

Liverpool John Moores University

Title: Introduction to Measurement Control and Instrumentation
Status: Definitive
Code: **4040ENG** (116941)
Version Start Date: 01-08-2016

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

Team	Leader
Ronan McMahon	Y

Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 57
Total Learning Hours: 200 **Private Study:** 143

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	22
Practical	11
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		50	2
Report	Lab		25	
Report	Simulation		25	

Aims

Students will gain an understanding of the basic concepts and become familiar with basic techniques in measurement, control and instrumentation.

Learning Outcomes

After completing the module the student should be able to:

- 1 Understand specifications and be able to choose sensors for specific applications
- 2 Understand and design simple measurement systems for data acquisition.
- 3 Understand basic concept and techniques in industrial control applications.
- 4 Demonstrate the practical application of some instruments used for measurements.
- 5 Use the computer software, Lab-View, for measurement and control.

Learning Outcomes of Assessments

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

Exam	1	2	3
Report	1	4	
Report	2	5	

Outline Syllabus

Sensors and Transducers: displacement sensors of LVDTs, potentiometers and their load effects; temperature sensors of thermometers, thermistors and thermocouples; strain gauges and force measurement; speed sensors and vibration sensors.

Structure and components of measurement systems; data acquisition; use of Lab-View for data acquisition and data analysis.

Basic control concepts; open-loop and closed-loop control; transient response of first-order and second-order systems; steady state response and steady state error; PID control functions and Ziegler-Nichols controller parameter setting; systems simulation by Lab-View; control systems performance assessment by Lab-view.

Learning Activities

By lectures, tutorials and labs

Notes

This level 4 module will introduce to students basic concepts and techniques of measurement and control, also enable them familiar with and be able to use lab instrumentation and computer software: Lab-View.