MODULE DESCRIPTOR

Module Title

Control and Signal Processing

Reference	EN4502	Version	5
Created	March 2021	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	August 2021	ECTS Points	7.5

Aims of Module

To provide students with the ability to analyse, design and implement 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 digital signal processing systems.
2	Design and evaluate digital filters using software simulation.
3	Apply classical control techniques in analysis and design linear continuous-time control systems.
4	Analyse, design and evaluate performance of controllers using computer simulation.

Indicative Module Content

Signal processing: signal classification, Z-Transform, discrete signals and systems, discrete time and frequency, digital filters, FIR and IIR filters design, filter implementation Control: Transient and steady state responses, Stability and Routh-Hurwitz criterion, Root Locus, Frequency responses and Bode plots, Lead-Lag compensators design, State-space models.

Module Delivery

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

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: | 2, 4 |

| Description: | Coursework. |

Component 2

| Type: | Examination | Weighting: | 70% | Outcomes Assessed: | 1, 3 |

| Description: | Closed book examination and online Moodle quiz. |

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**
Examination:	**A**	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
	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	Signal Acquisition, Instrumentation and Control (EN3500)
Corequisites for module	None.
Precluded Modules	Control and Instrumentation (EN4501)

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	DUTTON, K., THOMPSON, S. and BARRACLOUGH, B., 1997. The Art of Control Engineering. Harlow: Pearson.
2	MULGREW, B., GRANT, P. and THOMPSON, J., 2003. Digital Signal Processing: Concepts & Applications. 2nd ed. Palgrave.
3	IFEACHOR, E.C. and JERVIS, B.W., 2001. 2nd ed. Digital Signal Processing. Prentice Hall.
4	DORF, R.C. and BISHOP, R.H., 2017. Modern Control Systems. 13th ed. Pearson.
5	STEVEN, S. The Scientist and Engineer's Guide to Digital Signal Processing. (Available FREE in electronic form at http://www.dspguide.com/).
6	HAHN, B. and VALENTINE, D., 2015. Essential MATLAB for Engineers and scientists. 5th ed. Butterworth-Heinemann.