

WM298-15 Automated 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 covers topics including sensors (e.g., vision systems), communication technologies, programmable logic controllers (PLCs), cyber-security, robot kinematics, and various types of industrial robots. Students will learn about automation's role in improving efficiency, safety, and reliability across industries, as well as ethical considerations in automation and industrial robotics.

Module aims

Application of automation technologies, including sensors, industrial robots, factory communications and PLC programming. It focuses on equipping students to select suitable sensors and industrial robots for various applications, programme PLCs for automation control, and ensure cyber-security within these systems. Also covers industrial communication methods and explores ethical considerations in robotics, preparing students to implement and manage safe automation systems in industrial settings.

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.

Matrices and Vector Algebra
Types of Robot configurations
Robot Kinematics including quaternions
Sensors for automation
Programmable Logic Controllers (PLCs) and ladder logic
Cyber-security for Automation Systems
Industrial and Media Communication Methods
Safety and Ethical Robotics

Learning outcomes

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

- Describe well established automation technology for industrial applications [AHEP:4-C13].
- Select and design appropriate sensors, microcontrollers and programming approaches for industrial applications [AHEP:4-C1, C2, C3].
- Appraise the safety and ethics of new automation applications [AHEP:4- C8].
- Specify and implement security solutions for automation control systems [AHEP:4-C10].

Indicative reading list

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

Subject specific skills

Knowledge and understanding of health & safety and standards in automation applications and design

Ability to be aware of their ethical, social, health and safety, and wider professional engineering responsibilities

Ability to conceive, make and realise a system or process

Knowledge and understanding of risk issues particularly in security.

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

Digital Literacy: IT skills

Professionalism: Attention to detail, Accountability and responsibility

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 study materials - e.g. notes, flashcards, summaries, etc.

Engagement with self-identified materials - industry reports, technical videos, podcasts, journal articles, etc.

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	No
Computer-based exam covering fundamentals of automation technology and ethical considerations.			

Reassessment component is the same

Weighting**Study time****Eligible for self-certification****Assessment component****Assessment 2**

70%

42 hours

Yes (extension)

Individual portfolio documenting the secure implementation of automation to an industry-relevant system.

Reassessment component**Assessment 2 reassessment**

No

Individual portfolio documenting the secure implementation of automation to an industry-relevant system.

Feedback on assessment

Formative: Verbal feedback during interactive class sessions and practical sessions; (Automated) individual feedback for computer-based tests; Verbal feedback during ad hoc meetings.

Summative: Cohort level summary feedback for formal tests / exams; 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.