

## Liverpool John Moores University

Title: Manufacturing Processes and Industrial Automation

Status: Definitive

Code: **6512USST** (126450)

Version Start Date: 01-08-2021

Owning School/Faculty: Engineering

Teaching School/Faculty: University of Shanghai For Science and Technology

Team	Leader
Rob Darlington	Y
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<b>Academic Level:</b>	FHEQ6	<b>Credit Value:</b>	10	<b>Total Delivered Hours:</b>	41
<b>Total Learning Hours:</b>	100	<b>Private Study:</b>	59		

### Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	6
Tutorial	11

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	2
Portfolio	AS2	Portfolio	30	

### Aims

*This module will deliver a broad introduction to industrial automation, and cover policy and logistical considerations that drive process solutions. The participants will work on automation and assembly problems and cultivate a deep understanding of electronic, electrical and pneumatic control.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Appraise the characteristics of the elements of automation systems including material planning and control policies
- 2 Critically evaluate the social and economic impact of industrial automation
- 3 Critically analyse automation problems and design suitable assembly processes solutions
- 4 Appraise the electronic, electrical and pneumatic devices needed to control industrial equipment
- 5 Appraise the basic concepts of dynamic system response and closed loop control
- 6 Simulate the behaviour and tuning of PID controllers

## Learning Outcomes of Assessments

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

Examination	1	2	3	4	5	6
Portfolio	1	2	3	4	5	6

## Outline Syllabus

### *Manufacturing Automation*

*Operations planning, lean manufacturing, inventory control and scheduling. Principles of production layout, manual assembly lines, automated assembly systems, cellular manufacturing.*

*The automation of assembly processes, mechanical, flexible and hybrid systems, flexibility in assembly. The systematic evaluation of product suitability for flexible assembly operations.*

*Material handling and identification technology.*

*Quality systems and inspection technologies.*

### *Process Control*

*Introduction to Control Systems including systems models and PID Control.*

*Use of LabView for control system analysis.*

### *Fluid Power Systems*

*Automation components and sensing devices*

*Drive systems and PLC control of automated systems*

*Robot systems: kinematics, dynamics and control. Sensor systems: force, vision*

## Learning Activities

Series of lectures and tutorials supported by practical work.

## **Notes**

The module explores modern manufacturing principles and provides an understanding of Lean manufacturing, computer integrated manufacturing, automation and the use of control systems in manufacturing.