Programme Specification

Automation and Robotics Engineering {Foundation} [GCET]

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Section 1: Key Programme Details

Part A: Programme Information

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

Highest 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: No

Credit recognition: Yes

Department responsible for the programme: FET Dept of Engineering Design & Mathematics, Faculty of Environment & Technology

Contributing departments: Not applicable

Professional, statutory or regulatory bodies: Not applicable

Apprenticeship: Not applicable

Mode of delivery: Full-time

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

For implementation from: 01 October 2023

Programme code: H67K00

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 HE Diploma graduates.

The Automation and Robotics Engineering programme produces diploma graduates with a wide range of expertise relevant to the Automation industry. The programme covers a broad range of disciplines such as digital principles for robotics, Introductory to Artificial Intelligence for robotics, Introduction of Robotics and Electronics, Robotic systems, Mechatronics and Programmable logic controllers. A number of developments have occurred in Automation and robotics engineering in recent times, many electrical or electronic devices in industry involve automation and robotics design systems processed by microprocessor or digital integrated circuit. In recognition of this, this programme allows students to develop expertise particularly in system design, microprocessor hardware/software design, automating systems engineering, simulation and modelling techniques.

The programme has been designed to cater for students with both industrial and/or academic backgrounds, to develop problem solving skills and be able to demonstrate leadership in a number of engineering settings.

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 bachelors level 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 HE Diploma 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.

Programme Learning Outcomes

PO1. Apply established embedded intelligence concepts to solve engineering problems involving design, realisation and development that arise across automation and robotic engineering applications and technologies.

PO2. Model appropriate quantitative methods and apply computer software tools for the evaluation, analysis and solution of automation and robotic systems.

PO3. To design and analyse intelligent autonomous and robotic engineering systems and be able to automate and assess technical designs.

PO4. Gain proficiency in operating and programming an automation system or a robot manipulator or a mobile robot using supplied system software.

PO5. Communicate, manage and operate effectively either as individuals or as members of a team.

PO6. Work effectively within the commercial, ethical and regulatory context of engineering processes, including sustainable development, risk management, health and safety and environmental legislation.

PO7. Make considered judgements and decisions on complex engineering issues in which not all facts and consequences are accurately known.

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

Part C: Higher Education Achievement Record (HEAR) Synopsis

Designed in conjunction with key national and multi-national employers, and on successful completion the programme provides individuals 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.

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 IET Handbook of Learning Outcomes for degree 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, and UFMFJA-30-2.

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