Programme Specification

Automation and Robotics Engineering {Foundation} [GCET]

Version: 2023-24, v3.0, 27 Mar 2024

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Section 1: Key Programme Details

Part A: Programme Information

Programme title: Automation and Robotics Engineering {Foundation} [GCET]

Highest award: BEng (Hons) Automation and Robotics Engineering

Interim award: BEng Automation and Robotics Engineering

Interim award: DipHE Automation and Robotics Engineering

Interim award: CertHE Automation and Robotics Engineering

Awarding institution: UWE Bristol

Affiliated institutions: Global College of Engineering and Technology (GCET)

Teaching institutions: Global College of Engineering and Technology (GCET)

Study abroad: No

Year abroad: No

Sandwich year: Yes

Credit recognition: No

School responsible for the programme: CATE School of Engineering, College of Arts, Technology and Environment

Professional, statutory or regulatory bodies: Not applicable

Modes of delivery: Full-time, Sandwich

Entry requirements: For the current entry requirements see the UWE public website.

For implementation from: 01 October 2023

Programme code: H67G00

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: The programme is designed to provide the balance of theoretical and practical understanding needed to meet the demands of engineering industries where there is a requirement for engineering practitioners with the skills to work at the interface between hardware and software, and in particular to meet the requirements set by Ministry of Higher Education (MoHE) in Oman for Engineering Graduates.

Features of the programme:

Educational Aims: The General aims of the programme are:

To produce graduates with the capacity to proactively solve problems.

To produce graduates with strong communication skills, who are able to explain their concepts to a diverse audience using a range of media.

To prepare students for progression to further study and/or research into automation and robotic engineering or related disciplines.

To develop students' independent study skills and prepare them for lifelong learning experiences.

The Specific aims of the programme are:

To produce graduates with a broad understanding of the discipline in conjunction with a detailed understanding of their chosen specialism; automation and robotic engineering.

To prepare students for a career in automation and robotics or an allied discipline.

To develop students with a thorough understanding of the technologies, techniques

and theories underpinning effective design, realisation and development of intelligent autonomous engineering systems, and the practical skills used in their creation.

To produce graduates with a sound understanding of the tools and techniques used to support the design and development process behind systems with embedded intelligence.

To produce practitioners with the ability and experience to tackle the cradle-to-grave process of hard automation and robotic development, from requirements capture to testing and delivery.

To produce graduates with a clear sense of user focused design and who possess a range of tools and techniques to uncover and define user requirements.

Programme Learning Outcomes:

On successful completion of this programme graduates will achieve the following learning outcomes.

Knowledge and Understanding

A1. Knowledge and understanding of scientific principles and methodology necessary to underpin their education in automation and robotic Engineering.

A2. The mathematical principles necessary to underpin their education in robotics and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.

A3. The requirement for engineering activities to promote sustainable development

Intellectual Skills

B1. Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of automation and robotic

B2. Understanding of engineering principles and the ability to apply them to analyse key engineering processes

B3. Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modeling techniques

B4. Understanding of and ability to apply a systems approach to hard automation and robotics problems

B5. Creating and providing real-world solutions to engineering problems in uncertain environment to complete the design

B6. Gaining proficiency in operating an automation system or a robot manipulator or a mobile robot using supplied system software

B7. Being able to program (code) an automation system or a robot manipulator or a mobile robot using a high-level programming language and library

Subject/Professional Practice Skills

C1. Ability to apply quantitative methods and computer software relevant to automation and robotics in order to solve problems

C2. Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues

C3. Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal

C4. Knowledge of management techniques, which may be used to achieve engineering objectives

C5. Workshop and laboratory skills

C6. Understanding of appropriate codes of practice and industry standards

C7. Understand customer and user needs and the importance of considerations such as aesthetics

C8. Identify and manage cost drivers

C9. Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues

Transferable Skills and other attributes

D1. Use creativity to establish innovative solutions

D2. Knowledge and understanding of commercial and economic context of engineering processes

D3. Understanding of the need for a high level of professional and ethical conduct in engineering

D4. Understanding of contexts in which engineering knowledge can be applied (e.g. Operations and management, technology development, etc.)

D5. Understanding use of technical literature and other information sources

D6. Awareness of nature of intellectual property and contractual issues

D7. Understanding of appropriate codes of practice and industry standards

D8. Awareness of quality issues

D9. Ability to work with technical uncertainty

D10. Ability to communicate work to technical and non-technical audiences

Assessment strategy: The assessment strategy has been designed to test the programme learning outcomes.

Student support:

Part B: Programme Structure

Year 1

The student must take 120 credits from the modules in Year 1.

Year 1 Compulsory Modules

The student must take 120 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFBG-30-0	Foundation Mathematics: Algebra and Calculus 2023-24	30
UFMFAG-30-0	Foundation Mechanics 2023-24	30

UFCFGK-30-0	Professional and Academic Skills 2023-24	30
UFCEXX-30-0	Program Design and Implementation 2023-24	30

Year 2
The student must take 120 credits from the modules in Year 2.

Year 2 Compulsory Modules
The student must take 120 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFN7-15-1	C Programming 2024-25	15
UFMFR8-15-1	Digital Principles for Robotics 2024-25	15
UFMFJ9-30-1	Engineering Mathematics 2024-25	30
UFMFJ3-30-1	Introduction to Robotics and Electronics 2024-25	30
UFCFE3-15-1	Introductory Artificial Intelligence for Robotics 2024-25	15
UFMFCA-15-1	Practical Electronics 2024-25	15

Year 3
The student must take 120 credits from the modules in Year 3.

