Liverpool John Moores University

Title:	MEASUREMENT AND CONTROL
Status:	Definitive
Code:	**5006ENG** (105501)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Dingli Yu	Y

Academic Level:	FHEQ5	**Credit Value:**	12	**Total Delivered Hours:**	26
Total Learning Hours:	120	**Private Study:**	94		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	20
Practical	4

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	2
Essay	AS2	Coursework, Laboratory based	15	
Essay	AS3	Coursework 2	15	

Aims

To develop an understanding of the application and design of measurement systems and techniques.
To introduce the principles of control systems, their analysis and design.

Learning Outcomes

After completing the module the student should be able to:

1	explain the basic concepts of dynamic system response and closed loop control
2	develop models for simple dynamic plant
3	select sensors and design signal processing circuits for some simple measurement.
4	demonstrate ability to design controllers and analyse system stability for simple linear systems.
5	explain the operation of and be able to design PID controllers

Learning Outcomes of Assessments

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

EXAM	1	2	3	4	5
CW	3				
CW	4	5			

Outline Syllabus

Introduction: concepts of transient and steady-state response, open-loop and closed-loop control.
Modelling and Simulation: differential equations, transfer functions, system simulation with Matlab/Simulink.
Measurement: Concept of sensors, transducers and measurement systems, static characteristics of sensors, design of signal conditioning circuits, temperature, force and displacement measurement.
Time response analysis: characteristics of first order and second order systems. Response to step and ramp input.
Controller design: design specification in time domain, direct synthesis method, functions of PID control, empirical controller parameter tuning.
Stability: concept of absolute and relative stability, system poles, Routh's stability criterion.

Learning Activities

By a series of lectures, tutorials, and laboratory experiments.

Notes

This module develops an understanding of the modelling, application and design of control systems, using quantitative analysis.