Liverpool John Moores University

Title:	CONTROL SYSTEMS DESIGN
Status:	Definitive
Code:	**6021ENG** (106358)
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:**	74
Total Learning Hours:	240	**Private Study:**	166		

Delivery Options
Course typically offered: Summer

Component	Contact Hours
Lecture	24
Practical	24
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	50	2
Report	AS2	Laboratory and formal report	50	

Aims

To extend the basic concepts of control into continuous design methodology, digital control systems and multi-variable systems.
To equip students with a comprehensive knowledge of the synthesis, analysis and design of continuous and digital control systems and multi-variable systems.

Learning Outcomes

After completing the module the student should be able to:

1	Design using frequency responses techniques for control systems
2	Design using the root-locus method for single-variable control systems
3	Analyse systems using state variables
4	Confidently apply CACSD packages to complex design problems
5	Specify a Discrete Controller to a design specification
6	Utilise empirical controller tuning methods

Learning Outcomes of Assessments

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

EXAM	1	2	3
Laboratory and formal report	4	5	6

Outline Syllabus

PID controller design. Frequency analysis and design. Root locus design. State variable analysis and design. State models. Diagonalisation. Controllability and observability. Pole placement by state feedback. Design of digital controllers: Design to specification - deadbeat, pole assignment, first and second order normalised transient responses. Simulation of process plant and plant control systems.

Learning Activities

Lecture, tutorials and laboratories

Notes

This level 3 module extends level 2 concepts into continuous control design using frequency response, root locus and state variable methods. It extends level 2 concepts into discrete control system design by mathematical analysis and synthesis. It also introduces discrete time modeling and the concepts of self-tuning control.