Module Specification

Smart Factory Modelling and Simulation

Version: 2025-26, v1.0, 15 Jun 2023

Contents

Part 1: Information

Module title: Smart Factory Modelling and Simulation

Module code: UFMF71-15-3

Level: Level 6

For implementation from: 2025-26

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: The Smart Factory Modelling and Simulation module is designed to provide students with the skills and knowledge to model and simulate smart factories using advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and data analytics. The module will cover the basics of smart factory design and the technologies used in these systems, as well as the tools and techniques used to model and simulate these systems.
Throughout the module, students will have the opportunity to work on real-world

modelling and simulation projects, allowing them to apply their knowledge and skills in a practical setting. The module will also include guest lectures from industry experts and visits to smart factories to give students a firsthand look at how these systems are designed and operated.
Upon completing the Smart Factory Modelling and Simulation module, students will be able to understand the basics of smart factory design and the technologies used in these systems, design smart factory systems using modelling languages, use simulation tools to test and evaluate the performance of smart factory systems, and apply their knowledge and skills to real-world modelling and simulation projects in the field of smart factories. They will also be able to understand the ethical and privacy considerations involved in designing and operating smart factories and communicate their designs and simulation results effectively to both technical and non-technical audiences.

Features: Not applicable

Educational aims: The educational aim of the Smart Factory Modelling and Simulation module is to provide students with the skills and knowledge needed to model and simulate smart factories using advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and data analytics.

Outline syllabus: I. Introduction to Smart Factories
-Basics of smart factory design and the technologies used in these systems
-Types of smart factories and their key components
-Ethical and privacy considerations in the design and operation of smart factories

II. Modelling Languages for Smart Factories
-Introduction to modelling software and programming languages
-Designing smart factory systems using these languages
-Best practices for creating effective models

III. Simulation Tools for Smart Factories
-Introduction to simulation tools and their use in testing and evaluating smart factory systems
-Setting up and running simulations
-Analysing and interpreting simulation results

IV. Real-World Modelling and Simulation Projects
-Working on real-world modelling and simulation projects in the field of smart factories
-Applying the tools and techniques learned in the module to solve problems and improve systems
-Communicating findings and insights effectively to both technical and non-technical audiences

V. Guest Lectures and Industry Visits
-Guest lectures from industry experts on the latest trends and challenges in smart factory modelling and simulation
-Visits to smart factories to see these systems in action.

Part 3: Teaching and learning methods

Teaching and learning methods: The Smart Factory Modelling and Simulation module will be taught through a combination of lectures, hands-on exercises, and real-world projects.
Lectures will provide students with a foundation of knowledge on the basics of smart factory design and the technologies used in these systems, as well as the tools and techniques used to model and simulate these systems. These lectures will be supplemented with slides, demos, and other multimedia materials to help students better understand the material.
Hands-on exercises will give students the opportunity to apply what they have learned in a practical setting. These exercises may include working with sample data sets, building and testing smart factory models, and running simulations.
Real-world projects will allow students to work on modelling and simulation problems and projects that are relevant to the field of smart factories. These projects will provide students with the opportunity to apply their knowledge and skills in a practical setting, and to gain experience working on real-world problems.
In addition to lectures, hands-on exercises, and real-world projects, the module will also include guest lectures from industry experts and visits to smart factories. These

activities will provide students with the opportunity to learn from experienced professionals and see smart factories in action in the real world.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Design, test, and evaluate smart factory systems using modelling software and programming languages.

MO2 Identify and apply industry-standard tools and methods for smart factory modelling and simulation.

MO3 Understand the ethical and privacy considerations, and the risks involved in working with smart factory models.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/items/42565d02-cb7b-40c7-8055-55e83ca90335.html?lang=en&login=1

Part 4: Assessment

Assessment strategy: The assessment for this module (for both sit and resit) consists of:

Written Assignment
This Smart Factory Modelling and Simulation module assessment will involve students submitting a written report on their final project. This report will provide detailed documentation of the work completed by the students and will serve as a

reference for future work in the field.

The report should be well-written, clearly structured, and properly formatted. It should also include figures, tables, and other visual aids as appropriate to aid in the understanding of the material.

Practical Skills Assessment

This Time-Controlled assessment for the Smart Factory Modelling and Simulation module will involve students completing a set of tasks within a fixed time period. This assessment will test students' ability to work efficiently and effectively under time pressure.

The tasks for this assessment will be based on the material covered in the module and may include building and testing smart factory models, running simulations, and analysing the results. The tasks will be designed to challenge students and to require them to apply their knowledge and skills in a practical setting.

This assessment will be conducted in a computer lab, and students will be given access to the necessary tools and software to complete the tasks. The time allowed for the assessment will depend on the complexity of the tasks and the learning objectives of the module.

The Time-Controlled assessment will be assessed based on the following criteria:

Completion of the tasks within the time allowed

Accuracy and quality of the work completed

Ability to work efficiently and effectively under time pressure

Overall performance on the assessment.

Assessment tasks:

Written Assignment (First Sit)

Description: This Smart Factory Modelling and Simulation module assessment will involve students submitting a written report on their final project. This report will provide detailed documentation of the work completed by the students and will serve as a reference for future work in the field.

Weighting: 60 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO3

Practical Skills Assessment (First Sit)
Description: This Time-Controlled assessment for the Smart Factory Modelling and Simulation module will involve students completing a set of tasks within a fixed time period. This assessment will test students' ability to work efficiently and effectively under time pressure.
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This assessment will be conducted in a computer lab, and students will be given access to the necessary tools and software to complete the tasks. The time allowed for the assessment will depend on the complexity of the tasks and the learning objectives of the module.
The Time-Controlled assessment will be assessed based on the following criteria:
Completion of the tasks within the time allowed
Accuracy and quality of the work completed
Ability to work efficiently and effectively under time pressure
Overall performance on the assessment.
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Written Assignment (Resit)
Description: This Smart Factory Modelling and Simulation module assessment will involve students submitting a written report on their final project. This report will provide detailed documentation of the work completed by the students and will serve as a reference for future work in the field.

Weighting: 60 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO3

Practical Skills Assessment (Resit)
Description: This Time-Controlled assessment for the Smart Factory Modelling and Simulation module will involve students completing a set of tasks within a fixed time period. This assessment will test students' ability to work efficiently and effectively under time pressure.
The tasks for this assessment will be based on the material covered in the module and may include building and testing smart factory models, running simulations, and analysing the results. The tasks will be designed to challenge students and to require them to apply their knowledge and skills in a practical setting.

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Accuracy and quality of the work completed
Ability to work efficiently and effectively under time pressure
Overall performance on the assessment.
Weighting: 40 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechatronics Engineering [Frenchay] MEng 2023-24

Mechatronics Engineering [Frenchay] BEng (Hons) 2023-24