# WM9RV-15 Digital Planning and Scheduling in Manufacturing Systems

## 27/28

**Department**
WMG
**Level**
Taught Postgraduate Level
**Module leader**
Mukund Janardhanan
**Credit value**
15
**Assessment**
100% coursework
**Study location**
University of Warwick main campus, Coventry

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## Description

## Introductory description

This module explores advanced concepts in planning and scheduling within manufacturing systems, focusing on the analysis and optimisation of complex production environments. Students will engage with factory simulation models, ERP/MRP systems, and data-driven decision-support tools to evaluate workflows, allocate resources, and develop operational strategies. The module also addresses the integration of human factors, sustainability, and resilience, providing a holistic perspective on managing manufacturing systems in dynamic and uncertain contexts. Through applied projects and case studies, students will develop the skills to generate insights and support evidence-based decision-making in real-world industrial scenarios.
When this module is delivered on any overseas programme, dual degree programme, it is delivered in a 2-week block rather than over 4 weeks.

## Module aims

The aim of this module is to equip students with the knowledge and practical skills to plan, schedule, and optimise manufacturing systems, enabling them to analyse complex production challenges and make informed, evidence-based decisions. Students will learn to apply simulation, ERP/MRP, and data-driven methods to evaluate alternatives and support operational and strategic planning, while considering human, ethical, and sustainability factors within industrial environments.

## 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.

Planning and scheduling in manufacturing systems
Push vs Pull Systems
Short-term vs Long-term planning
Applying ERP/MRP tools for planning and scheduling decisions
Using simulation outputs to support planning & scheduling decisions
Planning under dynamic conditions

## Learning outcomes

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

- Analyse and evaluate manufacturing systems to determine optimal planning and scheduling strategies under uncertainty, variability, and dynamic production conditions.
- Develop and apply factory simulation models to solve planning and scheduling problems, generate experimental results, and support data-driven decision-making.
- Apply relevant ERP/MRP and data-driven tools to enhance planning, scheduling, and resource allocation in manufacturing systems.
- Assess the role of humans, sustainability, and resilience in manufacturing systems, considering ethical, social, and operational implications in planning and scheduling decisions.

## Indicative reading list

Reading lists can be found in Talis

Specific reading list for the module

## Subject specific skills

Students will develop the ability to analyse and model manufacturing systems using planning, scheduling, ERP/MRP, and simulation tools. They will gain practical skills in applying data-driven methods to support resource allocation and operational decision-making. Students will also learn to evaluate planning solutions with consideration for human, sustainability, and resilience factors in industrial environments.

## Transferable skills

Students will develop strong analytical, problem-solving, and decision-making skills through evaluating complex operational scenarios. They will enhance their digital literacy by working with simulation, data analytics, and planning tools, as well as improve their communication skills through presenting evidence-based recommendations.

## Study

## Study time

| Type | Required |
|---|---|
| Lectures | 20 sessions of 1 hour (50%) |
| Seminars | 10 sessions of 1 hour (25%) |
| Online learning (independent) | 10 sessions of 1 hour (25%) |
| Total | 40 hours |

## Private study description

Students are expected to engage in independent study to consolidate and extend their understanding of planning, scheduling, ERP/MRP, and simulation concepts. This includes reading textbooks and research papers, completing software-based exercises and analysing case studies

## Costs

| Category | Description | Funded by | Cost to student |
|---|---|---|---|
| IT and software | | Department | £0.00 |

## 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: Individual Report- Simulation | 30% | 18 hours | Yes (extension) |
| Develop and analyse a discrete-event simulation model to evaluate operational performance. | | | |
| **Reassessment component** | | | |
| Resubmission Individual | | | No |

| | Weighting | Study time | Eligible for self-certification |
|---|---|---|---|
| Report- Simulation | | | |

Develop and analyse a discrete-event simulation model for a different manufacturing or service process, demonstrating the ability to apply simulation techniques to evaluate and improve system performance.

**Assessment component**

| | | | |
|---|---|---|---|
| Assessment 2- Individual Report | 70% | 42 hours | Yes (extension) |

Critically analyse a complex industrial planning and scheduling case study using ERP/MRP and data-driven tools while considering human, sustainability, and resilience factors. Students are expected to integrate quantitative analysis, simulation insights, and contemporary literature to produce actionable, evidence-based recommendations suitable for real-world industrial decision-making.

**Reassessment component**

| | | | |
|---|---|---|---|
| Reassessment - Individual Report | | | No |

For the reassessment component, students will work on a different industrial planning and scheduling case study. The focus remains on using ERP/MRP systems and data-driven tools, integrating analysis and literature to produce actionable recommendations, but the scenario and data will differ from the main assessment.

### Feedback on assessment

Formative Feedback:

- Verbal formative feedback during sessions
  Summative Feedback:
- Written individual feedback will be provided for both the assessments

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## Availability

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