

Module Title Advanced Electronics	Reference EN4512 SCQF SCQF Level 10 SCQF Points 15 ECTS Points 7.5 Created May 2002 Approved March 2004 Amended August 2011 Version No. 2
Keywords high frequency electronics, noise, EMC, HDL, SoC, Digital design	

This Version is No Longer Current

The latest version of this module is available [here](#)

Prerequisites for Module	Indicative Student Workload		
Electronics 3 (EN3512), or its equivalent.	<i>Contact Hours</i>	Full Time	Part Time
	Assessment	2	2
	Laboratory	12	12
Corequisite Modules	Lectures/Tutorials	24	24
None.	<i>Directed Study</i>		
Precluded Modules	Directed Self		
	Study/Coursework preparation	48	48
None.	<i>Private Study</i>		
Aims of Module	Private Study	64	64
To provide the student with the ability to analyse, synthesise, simulate and implement complex electronic systems.	Mode of Delivery		
Learning Outcomes for Module	This is a predominantly lecture-based course supplemented with tutorial sessions. The HDL content is lab-based.		
On completion of this module,	Assessment Plan		

students are expected to be able to:

- 1.Design high-frequency, wide-band circuits.
- 2.Analyse and design EMC-compliant systems.
- 3.Appreciate the principles of high-speed digital design
- 4.Analyse, design and synthesise digital systems using an HDL.

Indicative Module Content

High frequency transistor models, circuits employing wideband discrete and integrated devices, layout design considerations for high frequency.

Sources of noise in circuits and systems, circuit noise estimation and minimisation; sources of interference, EMC regulations, EM emissions and susceptibility, design methods for EM compliance.

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

	Learning Outcomes Assessed
Component 1	3,4
Component 2	1,2,3,4

Component 1 is coursework which is based on a laboratory design exercise, with preparatory and practical progress recorded in a logbook, and the submission of a final formal report (30% weighting).

Component 2 is closed book examination (70% weighting).

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.

System level design of complex digital designs, SoC, IP blocks, implementation using Field Programmable devices (e.g. FPGA).

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.