a.r.u.

Module Definition Form (MDF)

Module code: MOD009172	**Version:** 1 **Date Amended:** 07/Feb/2023

1. Module Title
Industrial Process Control

2a. Module Leader
Kahtan Aziz

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
7

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This module aims to provide you with a thorough introduction to key concepts underlying advanced topics in control of industrial systems analysis and design. Conventional engineering and industrial applications and examples are provided emphasising particular differences in the design procedure. The weekly lectures and tutorials deliver a comprehensive insight into current industrial control technology and practices, including Programmable Logic Controllers (PLC), Supervisory Control and Data Acquisition (SCADA) and Distributed Control System (DCS) systems. Subjects include discrete event system control, programming pneumatics PLCs, and an introduction to manipulator theory and practice.

6b. Outline Content

The module will incorporate lectures and laboratory sessions on topics including:

• Review of classical and introduction to advanced control – uncertainty, sensitivity and robustness, robust stability and performance,

• Advanced loop-shaping control approaches,

• Requirement for nonlinear control – nonlinearities in control design problems, nonlinear control stability and the role of Lyapunov functions,

• Introduction to nonlinear control design methods

• Programmable Logic Controllers (PLC)

• Supervisory Control and Data Acquisition (SCADA)

• Distributed Control System (DCS) systems

• Application examples – review of control issues in the industry (case study)

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

Matlab Simulink and Simscape, Pneumatics Laboratory

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Demonstrate knowledge and understanding of the need for industrial automation, describing the necessary conditions and limitations under which manual and automated production methods are used.
2	Knowledge and Understanding	Demonstrate knowledge of computational and analytical methods in industrial process automation; Recognise and discuss their scope and limitations.
3	Intellectual, practical, affective and transferrable skills	Apply knowledge of mathematics and engineering principles such as kinematics and dynamics, control, and transducer systems to solve industrial process control problems.
4	Intellectual, practical, affective and transferrable skills	Select and critically evaluate technical literature and other sources of information on the topic of industrial process control.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2024/5	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	36	1-4	Lectures/ Lab/ Tutorial 3 Hour per week
Other teacher managed learning	0	None	None
Student managed learning	114	1-4	Self-study
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Coursework	1 2 4	40 (%)	Fine Grade	40 (%)
1500 word technical report, maps to Engineering Council Learning Outcomes M3, M4					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Examination Chelmsford	1 3	60 (%)	Fine Grade	40 (%)
1.5 Hours examination, maps to Engineering Council Learning Outcomes M1					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]