

WM2A1-15 Automated Manufacturing Systems

27/28

Department

WMG

Level

Undergraduate Level 2

Module leader

Rob Thornton

Credit value

15

Module duration

10 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module explores the technologies and principles behind modern automated manufacturing systems, incorporating discrete event simulation (DES) as a key method for modelling and optimizing these systems. Learners will gain exposure to various industrial automation practices, covering robotics, automated material handling, assembly lines, and production scheduling. The module also addresses the role of sustainability, focusing on how efficient automated systems can reduce environmental impact while enhancing productivity.

Module aims

The aim of this module is to provide students with a thorough understanding of the design, control, and optimization of automated manufacturing systems. The module aims to equip students with the tools and skills necessary to analyse, improve, and sustainably manage automated manufacturing processes.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Discrete event modelling,
Automated assembly system optimisation,
Lean principles in automated manufacturing,
material planning and control.
MRP/ERP/MES systems

Learning outcomes

By the end of the module, students should be able to:

- Describe the characteristics of automation systems management, including material planning and control, and the integration of manufacturing resource planning (MRP), manufacturing execution system (MES), and enterprise resource planning (ERP) systems in automated manufacturing [AHEP:4-C13].
- Analyse automation solutions to design suitable production/assembly systems, considering the role of robotics and automated material handling in manufacturing sustainability [AHEP:4-C7].
- Apply discrete event modelling to simulate automated manufacturing systems and assess production line efficiency [AHEP:4-C5].
- Evaluate the sustainability impacts of different automation solutions and their effectiveness in enhancing quality in automated manufacturing systems, using the outputs from discrete event simulations [AHEP:4-C14].

Indicative reading list

[Reading lists can be found in Talis](#)

Subject specific skills

Automation System Design and Analysis
Smart Manufacturing Integration
Human-Robot Collaboration
Sustainable Automated Manufacturing
Discrete Event Modelling

Transferable skills

This module will contribute to the development of the following from the Warwick Core Skills framework:

Critical Thinking: Interpreting, analysing
Problem Solving: Problem creation
Teamworking: Collaboration
Digital Literacy: IT skills

Professionalism: Attention to detail
Sustainability: Community citizenship

Study

Study time

Type	Required
Lectures	12 sessions of 1 hour (8%)
Seminars	12 sessions of 1 hour (8%)
Practical classes	6 sessions of 1 hour (4%)
Online learning (independent)	30 sessions of 1 hour (20%)
Private study	30 hours (20%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

Online learning (independent): Engagement with provided study materials and signposted resources - review, interpretation and application to example problems and case studies.

Private study: Creation of own tools and resources - e.g. theoretical / physical models, computational simulations, digital design artefacts, portfolio evidence etc. relevant to subject.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A

	Weighting	Study time	Eligible for self-certification
Assessment component			
Assessment 1	30%	18 hours	Yes (extension)

	Weighting	Study time	Eligible for self-certification
Individual report on the analysis of a manufacturing system case study, identifying inefficiencies and proposing strategies to incorporate automation, considering operational, sustainability, and cost-effectiveness perspectives.			
Reassessment component			
Assessment 1 reassessment			No
Individual report on the analysis of a manufacturing system case study, identifying inefficiencies and proposing strategies to incorporate automation, considering operational, sustainability, and cost-effectiveness perspectives.			
Assessment component			
Assessment 2	70%	42 hours	No
Group portfolio comprising report and working simulation model of an automated manufacturing system. The model will incorporate and analyse key factors observed in real-world systems, and their effect on system performance and quality. Subject to peer marking in line with WMG policy.			
Reassessment component			
Assessment 2 reassessment			No
Individual portfolio comprising report and working simulation model of an automated manufacturing system. The model will incorporate and analyse key factors observed in real-world systems, and their effect on system performance and quality.			

Feedback on assessment

Formative: Verbal feedback during interactive class sessions and practical sessions; Verbal feedback during ad hoc meetings.

Summative: Written feedback and marks aligned with University 20 point marking scale.

Availability

There is currently no information about the courses for which this module is core or optional.