Liverpool John Moores University

Title:	CONTROL SYSTEMS
Status:	Definitive
Code:	**6525ENGIOM** (117275)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Russell English	Y
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Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	50
Total Learning Hours:	200	**Private Study:**	150		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	36
Practical	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		50	2
Essay	Essay		25	
Essay	Essay		25	

Aims

To extend the basic concepts of control in level 5 in the design and analysis of continuous and digital control systems

Learning Outcomes

After completing the module the student should be able to:

1 Analyse and design control systems employing frequency analysis
2 Construct root locus of closed-loop systems and design systems using root locus technique
3 Apply the state space concept to analyse linear systems and design state feedback control with pole-placement method
4 Analyse and synthesize sampled-data systems in the z-domain
5 Design and simulate control systems using computer software, e.g. Matlab/Simulink, Scilab

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Exam	1	2	3	4
Essay 1	1	5		
Essay 2	2	4	5	

Outline Syllabus

Root locus: root locus concepts and construction. analysis and design with root locus. Frequency analysis: Nyquist criterion, Bode plots, design criteria in frequency domain.
State space: state variables and state space models, controllability and observability, pole placement by state feedback, state observers.
Digital systems: sampled-data systems, pulse transfer function, closed-loop transfer function, stability analysis, implementation of digital controllers, discrete system simulation

Learning Activities

Combination of lectures and laboratory work

Notes

This level 6 module extends level 5 concepts into continuous control design using frequency response, root locus and state space methods. It also extends level 5 concepts into discrete control system modelling and controller design by mathematical analysis and synthesis.