Liverpool John Moores University

Title:	Applied Control
Status:	Definitive
Code:	**5083ENG** (116967)
Version Start Date:	01-08-2018
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Ronan McMahon	Y
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Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	62
Total Learning Hours:	200	**Private Study:**	138		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	36
Practical	12
Tutorial	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		60	2
Report	Report 1		20	
Report	Report 2		20	

Aims

To develop an understanding of components and the principles of control systems, basic design and analysis techniques, and practice some control applications to industrial systems.

Learning Outcomes

After completing the module the student should be able to:

1	Demonstrate understanding of the basic concepts of dynamic system response and closed loop control.
2	Develop models for simple dynamic plant with Matlab/Simulink
3	Demonstrate ability to design controllers and analyse system stability
4	Simulate control systems with Matlab/Simulink and assess system performance
5	Demonstrate understanding of system components and controller realization

Learning Outcomes of Assessments

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

Exam	1	2	3	4	5
Report 1	2	4			
Report 2	1	5			

Outline Syllabus

Introduction: control system structure including sensors, controllers, actuators and plants. Matlab/Simulink.
Modelling & Simulation: introduce transfer function models for different plants, how to use Matlab/Simulink to model a dynamic system, how to simulate a control system with Matlab/Simulink for system analysis and performance assessment.
Time response analysis: characteristics of first order and second order systems, response to step and ramp input.
Controller design: design specification in time domain, functions of P, I, and D control, empirical controller parameter setting method.
Industrial control: implementation of PID controllers, proportional and derivative kicks, integral controller wind-up and anti-wind-up method.
Control system hardware design.
Stability: concept of absolute and relative stability, stability analysis.

Learning Activities

By a series of lectures, tutorials, and computer simulations.

Notes

This module develops an understanding of the modelling, application and design of control systems, with Matlab/Simulink.