

Module Title:	Automatic Control 1	
Language of Instruction:	English	
Credits:	5	
NFQ Level:	7	
Module Delivered In	1 programme(s)	
Teaching & Learning Strategies:	Lectures will incorporate a mixture of presentations, examples and student exercises/problem-solving, question and answer sessions, group discussions and online resources. Extensive use will be made of “hands-on” Control workshop programme to promote greater student engagement with the learning process by facilitating them to apply and implement the concepts explored in the classroom.	
Module Aim:	The aim of this module is to enable students to develop an understanding of PID automatic control systems and to select and apply appropriate control strategies for simple applications.	
Learning Outcomes		
On successful completion of this module the learner should be able to:		
LO1	Classify and discuss the objectives and principle of operation of general closed-loop automatic control systems.	
LO2	Determine how different process characteristics will contribute to the control system response and performance.	
LO3	Explain the principles of operation of On/Off, P, PI and PID control modes.	
LO4	Apply different control modes based on process requirements to basic applications.	
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		
8358	MEUS H3505	Process Measurements 1
Requirements		
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.		
No requirements listed		

Module Content & Assessment

Indicative Content

The Control Loop

Objectives of Automatic Control, Loop Block Diagrams, Components of Sample Systems, Open and Closed-Loop Control, Feedback in Control Systems, Process Disturbances, Control Definitions and the need for safety and ethical use of Automatic Control systems.

Process Characteristics

Basic process types, Process load, Supply-side/Demand-side Capacities, Process Lags, Dead Time, Process Gain, Process Reaction Curve, Dynamic Process Characteristics and data gathering by generating process signature curve and extracting critical parameters (eg Dead time, Gain and Time Constant).

Final Control Elements

Introduction to the most common types of FCEs (pumps, valves, electrical power regulation/delivery devices). Range of devices, applications, fail safe implications and potential impacts on control response.

Modes of Control

On-Off Control, Proportional Control, Proportional + Integral Control, Proportional + Derivative Control, PID (3 Term) Control, Controller Selection, Calculations of controller output in different modes for a given set of process conditions.

Assessment Breakdown	%
Continuous Assessment	30.00%
End of Module Formal Examination	70.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	Online/Classroom based written test	1,2	5.00	Week 6
Short Answer Questions	Online/Classroom based written test	1,2,3	5.00	Week 11
Written Report	Practical/Work-based Control System application appraisal	1,2,3,4	20.00	Sem 1 End

No Project

No Practical

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Written Examination	1,2,3,4	70.00	End-of-Semester

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	Online/Classroom based written test.	1,2	5.00	Week 6
Short Answer Questions	Online/Classroom based written test	1,2,3	5.00	Week 11
Written Report	Practical/Work-based Control System application appraisal.	1,2,3,4	20.00	Sem 1 End

No Project

No Practical

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Written examination	1,2,3,4	70.00	End-of-Semester

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

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lab/Lecture	Every Week	3.00
Independent Learning Time	Every Week	6.00
Total Hours		9.00

Workload: Part Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lab/Lecture	Every Week	3.00
Independent Learning	Every Week	6.00
Total Hours		9.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EMIMC_D	Batchelor of Science in Industrial Measurement and Control	1	Mandatory