

MODULE DESCRIPTOR

Module Title

Process Control Systems

Reference	EN3104	Version	3
Created	April 2023	SCQF Level	SCQF 9
Approved	July 2018	SCQF Points	30
Amended	August 2023	ECTS Points	15

Aims of Module

To provide the student with the knowledge and skills to safely design and analyse batch and continuous processes and their respective process control and safety instrumented systems.

Learning Outcomes for Module

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

- 1 Interpret the applicability and limitations of modelling and simulation techniques to the dynamics of processes.
- 2 Explain process control systems for simple continuous and/or batch processes.
- 3 Demonstrate the engineering processes and standards for the development of safe process control systems for batch and/or continuous processes.
- 4 Formulate HAZID, HAZOP and LOPA outcomes and apply them to safety instrumented systems and emergency shutdown systems.
- 5 Assess the executive functions of fire and gas systems and the inter-relationship with process control systems.

Indicative Module Content

Process classification. Recipes, NAMUR NE33, ISA-88.01. Physical and Procedural models. Batch & semi-batch process control. Sequential control. Relationships between LOPA, SIL and HAZOPs to ESD and SI systems. Alarm management. Fire and Gas elements and systems. Hardware-in-the-loop and simulation systems.

Module Delivery

The module is delivered in Blended Learning mode using structured online learning materials/activities and directed study, facilitated by regular online tutor support. Workplace Mentor support and work-based learning activities will allow students to contextualise this learning to their own workplace. Face-to-face engagement occurs through annual induction sessions, employer work-site visits, and modular on-campus workshops.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	30	N/A
Placement/Work-Based Learning Experience [Notional] Hours	240	N/A
TOTAL	300	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>	240	

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	60%	Outcomes Assessed:	1, 2, 3
Description:	Report based on lab activities				

Component 2

Type:	Coursework	Weighting:	40%	Outcomes Assessed:	4, 5
Description:	Case study report				

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 60% (vertical axis) and C2 is worth 40% (horizontal axis).

		Coursework:						
		A	B	C	D	E	F	NS
Coursework:	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	E	E	E	F	F	F	
	NS	Non-submission of work by published deadline or non-attendance for examination						

Module Requirements

Prerequisites for Module	Completion of Stage 2, SCQF Level 8, or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 FISHER, T.G. and HAWKINS, W.M., 2006. Batch Control Systems - Design, Application, and Implementation. 2nd ed. Elsevier.
- 2 CACCAVALE, F., 2011. Control and Monitoring of Chemical Batch Reactors. Springer.
- 3 CORRIOU, J-P, 2017. Process Control. 2nd ed. Springer.
- 4 MANGEY, R., 2018. Modeling and Simulation in Industrial Engineering. Springer.