

WM3G5-15 Manufacturing System Planning and Control

27/28

Department

WMG

Level

Undergraduate Level 3

Module leader

Mukund Janardhanan

Credit value

15

Module duration

14 weeks

Assessment

100% coursework

Study locations

University of Warwick main campus, Coventry Primary

Distance or Online Delivery

Description

Introductory description

The course will provide an in-depth review of Industrial Engineering tools/techniques such as material flow, layout design and scheduling aspects within a manufacturing planning and control paradigm, covering both foundational and advanced methodologies. Students will gain insights into the dynamic landscape of decision-making in manufacturing, enhancing their ability to navigate and optimise production processes.

Relevant Apprenticeship Standard ST0025.

This module is linked to C1, C3, C4, C5 and C6 of AHEP4.

LO1: C1, C4; LO2: C1, C5; LO3: C1, C3, C6; LO4: C1, C3, C5; LO5: C4, C5;

[Module web page](#)

Module aims

This module is designed to equip students with a comprehensive understanding of the fundamental factors influencing decision-making for manufacturing managers. Students will gain

an appreciation of the ways in which tools and techniques in manufacturing planning and control can be used to fully support the industry objectives. Opportunities are provided for students to explore applications of the tools and techniques in different situations, in order to understand their use and effectiveness.

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.

- Method Study - Evaluation and Improvement Opportunities
- Facilities Layout Design – Key Drivers
- Work Measurement Techniques – DTM, AS, PMTS,
- Manufacturing System Optimisation
- Ergonomics physical/cognitive
- Job Specification Analysis
- Principles of Discrete Event Simulation
- Cyber Physical Manufacturing Systems

Learning outcomes

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

- Analyse and apply various planning strategies to optimize manufacturing systems [AHEP:4- C1, C4]
- Critically assess the strategic principles of industrial engineering in design of manufacturing systems [AHEP:4- C1, C5]
- Apply analytical techniques to evaluate the performance of a manufacturing system [AHEP:4- C1, C3 and C6]
- Apply appropriate discrete event modelling techniques to represent manufacturing processes, resources and constraints [AHEP:4- C1, C3 and C5]
- Evaluate the application of digital tools for planning and control in future manufacturing systems [AHEP:4- C4, C5]

Indicative reading list

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

[Specific reading list for the module](#)

Subject specific skills

- Translate conceptual ideas or technical requirements into developmental outcomes or operational designs or specifications for systems or components to solve manufacturing challenges such as compliance, technology, technical or physical challenges (S1 from ST0025)
- Select, use and apply approved problem-solving methods to solve complex problems and

determine appropriate solutions or actions such as Define, Measure, Analyse, Improve, and Control (DMAIC), Failure Mode Effects Analysis (FMEA) or Plan-Do-Check-Act (PDCA) (S2 from ST0025)

- Manage assigned projects or programmes of work to meet the required specification, taking into account factors such as resource requirements, safety, quality, cost and performance or sustainability criteria for projects such as design or upgrade of new plant/equipment, installation/commissioning of plant and equipment or maintenance, repair or upgrading of plant/equipment (S6 from ST0025)
- Identify resources, such as digital tools or technologies, human, equipment, materials or data, to complete design and development projects or programmes of work (S9 from ST0025)

Transferable skills

*Critical Thinking- Recognise patterns, themes and key messages from sometimes confused and incomplete data. Make informed decisions on the value of a range of sources allowing an evidence based conclusion based on this analysis.

*Problem-solving- Use rational and logical reasoning to deduce appropriate and well-reasoned conclusions. Retain an open mind, optimistic of finding solutions, thinking laterally and creatively to look beyond the obvious.

*Team work- Operate within, and contribute to, a respectful, supportive and cooperative group climate. Sensitive to the impact of actions on others.

*Information Literacy- Critical awareness of how information is gathered, used, managed and synthesised. Understanding of the relative value of different sources and the importance of provenance. The systematic collection, analysis and evaluation of information in the investigation of a topic.

*Professionalism- Prepared to operate autonomously. Aware of how to be efficient and resilient. Manages priorities and time. Self-motivated, setting and achieving goals, prioritising tasks.

Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (13%)
Practical classes	4 sessions of 1 hour (3%)
Work-based learning	15 sessions of 1 hour (10%)
Online learning (scheduled sessions)	3 sessions of 1 hour (2%)
Other activity	3 hours (2%)
Private study	45 hours (30%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

Students encouraged to review online material, reading list and Moodle Quizzes.

Other activity description

3 hours on online support/consultancy before assessment.

Work-based learning details of 15 hours is as follows:

15 hours in the module will be used for gathering information regarding the application of simulation techniques from the workplace and documenting it for the assessment.

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			
Individual Report Critically analyse different manufacturing planning and control strategies adopted in their workplace and develop proposal on how new techniques can be applied to create and sustain competitive advantage in the market.	60%	36 hours	Yes (extension)

Reassessment component

Individual Report Critically analyse different manufacturing planning and control strategies adopted in their workplace and develop proposal on how new techniques can be applied to create and sustain competitive advantage in the market.	No
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Assessment component

Individual Report-	40%	24 hours	Yes (extension)
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	Weighting	Study time	Eligible for self-certification
Simulation			
Group activity on the simulation exercise and individual report. Report contains two parts: First part will be common for all students based on the simulation results and second part will contain individual data analysis on the conducted activity.			
Students work in groups of 3 (exceptionally 2) but submit it individually. No peer marking is expected.			
Reassessment component			
Individual Resit Report			No
Critical analysis of the simulation exercise related to a given manufacturing case study in a report format.			

Feedback on assessment

Formative Feedback:

- Automated individual feedback on online revision quizzes
- Verbal formative feedback during seminar sessions

Summative Feedback:

- Written individual feedback will be provided for both the assessments

Availability

Courses

This module is Core for:

- Year 4 of UWMS-H7C1 Undergraduate Applied Professional Engineering (Manufacturing Engineer)
- Year 4 of DWMS-H7C5 Undergraduate Applied Professional Engineering (Manufacturing Engineer) (Degree Apprenticeship)