

# Digital Control

## Module Information

2022.01, Approved

### Summary Information

Module Code	7423MEPC
Formal Module Title	Digital Control
Owning School	Engineering
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

### Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

### Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	11
Tutorial	11

### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

### Aims and Outcomes

Aims	To extend concepts of digital control theory into system identification, controller design and self-tuning control techniques for single-input, single-output systems.
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**After completing the module the student should be able to:**

**Learning Outcomes**

Code	Number	Description
MLO1	1	Comprehensively apply the theory of sampled-data systems to complex control problems
MLO2	2	Apply high level system identification techniques and critically analyse their operation
MLO3	3	Design and implement digital and self-tuning controllers
MLO4	4	Judiciously apply proprietary computer software for discrete-time identification and controller design

**Module Content**

Outline Syllabus	Discrete-time systems: sampling and reconstruction, open loop and closed loop discrete time analysis, system time response characteristics, poles and zeros, stability analysis techniques. System identification: ARX/ARMAX models, least squares, model validation, recursive parameter estimation algorithms (e.g. RLS, ELS), implementation Digital control: control system specifications, design techniques (e.g. discretisation, direct design), ringing poles, self-tuning control algorithms (e.g. pole assignment, minimum variance, optimal) and operation. Computer packages will be used to gain experience in applying and simulating techniques.
Module Overview	
Additional Information	This level 7 module expands a student's experience of discrete single-input, single-output control systems. The emphasis is on the understanding of design and identification techniques and to be able to apply the techniques both theoretically and practically. United Nations Sustainable Development Goals: 2. Zero Hunger 3. Good Health and Wellbeing 6. Cleaner Water and Sanitation 7. Affordable and Clean Energy 11. Sustainable Cities and Communities

**Assessments**

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO2, MLO3
Report	PC based assignment	30	0	MLO4

**Module Contacts**

**Module Leader**

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

**Partner Module Team**

Contact Name	Applies to all offerings	Offerings
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