Liverpool John Moores University

Title:	CONTROL SYSTEMS
Status:	Definitive
Code:	**6002ENG** (105534)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Barry Gomm	Y

Academic Level:	FHEQ6	**Credit Value:**	24	**Total Delivered Hours:**	51
Total Learning Hours:	240	**Private Study:**	189		

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	AS1	Examination	70	3
Essay	AS2	Coursework	15	
Essay	AS3	Coursework	15	

Aims

To extend the basic concepts of control in level 2 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 dynamic compensation employing frequency analysis
2 construct root locus of closed-loop system response and design systems using root locus technique
3 examine and evaluate system stability
4 apply the state space concept and characteristics of linear systems
5 apply state feedback control with pole-placement method
6 obtain discrete transfer functions for dynamic systems
7 analyse and synthesize sampled-data systems in the z-domain
8 design and simulate control systems using computer software, e.g. Matlab/Simulink

Learning Outcomes of Assessments

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

EXAM	1	2	3	4	5	6	7
CW	1	2	8				
CW	6	7	8				

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, diagonalisation of system matrix, solving state equation, controllability and observability, pole placement by state feedback, state observers.
Digital systems: sampled-data systems, pulse transfer function, closed-loop transfer function, stability analysis, direct synthesis method, discrete system simulation.

Learning Activities

Combination of lectures and laboratory work

Notes

This level 3 module extends level 2 concepts into continuous control design using frequency response, root locus and state space methods. It also extends level 2 concepts into discrete control system modelling and controller design by mathematical analysis and synthesis.