

Liverpool John Moores University

Title: INSTRUMENTATION AND CONTROL SYSTEMS
Status: Definitive
Code: **5001ENG** (105484)
Version Start Date: 01-08-2016

Owning School/Faculty: Electronics and Electrical Engineering
Teaching School/Faculty: Electronics and Electrical Engineering

Team	Leader
Christopher Wood	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	18
Practical	3
Tutorial	3

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	2
Essay	AS2	Assignment	15	
Essay	AS3	Assignment	15	

Aims

To introduce the concepts of analogue and digital measurement system, and the fundamental concepts of control and instrumentation of engineering systems.

Learning Outcomes

After completing the module the student should be able to:

- 1 Explain the principles of electronic measurement systems.
- 2 Specify power supply and electronic amplification systems.
- 3 Specify and appreciate the range of sensors for transducers to perform various measurements.
- 4 Explain the function of digital data logging and recording systems.
- 5 Design feedback systems for the control of variables in engineering situations and processes.

Learning Outcomes of Assessments

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

EXAM	1	2	3	4	5
CW	3	4			
CW	2	4	5		

Outline Syllabus

Signal conditioning circuits: Wheatstone Bridge systems. Amplifiers. Operational Amplifiers - modes of operation.

Filters - Techniques. Noise reduction systems.

Review of transducers for temperature, pressure, force, torque, displacement, velocity and acceleration measurements. Digital codes and conversion processes.

DAC and ADC systems. Interfaces for industrial I/O. Data logging and data acquisition systems. Value of digital signal processing.

PC-based systems. Review of Boolean logic for digital systems.

Software techniques for instrumentation and control.

Importance of the compatibility in the information flow from transducer through signal conditioning and processing of data to control and analysis.

Learning Activities

Lectures, tutorials and laboratory work.

Notes

This module provides the basic technical expertise to allow the student to specify instrumentation systems for controlling processes. It also provides a firm foundation and lead-in to further studies in control engineering at a higher level.