Liverpool John Moores University

Title:	Mechatronics for Manufacturing B
Status:	Definitive
Code:	**5506MTC** (125784)
Version Start Date:	01-08-2019
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Frederic Bezombes	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	39
Total Learning Hours:	200	**Private Study:**	161		

Delivery Options
Course typically offered: Non Standard Year Long

Component	Contact Hours
Online	24
Practical	6
Tutorial	9

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	VLE test	25	
Practice	AS2	Practical laboratory work	25	
Report	AS3	Work based learning project	50	

Aims

To develop a practical understanding of how sensors and actuators may be used with industrial control systems to operate and monitor manufacturing processes and systems.

Learning Outcomes

After completing the module the student should be able to:

1 Specify the performance characteristics and interface requirements of a sensor to be used in an automated manufacture application
2 Specify the performance characteristics and power requirements of an actuator to be used in an automated manufacture application.
3 Design and implement a program on a simple micro-controller to control a simple manufacturing process using data from sensors

Learning Outcomes of Assessments

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

VLE test	1	2	
Laboratory work	3		
Report on WBL project	1	2	3

Outline Syllabus

The list below provides an overview of topics which may be covered in this module:

Sensors
Temperature ; Position, Displacement and Velocity ; Acceleration ;Pressure & Force ; Fluid Flow Rates ; Smart sensors (eg RFID).
Signal Type : Analogue ; Digital.
Characteristics ; Range & Span ; Sensitivity ; Precision, Accuracy, Repeatability.

Actuators and Indicators
Electro-mechanical actuators, motors ; solenoids.
Indicators and Displays.

Embedded Systems Hardware
Micro-controllers.
Characteristics of I/O ; Analogue Voltage (e.g. Typical Ranges: 0-5v, +/-10v) ; Digital (e.g. Typical Voltages: 3.3v, 5v, 12v, 24v).
Serial Interfaces : i2c and UART
Signal Conditioning & Filtering : Amplifiers ; Filters ; Protection

Programming mirco-control systems.
Common programming design patterns using While loops and conditional statements ; Reading from, and writing to hardware ports.

Control
Control Objectives ; Set-point ;Tracking ; Stabilisation.
Closed-loop Control ; Feed-forward control ; ON/OFF Control.

Learning Activities

Online lectures and tutorials, campus based tutorials, campus based practical activity, work based learning

Notes

This module incorporates elements of flipped delivery in order to encourage engagement. The source of primary knowledge for this module will be via material made available through the VLE, while understanding will be developed through tutorials and significant practical content as well as a work based learning activity.