MODULE DESCRIPTOR

Module Title

Signal Acquisition, Instrumentation and Control

Reference	EN3500	Version	10
Created	April 2023	SCQF Level	SCQF 9
Approved	March 2004	SCQF Points	15
Amended	August 2023	ECTS Points	7.5

Aims of Module

To provide the student with the ability to evaluate signals and control systems, select appropriate instrumentation and apply computer-based analysis tools.

Learning Outcomes for Module

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

1	Demonstrate knowledge of mathematics and engineering principles to describe and manipulate signals in the time and frequency domains.
2	Assess the performance of a control systems using computer simulation.
3	Interpret appropriate linear control system, discussing the limitations of the techniques employed
4	Design instrumentation systems for the measurement of common control parameters.
5	Discuss transducers and instrumentation for the measurement of common control parameters.

Indicative Module Content

Open and closed loop systems, concept of stability, Laplace transform, electrical and mechanical system models, block diagrams, first and second order system response, PID controllers, application of computer based tools in signal acquisition, instrumentation and control. Signal types, signal characteristics, sensitivity, sensors and transducers and their operation, calibration, signal conditioning and amplification, time and frequency domain, sampling theorem and aliasing, anti-aliasing filters, A to D conversion, sampling rate, resolution, D to A conversion, interfacing, digital I/O, virtual instrumentation.

Module Delivery

Full-time students: This module is delivered by a combination of lectures and tutorials. It will be supported by practical examples and activities including computer based laboratory exercises. Part-time students: This module is delivered by a combination of lectures and tutorials online. It will be supported by online evening sessions.

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Indicative Student Workload	Full Time	Part Time
Contact Hours	50	50
Non-Contact Hours	100	100
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:	Examination	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4, 5
Description:	Closed book examination.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Mathematics 2 (EN2901) or 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.

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INDICATIVE BIBLIOGRAPHY

1	DORF, R.C. and BISHOP, R.C., 2017. Modern Control Systems. 13th ed. London: Pearson Education.
2	DUTTON, K., THOMPSON, S. and BARRACLOUGH, B., 1997. The Art of Control Engineering. Harlow: Addison-Wesley.
3	BENTLEY, J. P., 2005. Principles of Measurement Systems. 4th ed. London: Longman.
4	MATLAB. Getting Started Guide. Mathworks.
5	Simulink User's Guide, Mathworks.