

MODULE DESCRIPTOR

Module Title

Advanced Control Methods

Reference	EN4104	Version	4
Created	April 2023	SCQF Level	SCQF 10
Approved	July 2018	SCQF Points	30
Amended	August 2023	ECTS Points	15

Aims of Module

To provide the student with the knowledge and understanding required to design and analyse complex and secure control systems.

Learning Outcomes for Module

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

- 1 Illustrate the applicability of advanced control and estimation techniques to process control systems.
- 2 Develop advanced solutions to a complex process control system.
- 3 Examine the understanding of the inter-relationships between fire and gas systems, safety instrumented systems and emergency shutdown systems including its continuous quality improvement and management.
- 4 Critique strategies to handle abnormal and emergency situations and securities for fire and gas systems, safety instrumented systems and emergency shutdown systems.

Indicative Module Content

Estimation and identification, Optimal control, Generalised and Model predictive control, Passive control, Non-linear control. Alarm management, Basic Process Control Systems, Emergency safety devices and instrument systems. Automation systems. Security and Cybersecurity of automation systems. HAZOP, SIL, SISs, ESDs.

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.

	Module Ref:	EN4104	v4
Indicative Student Workload		Full Time	Part Time
Contact Hours			N/A
Non-Contact Hours		30	N/A
Placement/Work-Based Learning Experience [Notional] Hours			N/A
TOTAL			N/A
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					
Туре:	Coursework	Weighting:	60%	Outcomes Assessed:	1, 2
Description:	Report based on lab activities				
Component 2					
Туре:	Coursework	Weighting:	40%	Outcomes Assessed:	3, 4
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:						
		Α	В	С	D	Е	F	NS
	Α	А	А	В	В	Е	Е	
	В	В	В	В	С	Е	Е	
	С	В	С	С	С	Е	Е	
Coursework:	D	С	С	D	D	Е	Е	
	Е	Е	Е	Е	Е	Е	F	
	F	Е	Е	Е	F	F	F	
	NS	Non-submission of work by published deadline or non-attendance for examination					d nination	

Module Requirements	
Prerequisites for Module	Completion of Stage 3, SCQF Level 9, or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 CACCAVALE, F, 2011, Control and Monitoring of Chemical Batch Reactors, Springer
- 2 ZHANG, P, 2010, Advanced Industrial Control Technology, 1st ed., Elsevier (e-book)