

Digital Control

Module Information

2022.01, Approved

Summary Information

Module Code	7407ELE
Formal Module Title	Digital Control
Owning School	Engineering
Career	Postgraduate Taught
Credits	10
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	22
Tutorial	22

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	Critically analyse the theory of sampled-data control systems
MLO2	2	Apply system identification techniques and critically evaluate their operation
MLO3	3	Design, analyse and implement digital and self-tuning controllers
MLO4	4	Use computer software to critically evaluate 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.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	100	2	MLO1, MLO2, MLO3, MLO4

Module Contacts