SYST C2609: Introduction to Systems and Control

Module Title:	Introduction to Systems and Control
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	6 programme(s)

Teaching & Learning Strategies:	This module will be delivered through a mix of lectures and laboratory assignments. It will employ a mixture of active/task-based learning, reflective learning and problem-based learning.

Module Aim:	The aim of this module is to introduce and develop understanding of the dynamics of common systems, analyse their characteristics, control them using standard strategies, and simulate them in the laboratory.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Define dynamic system behaviour in terms of stability, steady-state and transient response.
LO2	Identify the objectives and principles of operation of general closed-loop automatic control systems.
LO3	Represent dynamic systems in transfer function form.
LO4	Explain and utilise feedback including parameterisation of (tune) PID controllers.
LO5	Use analysis tools to simulate/analyse dynamic systems and their practical implementation using basic control techniques.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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Module Content & Assessment

Indicative Content
Systems Transfer function and characterisation: e.g.: Transient, Steady state, Stability. Block diagram analysis/algebra.
Control Objectives of Automatic Control, Loop Block Diagrams, PID Control, definitions and the need for safety and ethical use of Automatic Control systems.
Analysis Mathematical modelling and simulation software. Signal analysis, Real-time spectral analysis, Off-line processing, Characterisation of a 2nd-order system

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Various assessments to reinforce learnings given throughout the semester.	1,2,3,4	20.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	A set of practical exercises to complement the theory elements of the module.	5	20.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	A final exam to assess the students' learning.	1,2,3,4	60.00	End-of-Semester

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Various assessments to reinforce learnings given throughout the semester.	1,2,3,4	20.00	n/a

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	A set of practical exercises to complement the theory elements of the module.	5	20.00	n/a

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	A final exam to assess students' learning.	1,2,3,4	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	Every Week	3.00
Laboratory	Every Week	2.00
Independent Learning Time	Every Week	4.00
	Total Hours	9.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EFARG_B	Bachelor of Engineering (Honours) in Agricultural Systems Engineering	6	Elective
CW_EMMEC_B	Bachelor of Engineering (Honours) in Mechanical Engineering	6	Elective
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	4	Mandatory
CW_EFARG_D	Bachelor of Engineering in Agricultural Systems Engineering	6	Mandatory
CW_EEMEC_D	Bachelor of Engineering in Mechanical Engineering	6	Elective
CW_EEROO_D	Bachelor of Engineering in Robotics and Automated Systems	4	Mandatory