Year 3 Compulsory Modules
The student must take 120 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFL9-15-2	Mathematics for Signals and Control 2025-26	15
UFMFR9-15-2	Mechatronics 2025-26	15
UFMFKA-30-2	Microcontrollers Applications Group Lab 2025-26	30

UFMFHM-15-2	Programmable Logic Controller Design 2025-26	15
UFMFHA-15-2	Project Management 2025-26	15
UFMFJA-30-2	Robotic Systems 2025-26	30

Year 4
Full time students must take 120 credits from the modules in Year 4.
Sandwich students must take 15 credits from the modules in Year 4.

Year 4 Compulsory Modules (Full-time)
Full-time students must take 105 credits from the modules in Compulsory Modules (Full-time).

Module Code	Module Title	Credit
UFMFX8-30-3	Engineering Project 2026-27	30
UFCF95-15-3	Entrepreneurial Skills 2026-27	15
UZRSSR-15-3	Ethics of Technology 2026-27	15
UFMFV8-15-3	Group Design and Integration Project 2026-27	15
UFMFC9-15-3	Machine Vision 2026-27	15
UFMFNF-15-3	Probabilistic Robotics 2026-27	15

Year 4 Compulsory modules (Sandwich)
Sandwich student must take 15 credits form the modules in Compulsory modules (Sandwich).

Module Code	Module Title	Credit
UFMF89-15-3	Industrial Placement 2026-27	15

Year 4 Optional Modules (Full-time)
Full-time students must take 15 credits from the modules in Optional Modules (Full-time).

Module Code	Module Title	Credit
UFCFU3-15-3	Advanced Databases 2026-27	15
UFMFH8-15-3	Digital Signal Processing 2026-27	15
UFMF99-15-3	Intelligent and Adaptive Systems 2026-27	15

Year 5
Sandwich students must take 105 credits from the modules in Year 5.

Year 5 Compulsory modules (Sandwich)
Sandwich students must take 105 credits form the modules in Compulsory modules (Sandwich).

Module Code	Module Title	Credit
UFMFX8-30-3	Engineering Project 2027-28	30
UFCF95-15-3	Entrepreneurial Skills 2027-28	15
UZRSSR-15-3	Ethics of Technology 2027-28	15
UFMFV8-15-3	Group Design and Integration Project 2027-28	15
UFMFC9-15-3	Machine Vision 2027-28	15
UFMFNF-15-3	Probabilistic Robotics 2027-28	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

Designed in conjunction with key national and multi-national employers, the programme provides graduates with the mix of skills and capabilities required by Omani business for the specification, design and delivery of systems and solutions, including safety critical systems, as required by the aerospace, automotive, oil, medical, and other industries.

The programme develops technically competent individuals who think, communicate

effectively, conduct inquiry, solve problems, undertake critical analysis and deliver effective automation and robotic systems solutions in a changing business context.

It provides a lifelong learning, emphasising the development of knowledge, skills and professional values essential to the practice of systems development.

The graduates of the Sandwich study mode in this programme have developed a diverse set of employability skills through the use of a substantive work-based experience and demonstrate an understanding of the connection between academic learning and professional practice.

Part D: External Reference Points and Benchmarks

The following reference points and benchmarks have been used in the design of the programme:

QAA UK Quality Code for HE
National qualification framework
Subject benchmark statements
College strategies and policies
Staff research projects

QAA subject benchmark statements:

All modules in the programme have been written to conform to the learning outcomes required by the Engineering Council UK. This is mandatory for accredited engineering programmes. The specific outcomes are derived from the requirements for electronic, digital and mechanical engineering described in The IMechE Handbook of Learning Outcomes for BEng and MEng programmes.

The modules have been designed to ensure adequate and appropriate coverage of these outcomes across the levels of study.

SEEC level descriptors have informed the design of the assessment of the learning outcomes.

College strategies and policies:

This programme addresses the College strategies through the following:

To produce “Able and Ready to Work Graduates”
To develop Distinctive Curriculum.
To establish assessment and feedback processes that enhance and deepen learning.
To promote research-informed education and evidence-based practice that supports an increasingly diverse student body.
To sustain and extend approaches to learning that further enhance the employability of GCET graduates and the career destinations they are able to reach.
To use technology and the campus environment to further enhance the student learning experience and teaching effectiveness within the context of a larger and more diverse student population

Staff research projects:

Research and industrial collaborations are key to several modules including UFMFKA-15-2, UFMFJA-30-2, UFMFV8-15-3, and UFMFX8-30-3.

Employer interaction and feedback: The College works with a number of industrial partners through the Industrial Consultative Committee. Feedback from employers through their sponsored students also helped in the design of this programme. The programme provides part-time and flexible options which ensure an ongoing interaction with regional employers.

What methods have been used in the development of this programme to evaluate and improve the quality and standards of learning? This could include consideration of stakeholder feedback from, for example current students, graduates and employers.

The methods that have been used in the development of this programme include:

Consultation with the Ministry of Higher Education in the Sultanate of Oman.
Consultation with the Ministry of Manpower in the Sultanate of Oman and, in particular, the Engineering human resources needs. Consultation with the University of Sultan Qaboos, the only public University in the Sultanate of Oman.
Consultation with the Directorate of Technical Vocation Education.
Feedback from students sponsored by different industries.
Consideration of the statistics from the National Center for Statistics and Information in the Sultanate of Oman.
Consideration of Oman's Ninth Five-Year Development Plan (2016-2020) where manufacturing has been identified as the top sector for development.

Part E: Regulations

Approved University Academic Regulations and Procedures