

### Summary Information

<b>Module Code</b>	6412ELE
<b>Formal Module Title</b>	Process Control and Applications
<b>Owning School</b>	Engineering
<b>Career</b>	Undergraduate
<b>Credits</b>	20
<b>Academic level</b>	FHEQ Level 6
<b>Grading Schema</b>	40

### Module Contacts

#### Module Leader

Contact Name	Applies to all offerings	Offerings
James Gomm	Yes	N/A

#### Module Team Member

Contact Name	Applies to all offerings	Offerings
Dingli Yu	Yes	N/A

#### Partner Module Team

Contact Name	Applies to all offerings	Offerings
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### Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

### Learning Methods

Learning Method Type	Hours
Lecture	33
Tutorial	11

### Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-CTY	CTY	January	12 Weeks

### Aims and Outcomes

<b>Aims</b>	To appreciate the problems associated with the design of closed-loop control of process systems. To understand the principles of cascade, feedforward and ratio control. To analyse non-linear process systems, systems containing large dead-time and coupled multi-loop systems.
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### Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Identify the principles of cascade, feed-forward and ratio control of process plants, with typical applications
MLO2	Appraise typical components in process systems and develop process models for analysis and controller design
MLO3	Characterise strategies for controlling systems possessing dead-time, inverse response and interaction properties
MLO4	Use computer based software packages for analysis, design and simulation of process control systems

### Module Content

Outline Syllabus
Actuator and sensor dynamics for processes, dynamics of time delay, stability of systems involving time delays, frequency response stability criteria, fitting first and second order models using step tests. Transfer function modelling using linearisation and deviation variables, digital PID control, cascade, ratio, feed-forward + feedback control, internal model control, Smith predictor, multivariable control systems.

### Module Overview

## Additional Information

UNESCO Sustainable Development Goals Quality Education Gender Equality Industry, Innovation and Infrastructure Partnerships for the Goals UK SPEC AHEP 4C Eng. M1 Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering. M2 Formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed. M3 Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed. M5 Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards. M6 Apply an integrated or systems approach to the solution of complex problems. IEng. B1 Apply knowledge of mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study. B2 Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. B3 Select and apply appropriate computational and analytical techniques to model broadly-defined problems, recognising the limitations of the techniques employed. B5 Design solutions for broadly-defined problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards. B6 Apply an integrated or systems approach to the solution of broadly-defined problems.

## Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO3, MLO2, MLO1
Portfolio	Design Assignment	30	0	MLO4