

## 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.

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
Actual Placement hours for professional, statutory or regulatory body	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
Description:	Report based on lab activities				

### Component 2

Type:	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:						
		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 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)