

Liverpool John Moores University

Title: Mechatronics 4 - Programming for Manufacturing
Status: Definitive
Code: **5002AMCPD** (126495)
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:** 10 **Total Delivered Hours:** 23
Total Learning Hours: 100 **Private Study:** 77

Delivery Options

Course typically offered: Summer

Component	Contact Hours
Online	12
Practical	6
Tutorial	5

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Practice	AS1	Practical laboratory work and report	100	

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 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:

Laboratory work & report 1

Outline Syllabus

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

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 related learning

Notes

This is a single module CPD programme code 36253.

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 related learning activity.

Candidates applying for the module must hold the prerequisite relevant engineering

qualifications at Level 3 totalling at least 90 credits. In addition, many will already have a HE level qualification and may use this CPD module to extend or update their existing skill set.

Intake entry point for study onto the CPD module will occur in summer.

The CPD module will not have any formal PSRB accreditation.

Subject benchmark statement - Aligns to Engineering Council UK SPEC

The module is a CPD version based on part of 5506MTC, which is part of the Advanced Manufacturing BEng.

The module will be delivered by remote study of on-line lecture content, plus a campus-based practical lab activity. Delivery of the module is intended to last approximately 12 weeks.

Learners are allocated a personal tutor, who may be drawn on to deal with any support requirements they may have. This support is delivered virtually using online virtual tutorial sessions.

Formative assessment will be facilitated through tutorial feedback, plus through engagement with online study material and assessment tasks.

The programme is assessed and run in line with the Academic Framework (<https://www.ljmu.ac.uk/about-us/public-information/academic-qualityandregulations/academic-framework>).

The methods for improving the quality and standards of learning are as follows:

- Continuous Monitoring and Enhancement
- Liaison and feedback from the students
- Reports from the External Examiner
- Programme team ensuring the module reflects the values of the current teaching and learning strategy
- Module/Programme Leader updating knowledge and skills to ensure these remain current and relevant.

As the content of this CPD is derived from the Advanced Manufacturing BEng, it will share the same external examiner as that programme.