MODULE DESCRIPTOR

Module Title

Advanced Electronics

Reference	EN4512	Version	7
Created	August 2021	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	August 2021	ECTS Points	7.5

Aims of Module

To provide the student with the ability to analyse, synthesise, simulate and implement complex electronic systems.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Design high-frequency, wide-band circuits.
2	Analyse and design electronic systems taking noise and associate effects, including EMC-compliance, into consideration.
3	Appreciate the principles of high-speed digital design.
4	Analyse and design HDL-based digital systems.
5	Design, synthesise and report on mixed digital systems.

Indicative Module Content

High frequency transistor models, circuits employing wideband discrete and integrated devices, layout design considerations for high frequency. Circuit noise sources and associated effects on electronic systems. Noise estimation techniques and mitigating measures. Interference and compatibility between systems, including EMC considerations. Principles of high-speed digital circuit design, reliability issues, system minimisation. HDL design flow: system design and synthesis using HDL and software tools. System-level design of complex digital designs, SoC, IP blocks, implementation using Field Programmable devices (e.g. FPGA).

Module Delivery

This is a predominantly lecture-based course supplemented with tutorial sessions. The HDL content is lab-based.

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Indicative Student Workload

		Full Time	Part Time
Contact Hours		39	39
Non-Contact Hours		111	111
Placement/Work-Based Learning Experience [Notional] Hours		N/A	N/A
TOTAL		150	150
Actual Placement hours for professional, statutory or regulatory body			

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	5
Description:	Summary design report and technical presentation in a group setting.				

Component 2

Type:	Examination	Weighting:	70%	Outcomes Assessed:	1, 2, 3, 4
Description:	Closed book examination.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 is worth 30% and C2 is worth 70%.

		Coursework:						
		A	**B**	**C**	**D**	**E**	**F**	**NS**
	A	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
Examination:	**D**	C	C	D	D	E	E	
	E	E	E	E	E	E	F	
	F	F	F	F	F	F	F	
	NS	Non-submission of work by published deadline or non-attendance for examination						

Module Requirements

Prerequisites for Module	Electronics 3 (EN3512), or its equivalent.
Corequisites for module	None.
Precluded Modules	None.

ADDITIONAL NOTES

An Indicative Bibliography will normally reference the latest edition of a text. In some cases, older editions are equally useful for students and therefore, those are the editions that may be stocked.

INDICATIVE BIBLIOGRAPHY

1	BEASLEY, J.S. and MILLER, G.M., 2014. Modern Electronic Communication. 9th ed. Essex: Pearson.
2	JOHNSON, H. and GRAHAM, M., 1993. High Speed Digital Design. 2nd ed. Upper Saddle River, NJ: Prentice Hall.
3	ROTH, C.H., 2017. Digital Systems using VHDL. 3rd ed. Boston, MA: PWS Publishing.
4	SEDRA, A.S. and SMITH, K.C., 2014. Microelectronic Circuits. 7th ed. New York, NY: Oxford University Press.
5	WILLIAMS, T., 2016. EMC for Product Designers. 5th ed. Oxford: Newnes.

1   BEASLEY, J.S. and MILLER, G.M., 2014. Modern Electronic Communication. 9th ed. Essex: Pearson.

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4   SEDRA, A.S. and SMITH, K.C., 2014. Microelectronic Circuits. 7th ed. New York, NY: Oxford University