Liverpool John Moores University

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Title:	Manufacturing Processes and Industrial Automation
Status:	Definitive
Code:	**6112MAN** (121992)
Version Start Date:	01-08-2022
Owning School/Faculty:	Engineering
Teaching School/Faculty:	Engineering

Team	Leader
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Academic Level:	FHEQ6	**Credit Value:**	10	**Total Delivered Hours:**	30
Total Learning Hours:	100	**Private Study:**	70		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	16.5
Practical	6
Tutorial	5.5

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 deleiver 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	Explain the characteristics of the elements of automation systems including material planning and control policies
2	Discuss the social and economic impact of industrial automation
3	Critically analyse automation problems and design suitable assembly processes solutions
4	Understand the electronic, electrical and pneumatic devices needed to control industrial equipment
5	Explain 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.

In this module, the knowledge learning outcomes are K4.