Manufacturing Processes and Industrial Automation

Module Information

2022.01, Approved

Summary Information

Module Code	6112MECH
Formal Module Title	Manufacturing Processes and Industrial Automation
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	11
Online	11
Practical	6
Tutorial	11

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

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.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explain the characteristics of the elements of automation systems including material planning and control policies
MLO2	2	Discuss the social and economic impact of industrial automation
MLO3	3	Critically analyse automation problems and design suitable assembly processes solutions
MLO4	4	Understand the electronic, electrical and pneumatic devices needed to control industrial equipment
MLO5	5	Explain the basic concepts of dynamic system response and closed loop control
MLO6	6	Simulate the behaviour and tuning of PID controllers

Module Content

Outline Syllabus	Manufacturing AutomationOperations 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 ControlIntroduction to Control Systems including systems models and PID Control.Use of LabView for control system analysis.Fluid Power SystemsAutomation components and sensing devicesDrive systems and PLC control of automated systemsRobot systems: kinematics, dynamics and control. Sensor systems: force, vision
Module Overview	This module will deliver a broad introduction to industrial automation, and cover policy and logistical considerations that drive process solutions. You will work on automation and assembly problems and cultivate a deep understanding of electronic, electrical and pneumatic control.
Additional Information	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.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6
Portfolio	Portfolio	30	0	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Xun Chen	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings