MODULE DESCRIPTOR

Module Title

Advanced Signal Processing and Systems Analysis

Reference	EN5502	Version	5
Created	June 2017	SCQF Level	SCQF 11
Approved	March 2004	SCQF Points	15
Amended	June 2017	ECTS Points	7.5

Aims of Module

To provide students with the ability to analyse, design and implement advanced control systems and signal processing systems.

Learning Outcomes for Module

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

1	Analyse, design and implement advanced digital signal processing systems.
2	Design, implement and evaluate digital signal processing operations
3	Model, analyse and design digital control systems.
4	Analyse, design and evaluate performance of digital controllers using computer simulation.

Indicative Module Content

Signal Processing: Discrete Fourier Transform, Fast Fourier Transform, Adaptive filtering, Spectral analysis, Wavelet Transform, DSP implementation. Digital Control: Z-Transform, Discrete transfer function, Sampled-data systems, Discrete Equivalents, State-space models, Transient and steady-state responses, Stability and Jury?s test, Compensator design, Controllability and observability, Pole placement, Observer design, Digital controller implementation.

Module Delivery

This is a lecture-based module supplemented with tutorial sessions.

Indicative Student Workload	Full Time	Part Time
Contact Hours	38	38
Non-Contact Hours	112	112
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:	2, 4

Description:	Component 1 is a coursework which consists of two items: to analyse a problem in control system, design a solution and verify this via computer simulation and to design signal processing operations and implement them in software.

Component 2

Type:	Examination	Weighting:	50%	Outcomes Assessed:	1, 3

Description:	Component 2 is an examination which will be of 2.5 hours duration.

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

To pass the module you must achieve at least 50% weighted average mark in the exam and coursework. In addition you need to achieve at least 40% in both the individual exam and coursework Components.

Module Grade	Minimum Requirements to achieve Module Grade:
A	70% and above
B	60-69%
C	55-59%
D	50-54%
E	40-49%
F	39% and below
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Control and Signal Processing (EN4502) or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	FRANKLIN, G.F., POWELL, J.D. and WORKMAN, M., 1998. Digital Control of Dynamic Systems. 3rd ed. Ellis-Kagle Press.
2	OGATA, K. 2015. Discrete-time Control Systems. 2nd ed. Prentice Hall.
3	ASTROM, K.J. and WITTENMARK, B., 2011. Computer-Controlled Systems: Theory and Design. 3rd ed. Prentice Hall.
4	HAYES, M.H., 1996. Statistical Digital Signal Processing and Modelling. New York: Wiley.
5	MULGREW, B., GRANT, P. and THOMPSON, J., 2003. Digital signal processing: concepts and applications. 2nd ed. Basingstoke: Macmillan Press.
6	Giron-Sierra, Jose Maria,2017. Digital signal processing with Matlab examples. Volume 2, Decomposition, recovery, data-based actions.
7	Ifeachor, Emmanuel C. and Jervis, Barrie W. 2001. Digital signal processing : a practical approach