without the need of formal calculations.
6. Hypothesize, especially in the context of transconductors, mixers and filters, of when certain design techniques could aid the design depending on the required design specifications, with a main focus on linearity and noise.

Module content

System-level design: Introduction to wireless receiver architectures, system-level specifications;
Design techniques: noise analysis and low noise design, high-frequency transistor performance, CMOS and BJT linearisation;
Building blocks: integrated continuous-time filters, analogue mixers and multipliers, integrated oscillators;
System-level case studies: video/tv receivers; paging receivers.

Learning and Teaching Approach

The course will be taught using traditional classroom lectures. Further student-staff interaction will take place through in question-answer sessions during the lectures.

Assessment Strategy Feedback

The module is summatively assessed through a 3-hour closed-book exam.

Summative feedback on the exam will be provided in the form of annotated model solutions after resit exams have taken place. Formative feedback will be provided during the interactive sessions (i.e. question-answer sessions).

Reading list

The reading list will be provided in session

Quality assurance

Date of first approval	
Date of last revision	
Date of this approval	

Module leader Prof. Esther Rodriguez Villegas

Notes/ comments

Office use only

QA Lead	
Department staff	
Date of collection	

Date exported	
Date imported	

Assessment details

Grading method	Numerical
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Pass mark

50%

Assessments

[illegible]

100%