MODULE DESCRIPTOR

Module Title

Advanced Digital System Design

Reference	EN4542	Version	4
Created	August 2021	SCQF Level	SCQF 10
Approved		SCQF Points	15
Amended	August 2021	ECTS Points	7.5

Aims of Module

To enable student to study the advanced techniques and methods for digital systems and to provide students with the ability to analyse, design an implement advanced digital systems.

Learning Outcomes for Module

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

1	Design, implement and evaluate the performance of digital systems.
2	Analyse and critically assess the design of advanced digital systems.
3	Synthesise solutions to engineering problems using computational intelligence based digital systems.
4	Analyse and evaluate solutions of computational intelligence based digital systems using computer simulation.

Indicative Module Content

Advanced techniques for processor design: pipelined processors, very long instruction word (VLIW) processors, superscalar processors, vector processors, parallel processors and supercomputers. Digital signal processing design: fixed and floating point processing, digital signal processors (architecture, instruction set, features and applications) and operation design. Computational Intelligence based digital system: artificial neural networks (biological basis, perceptron, back-propagation, feedback), fuzzy logic (fuzzification, inference engine, defuzzification), evolutionary artificial neural networks and other current methods.

Module Delivery

This module is taught using a structure programme of lectures, tutorials, laboratory exercises and student-centred learning.

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Indicative Student Workload	Full Time	Part Time
Contact Hours	51	51
Non-Contact Hours	99	99
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:	50%	Outcomes Assessed:	1, 4
Description:	Coursework.				

Component 2

Type:	Examination	Weighting:	50%	Outcomes Assessed:	2, 3
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 50% and C2 is worth 50%.

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

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1. DU, K.L. and SWAMY, M.N.S., 2006. Neural Networks in a Softcomputing Framework. London: Springer.
2. HAYKIN, S., 2008. Neural Networks and Learning Machines: A Comprehensive Foundation. 3rd ed. London: Pearson Education.
3. NEGNEVITSKY, M., 2011. Artificial Intelligence: A Guide to Intelligent Systems. 3rd ed. Harlow: Addison-Wesley.
4. HENNESSY, J.L. and PATTERSON, D.A., 2011. Computer Architecture: A Quantitative Approach. 5th ed. Amsterdam, Netherlands: Morgan Kaufmann.
5. CHASSAING, R. and REAY, D.S., 2008. Digital Signal Processing and Applications with the TMS320C6713 and TMS320C6416 DSK. 2nd ed. Hoboken, NJ: Wiley-Blackwell.