



Programme Specification

Automation and Robotics Engineering {Foundation}

[Feb][FT][GCET][4yrs]

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Section 1: Key Programme Details

Part A: Programme Information

Programme title: Automation and Robotics Engineering {Foundation}
[Feb][FT][GCET][4yrs]

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: No

Credit recognition: No

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

Professional, statutory or regulatory bodies: Not applicable

Modes of delivery: Full-time

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

For implementation from: 01 February 2019

Programme code: H67G-FEB-FT-GE-H67G

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 2019-20	30

UFMFAG-30-0	Foundation Mechanics 2019-20	30
UFCFGK-30-0	Professional and Academic Skills 2019-20	30
UFCEXX-30-0	Program Design and Implementation 2019-20	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 2020-21	15
UFMFR8-15-1	Digital Principles for Robotics 2020-21	15
UFMFJ9-30-1	Engineering Mathematics 2020-21	30
UFMFJ3-30-1	Introduction to Robotics and Electronics 2020-21	30
UFCFE3-15-1	Introductory Artificial Intelligence for Robotics 2020-21	15
UFMFCA-15-1	Practical Electronics 2020-21	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
UFMFV7-15-2	Control 2021-22	15
UFMFL9-15-2	Mathematics for Signals and Control 2021-22	15

UFMFR9-15-2	Mechatronics 2021-22	15
UFMFKA-30-2	Microcontrollers Applications Group Lab 2021-22	30
UFMFHM-15-2	Programmable Logic Controller Design 2021-22	15
UFMFJA-30-2	Robotic Systems 2021-22	30

Year 4

The student must take 120 credits from the modules in Year 4.

Year 4 Compulsory Modules

The student must take 105 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFCF95-15-3	Entrepreneurial Skills 2022-23	15
UZRSSR-15-3	Ethics of Technology 2022-23	15
UFMFV8-15-3	Group Design and Integration Project 2022- 23	15
UFMFXD-30-3	Individual Project BEng 2022-23	30
UFMFC9-15-3	Machine Vision 2022-23	15
UFMFNF-15-3	Probabilistic Robotics 2022-23	15

Year 4 Optional Modules

The student must take a minimum of 15 credits from the modules in Optional Modules.

Module Code	Module Title	Credit
UFCFU3-15-3	Advanced Databases 2022-23	15
UFMFH8-15-3	Digital Signal Processing 2022-23	15
UFMF99-15-3	Intelligent and Adaptive Systems 2022-23	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.

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